Shareholder value creation and profit maximizing are among the primary objectives of a firm. Shareholder value creation focuses more on long term sustainability of returns and not just profitability. Rational investors expect good long term yield of their investment. Corporate financial decisions play an imperative role in general performance of a company and shareholder value creation. There have been a number of firms facing financial crisis among them; Mumias Sugar Ltd, Uchumi Supermarkets Ltd and Kenya Airways Ltd. All these companies are quoted at the Nairobi Securities Exchange. Due to declining performance of these companies, share prices have been dropping and shareholders do not receive dividends. This study investigated the effects of financing decisions on shareholder value creation of non-financial firms quoted at NSE for the period 2008-2014. The study was guided by various finance models; which include, Modigliani and Miller, Pecking Order Theory, Agency Free Flow Theory, Market Timing Theory and Capital Asset Pricing Model. The study used general and empirical models from previous studies as a basis for studying specific models which were modified to suit the current study. The study was guided by the positivism philosophy. The study employed explanatory design which is non-experimental. Census design was used as the number of non-financial firms at the time of the study was 40 companies. The data was gathered from NSE handbooks and CMA publications comprising of annual financial statements, income statements and accompanying notes. Ordinary Least Square regression analysis was conducted to examine the effect of various financing decision variables on shareholder value creation. Step wise regression technique was used to test for moderating effect of Gross Domestic Product growth rate. The results revealed that equity financing, debt financing, working capital financing and dividend financing had a statistically significant positive effect on EVA. The study further analyzed sector based differences among companies listed at the NSE. The results indicated significant differences among various sectors in respect to the effects of financing decisions on shareholder value creation. The study found that, the moderating effect
between financing decisions on shareholder value creation and GDP growth rate had a positive and statistically significant effect. Feasible generalized least squares were used to estimate the model. Diagnostic tests were conducted to ensure non-violation of the assumptions of Classical Linear Regression Model. Among the tests conducted; includes panel unit root test, Autocorrelation, Homoskedasticity and Multicollinearity tests. Study model tests showed that, there was non-violation the assumptions and hence the model found fit for further analysis. The study recommends that managers of quoted non-financial companies should strive and practice periodic shareholder value creation analysis for continuous assessment of growth process. The government through the CMA should come up with regulatory framework that guide firm listed in enacted dividend policies. Further it is recommended that shareholder value creation report is enforced as an additional statement published by the firms quoted at the NSE, Kenya. Moreover, the government through Central Bank should employ fiscal and monetary policies aimed at reducing the cost of borrowing.

RESOURCE ISOLATING MECHANISM AND COMPETITIVE ADVANTAGE AMONG COMMERCIAL BANKS IN KENYA

PURITY WAIRIMU NDEGWA-PHD

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Commercial banks in Kenya are facing intense rivalry within the industry. For these banks to survive, it is important that they respond to the changes in the external environment. Competitive advantage which has become the core focus of corporate strategy, has increasingly gained much attention in strategic management and is a concept which enables organizations to survive in the long-run. Studies done on competitive advantage show a number of empirical and theoretical gaps as they concentrated on the resources a firm should have to create competitive advantage but lacked explanation on which resource isolating mechanisms a firm should adopt to sustain the competitive advantage. The main purpose of this study was to establish the effect of resource isolating mechanism on competitive advantage among commercial banks in Kenya. The specific objectives in this study were to determine the effect of economic deterrence, identification of rival competitive advantage and exploitation of opportunities on competitive advantage among commercial banks in Kenya. This relationship was mediated by organizational capabilities and moderated by management characteristic and external environment. Descriptive and explanatory research design was employed in the study. The research population was all 40 commercial banks in Kenya. Purposive sampling was used to select a sample of 160 respondents from the key departments of Finance, Sales and Marketing, Strategy and Operations of all the 40 commercial banks' headquarters in Nairobi. The data collection instrument used was semi-structured questionnaire. The variables characteristics were summarised using descriptive statistics. Hypotheses testing was done to determine the effect of the resource isolating mechanism on competitive advantage. The study found
that economic deterrence was not significant and had negative effect on CA, identification of rival competitive advantage was significant and had positive effect on CA and exploitation of opportunities was significant and had positive effect on CA. There exists a significant partial mediation by organizational capabilities on the relationship between resource isolating mechanism and competitive advantage. The moderating effect of management characteristics was significant, whereas external environment was found not to have moderating effect on the relationship between RIM and CA. The study concluded that there exists a positive effect of resource isolating mechanism on competitive advantage. The study contributes to the body of knowledge as well as policy in terms of understanding the effect of resource isolating mechanism on competitive advantage. This study recommends that it is important for the commercial banks management to implement strategies that reflect the changes in the external environment and appropriate allocation of resources. Commercial bank should also effectively position the banks’ products, build strong customer relationships and focus on competitive activities which create and sustain competitive advantage. Further, the researcher recommends a similar study could be conducted to other sectors other than commercial banks for generalization purposes.

SYSTEMATIC RISK AND PERFORMANCE OF THE STOCK MARKET IN KENYA

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Stock prices in Kenya have been experiencing drastic volatility in the recent past. In the year 2015 alone, the value of the listed companies shrunk by about Ksh 250 billion representing about 25% of the national government annual budget. Performance of stock market is an important proxy of a country’s economic environment. Globally, economists, financial analysts and investors are interested in comprehending the factors that affect the fluctuations of stock markets. When the stock markets operate smoothly and efficiently, they facilitate economic growth and lower business risk. Excessive fluctuations of stock prices (in the financial markets) affects the smooth operation of financial markets and consequently adversely affects the performance of an economy. Rational investors are keen in achieving their maximum expected rate of return of their investments including stocks; they constantly value and revise their portfolio composition so as to maximise their wealth. An effectively diversified portfolio minimises the unsystematic risk hence almost eliminating these risk associated with an individual asset. However systematic risks cannot be managed by simple diversification. Investors therefore need to understand the effect of these systematic risks on the stock performance. The study sought to determine the relationship between systematic risk factors and performance of the stock market in Kenya. The specific objectives of the study were: to establish the relationship between Interest Rates, Foreign Exchange Rate, Inflation, Gross Domestic Product, Trading volumes and
Performance of stock market in Kenya. The study adopted a positivist philosophy and employed a correlation research design. The study targeted all the stock listed in the Nairobi Securities exchange. This study utilized the NSE 20 share index movements to measure the performance of the stock market in Kenya. The study was underpinned by the Efficient Market Hypothesis, Capital Asset pricing Model, Arbitrage Pricing theory, Keynesian theory and Mixture Distribution model as theories and models anchoring the study. The study investigated the long run and the short run relationships between the systematic risks and performance of stock markets in Kenya using ten years (2007 to 2016). The study used time series secondary data from the Central Bank of Kenya, Kenya National Bureau of Statistics and the Nairobi Securities Exchange. The study used cointegration analysis to establish the relationships between the variables of study. In addition Johansen-Julius test of cointegration, Vector Error Correction Model and Granger causality test were used to test the relationships. The study found a significant long run positive relationship between interest rate, exchange rate, inflation, gross domestic product and performance of the stock market in Kenya. The study found a negative significant relationship between commercial bank weighted average lending rate, the trading volumes and the Performance of Nairobi Stock exchange. Growth in Gross Domestic Output was insignificant in explaining the performance of Nairobi stock exchange. In the short run, only three lags of commercial bank weighted lending rate, one lag of Inflation, and three lags of Trading volumes were significant in explaining changes in Nairobi stock exchange. This is an indication that C.B.K should not be keen to increase the CBR because this leads to a decline in stock prices and this discourages potential investors away which is disastrous for the economy. Additionally, the central bank should not be keen on having a target exchange rate for the USD/Ksh because changes in exchange cannot significantly explain the changes in stock price hence such a move would not be very effective. Investment firms, financial analyst should use past data on 91 Treasury bills rate, Inflation, Trading volumes to predict future performance of stock exchange for the benefit of investors.

DISTINCTIVE COMPETENCIES AND ORGANIZATIONAL PERFORMANCE IN THE ALCOHOL MANUFACTURING FIRMS IN KENYA

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The environment in which the organization operate in today, presents a challenging context created by many factors in which companies have to compete within a complex unpredictable environment. This ranges from radical technological advancement, globalization and rapid adoption of new technologies to the development and exploitation of knowledge. These new developments in the business climate require organizations to learn how to spot future opportunities and be able to leverage on existing ones. Consequently, Organizations must seek new sources of competencies and engage in novel ways of getting a competitive edge. This
study therefore, sought to probe the effect of Distinctive Competencies on Organizational Performance in the Alcohol manufacturing firms in Kenya. The specific objectives were: to establish the effect of production competence on organizational performance, to determine the effect of research and development competence on organizational performance, to establish the effect of marketing competence on organizational performance, to examine the effect of human resource management competence on organizational performance, and lastly, to examine the moderating effect of macroeconomic environment on the relationship between distinctive competencies and organizational performance of the Alcohol manufacturing firms in Kenya. The study design applied in this research is descriptive and explanatory research design. Positivist philosophy which advocates objectivity and consistent use of rational and logical approaches to research was also used. The target population of this study was 25 licensed alcohol companies. The study employed a multistage random sampling technique. The unit of observation was the heads of each functional unit of the departments that is production, marketing, human resource management, research and development. The study relied on primary data where semi-structured questionnaire were utilized in data collection as well as secondary data from financial statements. The response rate was 84% which is considered satisfactory for making inferences and drawing deductions. The study produced both qualitative and quantitative data where qualitative data was analyzed using common themes and presented in narrative form, quantitative data was evaluated using inferential statistics and descriptive statistics. Regression models were used to scan the relationship between distinctive competencies and performance. The discoveries of this inquiry show that, distinctive competencies namely; research and development, production, marketing and human resource competencies have a significant effect on organizational performance. Macroeconomic Environment was observed to have a moderating weight on the relationship between distinctive competencies and organizational performance. The results were presented in tables and figures. The study findings are significant to the alcohol manufacturing firms’ policy makers, beverage manufacturing managers, regulatory agencies and academicians. This is in terms of decision making in the Alcohol manufacturing firms and knowledge advancement within the scholars as well as practicing managers operating in a turbulent microeconomic environment that affects performance within the industry. Therefore, the study acclaims that managers in the Alcohol manufacturing firms should endeavor to adopt Distinctive Competencies that enhances the performance of the organization that is; Production, Research and Development, Marketing and Human Resource.

BUSINESS PROCESS OUTSOURCING AND ORGANISATIONAL PERFORMANCE OF COMMERCIAL BANKS IN KENYA

Gituma Murithi Isaiah-PHD

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The overarching objective of any going-concern business entity is performance sustainability. However, performance sustainability challenges continue to persist in the banking industry despite appropriation of different performance management strategies. This challenge obtains in commercial banks in Kenya as evidenced by the recent assumption of cost rationalisation measures, increasing volumes of non-performing loans, acquisitions, liquidation, and statutory management of some banks due to liquidity problems. Thus, this study sought to establish the efficacy of business process outsourcing strategy in addressing performance challenges of commercial banks. Specifically, the study sought to establish the effect of outsourcing information technology, human resource management, marketing, and security processes on performance of commercial banks in Kenya; the mediating effect of competitive advantage and the moderating effect of organisational characteristics on the relationship between BPO and performance of commercial banks. The philosophical foundation of the study was positivism. The study employed descriptive and explanatory research designs and was longitudinal in nature. The target population was thirty two commercial banks. Four managers from each commercial bank at the headquarters (Information Technology, Human Resource Management, Marketing and Operations departments) were targeted thus yielding a sample size of one hundred and twenty eight respondents. Primary data were collected using self-administered questionnaires based on the 5-point Likert scale. Descriptive statistics were computed to describe the characteristics of the study variables while multiple linear regression analysis was used to establish the nature and magnitude of the relationships between the independent and dependent variables. All statistical tests were subjected to 95 per cent level of significance (p≤0.05). The study established that outsourcing information technology, human resource management, marketing, and security processes, all had statistically significant positive effect on performance of commercial banks in Kenya. Competitive advantage was found to fully mediate the relationship between BPO and bank performance while bank size was found to moderate the relationship between BPO and bank performance. Owing to the empirical findings, commercial banks in Kenya should wholly embrace BPO as an effective performance management strategy and widen the bracket of the range of businesses processes to be outsourced. Extant literature shows that most commercial banks mainly outsource non-critical non-core business processes. Positive results of this study that focused mainly on critical non-core business processes should motivate and give more confidence to the top management in outsourcing more critical processes and gradually core business processes as is the case in developed countries. Management of commercial banks should give more attention to outsourcing of marketing processes as well as software development as they were highly correlated with bank performance. Whereas, outsourcing training was highly supported by respondents, outsourcing recruitment and performance management were not. Therefore, vendors should exercise due diligence in understanding specific requirements for different industries. Commercial banks should be more creative in managing their security processes as their outsourcing was the least correlated with performance. With the modern trend of housing banking halls under the same roof with other business entities especially in shopping malls, managing physical security can be collaboratively done in order to
save on costs. The study findings are instrumental in informing the Central Bank of Kenya decisions when reviewing policies relating to business process outsourcing in commercial banks.

INFORMATION AND COMMUNICATION TECHNOLOGY INTEGRATION AND PERFORMANCE OF UNIVERSITIES IN NAIROBI METROPOLITAN, KENYA

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The higher education institutions had faced challenges regarding operational efficiency, academic effectiveness and managerial dispensation necessitating an investigation of ICT capability and its influence to enhancing university performance. Research proponents argued that use of ICT in education services was inevitable; and that managerial and academic workforce applied ICT capabilities to automate processes, improve information sharing and enhance organizational growth. The Kenyan universities had inadequate ICT integration which resulted into unsatisfactory academic and managerial performance. This study sought to investigate extent of ICT integration and university performance, based on variables namely ICT infrastructure, user skills, management support, service delivery and policy. The study applied explanatory research design and positivism philosophy to explore cause – effect relationship of ICT integration and university performance. The target population for the study was 34 public and private universities in Nairobi Metropolitan. Stratified random sampling was used to select target population of 68 respondents basically IT Specialists, out of which a sample of 59 respondents was obtained. A structured questionnaire based on content validity and reliability of 0.80 was used to collect data which was analyzed using both descriptive and inferential statistics. Diagnostic tests conducted included normality of error term, homoscedasticity, multicollinearity and autocorrelation. Linear multiple regression model was used to estimate the effect of ICT integration on university performance. Tests of hypothesis were based on ten percent significant level. The study established that university performance depended on ICT infrastructure, user skills, service delivery and management support which impacted on academic and managerial functions. The policy implication derived from the study suggested the need by universities to align ICT capabilities with academic and managerial functions through enhanced information sharing, transformation of business processes and increased organizational growth. The research results had direct benefits to the university academic fraternity and administrators, managers and researchers.

TECHNOSTRUCTURAL INTERVENTIONS AND PERFORMANCE OF COMMERCIAL BANKS IN KENYA

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Kenya’s banking industry has for many occasions experienced turbulence, leading to growing aspersions as to its stability and continued performance. Commercial banks have consequently been seen to be putting in place measures to enable them continue performing as expected. Some of these strategies have included embracing organization development interventions, such as technostructural interventions. From the literature, studies still point to the fact that there exists a theoretical quandary on whether technostructural interventions can indeed lead to desirable organization performance outcomes, or not. The need to fully comprehend the effects of technostructural interventions on performance of commercial banks in Kenya thus became necessary. As well, given that employee commitment has been argued to be an important determinant of organization performance, incorporating the same in study, as a mediating variable, in exploring the extant relationship between technostructural interventions and performance of commercial banks in Kenya, was considered vital. Buoyed by scholarly arguments, this study, besides, incorporated leadership styles, specifically transformational and transactional leadership styles, as a moderating variable in the relationship between technostructural interventions and organizational commitment, and also as a moderating variable in the relationship between employee commitment and organizational performance. The study objectives hence were: To determine the effect of job enrichment on performance of commercial banks in Kenya; to determine the effect of employee involvement on performance of commercial banks in Kenya; to determine the effect of physical layout on performance of commercial banks in Kenya; to establish the mediating effect of employee commitment on the relationship between technostructural interventions and organizational commitment, and also as a moderating variable in the relationship between employee commitment and organizational performance. The study included the sociotechnical systems theory, the Herzberg two factor theory, the Job Characteristics Model and the AMO theory of organisation performance. The study adopted a positivist philosophy and blended cross sectional and descriptive research designs. The population comprised of all the commercial banks in Kenya. Sample size for the respondents was determined by the Yamane formula. Research data was collected using questionnaires. Descriptive analysis was undertaken on respondent’s biographics and bank characteristics. Multiple regression models were then used to analyses the relationships and as such to test the hypotheses at 0.05 significance. The study established that employee involvement has a positive and significant effect on the performance of commercial banks in Kenya. The study also established that employee commitment partially mediates the relationship between technostructural interventions and the performance of commercial banks in Kenya and that leadership styles moderate the relationship between employee commitment and performance of commercial banks in Kenya. On the basis of these characteristics, conclusions and recommendations were made, chief being that banks be cautious in using physical layout and job enrichment interventions as strategies of driving performance and that other studies be undertaken to establish under what circumstances job enrichment and physical layout interventions can be used to drive performance of
commercial banks in Kenya. Even so, it is expected that the findings of this study will help inform policy in commercial banks besides contributing to the field of organization development in Kenya.

OPERATIONS STRATEGY AND PERFORMANCE OF MANAGEMENT CONSULTANCY FIRMS IN NAIROBI CITY COUNTY, KENYA

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Competition in the modern world requires consultancy firms to adopt operations strategies that will ensure superior performance. Previous studies have identified challenges facing consultancy firms which have led to their poor performance such as uncertainty of returns, poor reputation, development of sustainable strategies and inadequate resources. Strategic management literature has not addressed performance dimensions of these firms and the dimensions used by practising firms have not been tested empirically. Previous research on operations strategy has concentrated on manufacturing sector through conceptual reasoning and at aggregate levels only. There is lack of empirical investigation linking operations strategy with performance among management consultancy firms. Therefore, this research aimed at investigating the effect of operations strategy on performance of management consultancy firms in Nairobi City County, Kenya. More specifically, it assessed the effect of resource management strategy, facility strategy, value proposition strategy and knowledge-based value chain strategy on performance of management consultancy firms in Nairobi City County. The study also sought to establish the mediating and moderating effect of organizational competences and regulatory framework respectively on the relationship between operations strategy and performance. This study was anchored on resource-based view theory, knowledge value chain model, social capital theory, Hayes and Wheelwright four stage model and the institutional theory. The study was founded on positivism philosophy and adopted a descriptive and explanatory research designs. Target population for the study was all the 227 management consultancy firms in human resource, marketing, accounting and finance and operations management in Nairobi City County out of which 144 were selected using stratified random sampling technique. Primary data was collected using semi structured questionnaire. Quantitative data was analysed using descriptive and inferential statistics. Hypotheses testing was carried out at 5% significance level and F-statistic was used to test the significance of the model and computed at 95% confidence level. Quantitative data was presented in form of tables and charts. Qualitative data collected through open ended questions was analysed using conceptual content analysis. The study found that resource management strategy, value proposition strategy and knowledge-based value chain strategy have a significant positive effect on performance of management consultancy firms in Nairobi City County while facility strategy has no significant effect. Organizational competences have a partial mediating effect on the relationship between operations strategy and performance of management consultancy firms in Nairobi City County while regulatory framework has no significant moderating effect on the relationship between operations strategy and performance. The
study recommends that the management of management consultancy firms in Nairobi City County should focus on deploying resource management, value proposition and knowledge based value chain strategies in a more strategically aligned manner in order to gain value, rarity, inimitability, organization specificity and non-substitutability. They should focus on building competences such as allocated, administrative, transactional and technical competences to guarantee sustained performance through maintaining their staff for a longer period of time, organising training seminars, meetings and encouraging information sharing. They should also develop and implement strategies to minimize the effect of the regulatory framework on the performance of consultancy firms and the government should come up with policies that are not punitive to the consultancy firms so as not to negatively affect their performance. The study called on future research to investigate the effect of operations strategy on performance in other service oriented organisations.

EMPLOYEES’ SEPARATION PLANNING AND RETIREMENT PREPAREDNESS AMONG PUBLIC SECONDARY SCHOOL TEACHERS IN KIRINYAGA AND MURANG’A COUNTIES, KENYA

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Most retirees contend with adjustment financial constraints, loneliness, depressive symptoms, poor health and increased exposure to alcohol consumption depending on retirement preparedness levels. Globally, most employees particularly from public institutions live in poverty during retirement despite living well during employment. However, studies on retirement preparedness usually focus on financial wellbeing neglecting physical, social and psychological wellbeing. The purpose of the present study was to assess the effect of employees’ separation planning on retirement preparedness among public secondary school teachers’ in Kirinyaga and Murang’a counties, Kenya. The specific objectives were first assessing the effect of teachers’ engagement in psychosocial, financial and personal health programmes on retirement preparedness. Further, the study sought to establish the moderating effect of human resource practices and the mediating effect of employee’s decision making on the relationship between employees’ separation planning and retirement preparedness among public secondary school teachers’ in Kirinyaga and Murang’a counties. The study was anchored on Role Theory, Continuity Theory, Life Course Perspective and the Theory of Planned Behaviour. The study adopted positivism philosophy and employed both descriptive and explanatory research designs. The target population was 1,238 teachers employed by the Teachers Service Commission by 2017 in Kirinyaga and Murang’a counties’ public secondary schools. A representative sample of 334 respondents was selected using multistage sampling technique. The stages involved identification of the counties, category of schools and finally the respondents. Data was collected using semi-structured questionnaires and interview guides. Validity of the questionnaires was guaranteed through expert opinion while the overall reliability was Cronbach’s Alpha 0.93. In data analysis, Statistical Package for Social Sciences (SPSS), Version 20 was used to compute statistics and analyze quantitative data. Thematic approach was employed to analyze
qualitative data. Descriptive statistics namely frequencies, percentages, means and standard deviation enabled researcher to meaningfully describe distribution and determine the significance of the study variables. Logit regression was used to establish the relationships between variables in the study and to test the null hypotheses at \( P \leq 0.05 \) and 95% confidence level. The study found out that psychosocial, financial and personal health programmes had positive effect on retirement preparedness of pre-retiree teachers. In addition, employee decision making had partial mediating effect on the relationship between employee separation planning and retirement preparedness. However, human resource practices had no moderating effect on the relationship between employee separation planning and retirement preparedness but was just an explanatory variable. The study concluded that pre-retiree teachers were not prepared for retirement. Psychosocial, financial, personal health programmes and human resource practices increase retirement preparedness. Employee decision making partially mediate the relationship between employee separation planning and retirement preparedness. The study therefore recommended that, employees should engage in diversified activities geared towards separation planning for successful retirement preparation as an all-inclusive approach for a holistic retiree’s wellbeing. The government should enact frameworks that enforce, monitor and evaluate programmes in employer organizations and employee nexus in separation planning for retirement preparedness. Human resource managers should ensure that employees’ separation planning and retirement preparedness is entrenched by employers through formulation of policies and practices that create an enabling environment to empower employee’s engagement in retirement planning soon after joining employment.

FINANCIAL SOUNDNESS AND EFFICIENCY OF DEPOSIT TAKING SAVINGS AND CREDIT COOPERATIVE SOCIETIES IN KENYA

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The deposits taking Savings and Credit Cooperative Societies (DTS) have continued to play a critical role in Kenya’s financial sector in terms of access, savings mobilization and wealth creation. According to the Kenya’s economic blueprint Vision 2030, is a key player to achieving the 10% annual economic growth target. Given the importance of the sector in economic growth, there has been considerable interest in their efficiency. In Kenya, DTS have been reported to have low efficiency, with the average efficiency being less than one against a general expectation of an efficiency level of one. There is limited empirical literature to explain the inefficiency of DTS in Kenya. In view of this, the study sought to establish the effect of financial soundness on efficiency. The specific objectives of the study were: to determine the effect of asset quality, capital adequacy, liquidity and earnings rating on efficiency of DTS. The study further sought to establish the moderating effect of size of DTS on the relationship between financial soundness and efficiency. The study was anchored on Buffer Capital Theory, Economic Efficiency Theory, Asymmetric Information Theory, Modern Portfolio Theory and Shiftability Theory of Liquidity. The study
adopted positivist philosophy and explanatory research design. The target population comprised 110 DTS as per SASRA report for the year 2017. The study used secondary data that was collected from the audited financial statements for the period 2012-2016. Data was collected using a document review guide. Data Envelopment Analysis methodology was used to generate efficiency scores. Both descriptive analysis which included mean and standard deviation and inferential statistics which included panel Tobit regression was done and was aided by Stata version 11. Tests conducted include: normality, heteroskedasticity, multicollinearity, autocorrelation, stationarity and model specification tests. Issues relating to the ethical conduct of research were upheld, ensuring that permission was sought from relevant authorities before collecting data. The study findings were as follows: DTS have not achieved efficiency; however, the efficiency level on average has increased over the study period. Further, the descriptive analysis indicates that the mean of capital adequacy and liquidity is above the required minimum by the regulator. The mean of asset quality is above the required maximum by the regulator. In addition, the correlation analysis indicates that asset quality, earning rating, and liquidity have a weak negative relationship with efficiency while capital adequacy has a weak positive relationship with efficiency. Lastly, asset quality, capital adequacy, and liquidity had a statistically significant effect on efficiency while earning rating had an insignificant effect on efficiency. Size of DTS was found to have a statistically significant moderating effect on the relationship between financial soundness and efficiency. The study concluded that: DTS are inefficient; increase in asset quality improves efficiency; holding more liquid assets decreases efficiency; the more stringent DTS regulations on capital adequacy the more efficient they are. The study contributes to: Finance Theory, methodology, and empirical literature. The study recommends that: DTS should adopt more robust ICT platforms which facilitates members’ access to the core services; DTS should develop credit administration strategies that reduce the amount of non-performing loans; a merger policy for the DTS should be developed so as to encourage the smallest DTS to merge in order to increase their economies of scale hence resulting to improved efficiency. Limitations highlighted include: lack of enough empirical evidence in Kenya; lack of uniform classification of accounting items.

STRATEGIC ASSETS AND PERFORMANCE OF FOOD PROCESSING FIRMS IN NAIROBI CITY COUNTY, KENYA

Justus M. Kyengo-PHD

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Dr. Godfrey M. Kinyua

The Food Processing firms contribute enormously to economic development in Kenya. However, a critical analysis indicates that food processing firms are experiencing declining performance. Therefore, this study sought to investigate the effect of strategic assets on performance of food processing firms in Nairobi City County, Kenya. Specifically, the study sought to determine the effect of Information Technology Capability, Marketing capability, Research, Development Capability, and Operational Capability on the performance of Food Processing Firms, Kenya. In addition, the study sought to
determine the mediation effect of competitive advantage on the relationship between strategic assets and performance. Moreover, it determined the moderation effect of market condition on the relationship between strategic assets and performance of Food Processing Firms. The study was anchored on dynamic capability theory, resource based theory, organizational learning theory and Institutional theory. The study used positivism research philosophy and adopted both explanatory and descriptive research designs, specifically a cross-sectional survey design. The target population of the study was 102 registered Food Processing Firms in Nairobi City County in Kenya. Multistage probability sampling technique was used to select 31 firms who formed the unit of analysis and 155 respondents. Primary data was collected using semi-structured questionnaires. Drop and pick technique was used to administer the questionnaires. Quantitative data was analyzed through descriptive and inferential statistics. Descriptive statistic such as frequencies, percentages, means, and standard deviations technique was used to summarize the characteristics of the data while multiple linear regression analysis was used to test the hypotheses. Qualitative data was analyzed through content analysis. The study established that IT capability, marketing capability, research and development, and operational capability have a positive and significant effect on the performance of food processing firms in Nairobi City County. The study noted that market condition moderated the relationship between strategic assets and performance. Finally competitive advantage was found to partially mediate the relationship between strategic assets and the performance of food processing firms. The study recommends that to shore up their performance, Food processing firms should adopt Information Technology capability such as technological flow, trying new ideas and seeking out new ways of doing things. To increase performance, firms should make new products and services, advertise, increase the number of trademarks and adopt novel marketing. Additionally, firms should adopt creative methods of operations, automate their processes and use current technologies to increase their performance. Also food processing firms should form a lobby group that participates in shaping their market conditions and one that relays timely market information to members.

ELECTRONIC COMMERCE CAPABILITY AND PERFORMANCE OF COMMERCIAL BANKS IN KENYA

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Kenya’s Vision 2030 economic blueprint seeks to transform Kenya into a middle-income country by the year 2030. The Government of Kenya through the Central Bank of Kenya has provided an enabling environment to ensure that commercial banks contribute towards the realization of the Vision 2030’s envisaged prosperous economy. In order to play their intermediation role, commercial banks have to be profitable. They have thus invested heavily in e-commerce solutions. Despite these initiatives, commercial banks have presented mixed results in terms of their performance. Hence, this study investigated the effect of e-commerce capability on performance of commercial banks in Kenya. The specific objectives of the study were to establish the effect of e-commerce information capability,
transaction capability, customization capability and back-end integration capability on performance of commercial banks in Kenya. The study also sought to establish the moderation effect of the business operating environment on the relationship between e-commerce capability and performance of commercial banks and determine the mediation effect of competitive advantage on the relationship between e-commerce capability and performance of commercial. The study was anchored on Unified Theory of Technology Acceptance and Use of Technology Theory and supported by Dynamic Capability Theory and Resource-Based View Theory. The study was guided by positivism research philosophy and used explanatory non-research design. A census of 43 commercial banks was taken; data for performance was extracted for the financial year 2016/2017. Data for e-commerce capability was collected from commercial banks websites. Data analysis was done using descriptive and inferential statistics. The study established that e-commerce information capability, customization capability and back-end capability significantly affected performance of commercial banks in Kenya. Transaction capability had an insignificant effect of performance of commercial banks in Kenya. The study further established that the business operating environment had positive but insignificant moderating effect on the relationship between e-commerce capability and performance of commercial banks in Kenya. Competitive advantage was found to partially mediate the relationship between competitive advantage and performance of commercial banks in Kenya. The study concluded that information capability, customization capability and back-end integration capability were significant predictors of performance of commercial banks. The study recommends that management of banks should invest more resources in e-commerce capability to improve their performance. The study further recommended for banks should include more transaction capability in their e-commerce platforms. This will ensure reduction in operation costs especially marketing and transactions costs.

SCHOOL OF ECONOMICS

FISCAL POLICY, MACROECONOMIC ENVIRONMENT AND PUBLIC DEBT IN KENYA

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Dr. Kennedy N. Ocharo

Fiscal policy in Kenya is geared towards macroeconomic stability, sustainable growth and conducive environment for investment and innovation. The macroeconomic environment has been unstable with the key macroeconomic variables being highly volatile and
susceptible to shocks, for instance, the ratio of debt to Gross Domestic Product increased from 25.4 to 56.2 per cent between 1963 and 2015 while fiscal balance to Gross Domestic Product ratio worsened from a surplus of 0.2 to a deficit of 7.6 per cent between 1963 and 2015. Due to the expected high government spending to finance ongoing development projects, limited revenue and unstable macroeconomic environment, public debt is expected to increase in the medium to long term. The debt levels have consistently exceeded the projections in the key policy documents implying non-compliance with the set fiscal policy guidelines affecting debt sustainability strategies. This continued buildup of public debt coupled with the volatile macroeconomic environment will make it difficult to stabilize the debt ratios, predict the future debt levels with certainty and prepare optimal policies that will ensure attainment of stable debt levels. The aim of this study was to estimate the optimal fiscal balance to Gross Domestic Product ratio and real growth rate of Gross Domestic Product that the government should target to stabilize future debt levels, determine the government’s fiscal reaction in response to changes in debt levels and carry out a stochastic simulation to determine future path and probability distribution of the public debt levels in Kenya. The study used secondary time series data from 1963 to 2015. The study results show that: to stabilize the debt levels, government needs to run an average ratio of fiscal deficit to Gross Domestic Product of four per cent and real economic growth rates of 5.4 per cent between 2016 and 2030; an increase in debt levels resulted to an increase in fiscal balance to Gross Domestic Product ratio implying a procyclical fiscal policy which is likely to undermine the Government’s target to attain fiscal policy and public debt sustainability. The simulated debt levels show the debt rising to 71.2 per cent between 2016 and 2030 against Kenya’s debt threshold of 74 per cent. This reduces fiscal space and in the event of a shock, the debt levels can increase beyond the debt threshold with serious negative implications to the economy. An analysis of
various policy options shows that a deliberate policy to increase real economic growth or reduce fiscal deficit ratio by five per cent of the previous period led to a drastic reduction in debt levels to 46 and 40 per cent, respectively, by 2030. The government therefore needs to formulate and ensure adherence to fiscal consolidation guidelines to guarantee the right response to increases in public debt and the counter cyclical fiscal policy to prevent the debt from taking an explosive path. The government further needs a fiscal legislation to set the maximum ceiling of fiscal deficit to Gross Domestic Product ratio beyond which the National Treasury cannot exceed.

ANALYSIS OF SYSTEMIC RISK AMONG ASSET PRICES MOVEMENT, FINANCIAL SYSTEM AND THE REAL SECTOR ECONOMY IN KENYA

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Dr. Shem Ouma

The global economy enjoyed a period of low inflation and growth during the great moderation period in mid-1980 to 2006. However, prevalence of financial crises during and immediately after the great moderation period led to the realization that asset price movement was central to financial system stability. Second, it was discovered that pursuance of monetary policy does not guarantee financial stability. In this regard, there was great uncertainty as to the policy instrument needed to safeguard financial health in the economy. Safeguarding financial stability encompasses analysis of systemic risk factors that causes turmoil in the financial and real economic sectors. Systemic risks consist of all potential risk in the economic system that may negatively affect proper functioning of the economic system. In this regard, this study sought to analyze systemic risk among asset prices movement, financial system and the real economy. Specific objectives include: (i) to analyze the systemic risk in security asset prices movement in Kenya; (ii) to analyze the systemic risk in housing asset prices movement in Kenya; and (iii) to investigate the relationship among financial risk, asset prices movement and real sector economic variables in Kenya. To address the first and second objectives, three variants of consumption-based capital asset pricing model (CCAPM) are used. These include the standard CCAPM model, habit formation CCAPM model and Two-goods CCAPM model. To address the third objective, a macro-financial model was specified and included asset prices movement, credit risk and real economy variables. Quarterly time series data from 2001Q1 to 2017Q3 was used for analysis. The macro-financial model was estimated using VAR-X model. The main findings show that consumption risk factors such as changes consumption growth, habit formation and growth of durable goods were important in
determination of security and housing asset prices movement. It was further established that while Kenyan investors make asset pricing decision with the objective of smoothing lifetime consumption, they exhibit low risk aversion behavior, and this was more pronounced in the housing market. However, there was evidence to show that risk aversion increases during bad economic times. Analysis of the relationship among financial risk, asset prices movement and the real sector confirmed existence of feedback loop between the asset market and real sector of the economy on one hand; and feedback effect between real sector variables and financial risk in the Kenyan economy on the other. It was further established that financial risk is countercyclical to business cycles and tend to increase during recession and reduce during boom periods. Based on these findings, the study concluded that while low risk aversion maybe an indication of low systemic risk in the Kenyan market evidence of adjustment of risk during recession emphasizes the need for constant monitoring of systemic risk in the asset market. In addition, existence of feedback loops among macro-financial variables and enhances the need to adopt systemic risk management policies. The main study recommendation include designation of a macroprudential authority within Central bank with clear structures and mandate to constantly monitor systemic risk in the economy.

INNOVATION CAPABILITY AND GROWTH OF MICRO AND SMALL ENTERPRISES IN KENYA

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In many countries, micro and small enterprises are recognized for their contribution towards economic growth, generation of employment opportunities and enhancing competitiveness. It is estimated that there were between 410 million and 473 million informal enterprises globally in 2015. These enterprises were estimated to contribute between 60 and 70 per cent of global gross domestic product by 2015. In spite of the prevalence of these enterprises and their large employment creation potential, only one per cent of these enterprises grow and graduate to employ more than ten employees globally. The rest either stagnate or die before reaching their third anniversary. In Kenya, it is estimated that there were 7.38 million micro and small enterprises, employing 14.1 million workers in 2015. These enterprises, however, continue to experience high mortality rates with an estimated 46 per cent of the enterprises closing down within their first year of operation. Thus, the numerous micro and small enterprises are characterized by high death rates and job churning alluding to the marginal nature of the jobs that they create. One growth challenge facing micro and small enterprises in Kenya is lack of market for their products and high local competition as cited by 32 per cent of the owners/operators of these enterprises. Innovation capability studies argue that a firm’s innovation capability provides it with an opportunity to introduce new products and production
processes thus opening up new market opportunities. Empirical evidence on the role that innovation plays in the growth of micro and small enterprises in Kenya, however, remains nascent. This study, therefore, investigated the role played by innovative capability toward growth of micro and small enterprises in Kenya. Specifically, the study analysed factors influencing innovation decisions, intensity, capability and how successful innovation influenced growth of micro and small enterprises. It made use of innovation capability indicators collected through a national cross-sectional survey of 575 micro and small enterprises in 2013. An augmented recursive econometric model was used to estimate the link between innovation capability and the growth of micro and small enterprises. The study found that the key factors influencing micro and small enterprise’ innovation decisions, intensity and outcomes include innovation expenditure per worker, physical capital intensity, skilled labour especially for production workers, affiliation status, proportion of domestic ownership and age. On the effect of innovation on micro and small enterprises’ growth, a key finding of the study was that there was no sufficient empirical evidence to support the idea that innovation capability influences micro and small enterprise growth in terms of employment. The study, however, found empirical evidence that links micro and small enterprises’ innovative capability and the sales growth. The study, therefore, recommended that Government should provide technical training targeted at improving micro and small enterprise production workers skills; pursue strategies aimed at broadening micro and small enterprises access to capital; provide shared physical capital infrastructure through shared work sites and improve these enterprises access to information and technology communication. Meanwhile micro and small enterprises and other larger enterprises should endeavour to collaborate, acquire intellectual property rights for their innovations and offer targeted and tailor made training for their production level workers.

SCHOOL OF AGRICULTURE

CHARACTERIZATION, WATER STRESS AND NUTRIENT MANAGEMENT OF YELLOW PASSION FRUITS (PASSIFLORA EDULIS, var F. FLAVICARPA. deg) IN KIAMBU AND EMBU COUNTIES, KENYA

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Passion fruit has gained significant importance as a horticultural crop of choice among farmers in Kenya. The yellow passion has been recently commercialized in Embu County due to its adaptation to the hot arid conditions and potential for high yields. Currently, the production levels of the fruit are low due to poor agronomic practices, declining soil fertility levels and changing climate leading to reduced rainfall. To further understand these challenges, there is need for careful investigation of plant-soil-water
relations which requires careful in-depth analysis of the soil’s nutrients of any area. This is because each nutrient has a specific role to play in the development of the plant and deficiency symptoms will manifest specific to each nutrient. Further, to establish and manage nutritional and water stress related disorders, their causes requires knowledge of the symptoms. The primary objective of this study was to carry out socioeconomic survey of passion fruit farmers and determine the correct water and nutrient management of yellow passion fruit in Embu County. The study also carried out morphological characterization of the cultivated populations to identify hybrids with favorable characteristics such as drought tolerance. The study involved a mixture of field survey, on-farm experiments with selected farmers and controlled experiments at Kenyatta University research farm. Results of the survey established that majority of the farmers grow passion on small acreages of less than 2 acres and have a common source of planting materials. Further, major agronomic practices including fertilizer and water application were also not correctly followed. The results on morphological characterization indicate the presence of two main groups of cultivars. Further, for fertilizer application, the study established that the treatments 100g DAP+20kg Manure+50g CAN and 20kg Manure+50g Nitrabor had the best impact on flowering (p≤0.05) and fruit development while results on determination of water uptake established the treatment of 10 liters of water per day giving the longest primary vine and highest number of secondary vines (p≤0.05). In conclusion, field survey and on-farm experimental results indicate the need for increased availing of new knowledge to farmers in the management of the crop while results from controlled experiments at the university farm indicate a need for correct application of fertilizers and efficient monitoring of irrigation regimes. All these factors will lead to improved quality and quantity in yield of yellow passion fruit. The study recommends provision of updated agronomic management practices to yellow passion farmers in Embu County, the use of either 100g DAP+10kg Manure+50g Nitrabor, 100g DAP+20kg Manure+50g Nitrabor or 50g DAP+10kg Manure+50g Nitrabor and the application of 10 liters of water per day per plant for optimum yield of passion fruits. Future studies on nutrient partitioning and water use efficiency can also be conducted to have a clear understanding of the nutrient and water relations in yellow passion fruit.

SOIL MOISTURE CONSERVATION, CROPPING SYSTEMS AND SOIL FERTILITY EFFECTS ON SOIL AND MAIZE PERFORMANCE IN MACHAKOS COUNTY, KENYA

Ngie Mwende-PHD

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Dr. Jane Mugwe

The main causes of food insecurity in semi–arid parts of Kenya are low soil fertility, low and unreliable rainfall. These two causes are the main challenges facing small-scale farmers in food production especially in semi-arid areas of the country. To overcome these challenges, soil and water management technologies especially those in soil and water conservation need to be embraced. The aim of the study was to determine the effect of tied ridges, fertilizers and cropping systems on soil properties (moisture, pH and organic carbon), growth and yield parameters of maize; and to identify the most cost effective
water and soil management technology. This study was carried out in four seasons at Katumani in
Machakos County. The experiment was a 2 x 4 x 2 factorial, laid out in a randomized complete block
design (RCBD). The treatments were: tied ridging, flat bed planting, farm yard manure 0 t/ha, farm yard
manure 5 t/ha, nitrogen fertilizer 20 kg/ha, farm yard manure 5 t/ha + nitrogen fertilizer 20 kg/ha, maize
mono crop and maize cowpea intercrop. Data collected included soil moisture content, soil pH, total
organic carbon, growth parameters and maize yield. The results showed that, treatments with flat bed
planting in maize mono crop significantly increased soil moisture content at 0–20cm depth as compared
to tied ridging in maize cowpeas intercrop during short rains 2015. Application of farm yard manure at 5
t/ha increased soil moisture content at 2 and 4 weeks after planting. The soil moisture content ranged
from 6.30% to 23.80%. During the short rains 2015, maize mono crop significantly increased vegetative
growth in comparison to maize cowpeas intercrop. Treatment with flat bed and 20 kg N/ha in maize
mono crop had the highest mean for vegetative growth. However, during the long rains 2016, treatment
with tied ridging and 20 kg N/ha in maize mono crop registered the highest mean for vegetative growth.
During the short rains 2015, treatments with maize mono crop significantly increased grain yield with a
range of 1.35 t/ha 3.59 t/ha. Flat bed planting with farm yard manure 5 t/ha in maize cowpea intercrop
significantly increased the grain yield by 165.93%. The harvest index during the short rains 2015 ranged
between 0.35 and 0.48. Treatments with maize mono crop significantly increased gross benefit, net
profit, gross margin and cost benefit ratio during short rains 2015 and long rains 2016. Application of
farm yard manure 5 t/ha + 20 kg N/ha had the highest variable cost. The yield differences among the four seasons
could have been as a result of variations/distribution in rainfall amount, soil moisture content and soil
fertility as induced by the treatments. Flat bed planting increased the yields during the short rains 2015
when the amount of rainfall was high whereas tied ridging resulted in improved yields during short rains
2014, long rains 2015 and 2016 when rainfall amount was low. For the farmers to maximize yields and
profits in the study area, adoption of flat bed planting with farm yard manure 5 t/ha and maize cowpeas
intercrop during the seasons of high rainfall could be appropriate treatment combination according to
the findings of this study. However, during seasons with low rainfall, tied ridging with 20 kg N/ha and
maize mono crop could be recommended for adoption. Also, variations in seasonal rainfall should be
considered when integrating different soil and water management practices because the effectiveness
of different technologies vary with the seasons. Farmers in Machakos County may have to consider use
of supplementary irrigation during the dry spells to increase soil moisture.

FINGERPRINTING AND RELATING JUVENILE CHARACTERS OF RICE TO YIELD AND YIELD
COMPONENTS IN KIAMBU AND KIRINYAGA COUNTIES


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Dr. Mukiri Wa Githendu
Rice is increasing as an important food and cash crop in Kenya and is third to maize and wheat in terms of consumption. Consumption has continually outstripped production resulting in massive importation. The main problem affecting productivity involves lack of proper information on best storage time, use of poor quality seed, varietal admixtures which has contributed to low yields. There is need to characterize genotypes. Microsatellite are useful in various plant genetic studies and plant characterization. Accelerated aging is considered an excellent option as a vigor test due to shortest time of acquisition and efficient results. In the proposed study, seed quality experiments including germination, dormancy, purity, were carried out in the laboratory using eight rice varieties in a Completely Randomized Design. Accelerated ageing tests at 0,24,48 and 72hrs(45°C and 98%RH) were carried out JKUAT post-harvest laboratory using eight rice varieties in four replications of 100 seeds each. Data was collected on dates to plumule and radical emergence and height. Five varieties were used to produce seeds which were stored for 1,2,3,4,5 and 6 months respectively. The seedlings were transplanted into fields in a Randomized Complete Block Design using 5*6 factorial arrangement. The study also determined the relationship between juvenile characters and adult characters of rice in Kiambu and Kirinyaga counties. All the data were analyzed using GENSTAT statistical package. ANOVA and LSD at 5% significant level. Seed quality results showed that There was significant variation in both coleorrhiza and coleoptile formation among rice varieties (p<0.001), treatments (p<0.001) and interaction between rice varieties and treatment ((p<0.001). The difference between all treatments was significant with 72 hours treatment having the highest number of days to coleorhiza and coleoptile formation. Results showed that the effect of genotype on coleorhiza and coleoptille formation was significant (p<0.001). Genotype B317 had the earliest coleoptile formation 8.75days, coleorhiza formation (9.81), B317 also had the highest germination percentages at 7(33.69), 14 (52.44) and at 21 days after sowing (56.62). Mzungu had the latest number of days to coleorhizae (12.44), coleoptiles (11.18) and lowest germination percentages at 14(27.52) and 21days (31.31). The genotype had significant effect on germination index, seed length and seedling vigor index. In Mwea, there was a significant effect of storage time on germination, with 4 months giving the highest seedling vigor index (673.6), height at 1 month after transplanting (73.3cm), height at maturity (72.3cm) and 3 months giving the highest days to flowering(58.87). The interaction between storage time and genotype on was significant, with genotype B217 stored for 3 months leading in height at one month after transplanting (87.7), height at maturity(91.8cm) in Kiambu. The interaction between storage time and genotype was significant with 5 months of storage having the highest seedling vigor index (759.5), 1000 grain weight (69) and yield (15.5kg/ha). Analysis of molecular variance results indicated that the five polymorphic markers used in this study showed a total of 11 alleles across the loci of the 18 rice genotypes studied. Juvenile characters such as seedling vigor and height at transplanting had a positive and significant correlation to 1000 grain weight. Genotypes TXD and B217 were identified by the 5
markers. TXD (Saro 5) was the best fit for fingerprinting as it was identified by only 1 marker. These results could be used in preparing rice seed certification procedures, in gene bank management and other seed storage ventures.

STRUCTURE, CONDUCT AND PERFORMANCE OF SOYBEAN MARKETING IN EMBU, THARAKA NITHI AND MERU COUNTIES, KENYA

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Soybean has the potential of contributing significantly to Kenya’s national objective of enhancing food security. The demand of soybean has increased from roughly 150,000MT in 2008 to 220,000MT in 2011, while supply is roughly between 50,000MT to 120,000MT. Many efforts have been put in place by the government to increase on the production and productivity of soybean. However, soybean farmers are faced with the difficulty in accessing the market, while on the other hand traders are experiencing an insufficient supply. Little is known about the soybean market in the central highlands of Kenya. This study therefore aimed at assessing the structure, conduct and performance of soybean markets. Specifically, the study determined the structure of the soybean market, the conduct and performance of the soybean market as well as opportunities and challenges affecting the marketing of soybean in Embu Tharaka-Nithi and Meru Counties. Key informant interviews were carried out among soybean farmers’ groups (16), Ministry of Agriculture Livestock and Fisheries (3) and soybean processing companies. A structured questionnaire was administered to respondents comprising of processors (16), wholesalers (15), retailers (86) and assemblers (3). Data was collected mainly on characteristics of respondents and marketing information such as quantities of soybean traded by wholesalers and traders, pricing, availability of price information and access to market. Data was used to calculate Herfindahl Hirschman Index (HHI), gross margins, marketing margin, and marketing efficiency. The results showed that there were eight (8) important marketing channels. Channel one the shortest (farmer-consumer) and channel three the longest (farmer, assembler, wholesaler, retailer and consumer). The HHI showed that wholesalers were competitive (0.0997); retailers were relatively competitive (0.1701) while processors indicated an oligopolistic market structure with an HHI index of 0.18 which is highly concentrated. Farmers, wholesalers and assemblers sold their soybean to processors at a fixed price given by the processors. The prices ranged from Ksh 58 to Ksh 70. Quantities traded were low with an average of 333.3kg for wholesalers, 793.33kg for assemblers and 47kg for retailers in the year 2016’. There were no trader associations in the study area even though farmers engaged in group marketing. Marketing Efficiency Indices revealed that Channel one was the most efficient. Constraints to marketing by farmers include low prices, lack of processing equipment’s, inadequate marketing arrangements, and high cost of processing. Wholesalers, retailers, processors and assemblers complained of in-adequate supply of
soybean. The study recommends that more processors be encouraged to enter the soybean market and farmers encouraged to do value addition so as to increase their returns.

**SCHOOL OF HOSPITALITY AND TOURISM**

**ROLE OF BRAND PERCEPTIONS AND ENTREPRENEURIAL SELF-EFFICACY ON PLACE BRAND EQUITY IN WESTERN KENYA TOURISM CIRCUIT**

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Many destinations have open up to and invested in the tourism industry leading to heightened competition between them. This has brought to fore the concept of place brand equity, where destinations seek to highlight their value to not only visitors, but also residents and investors. Tourism destinations have therefore developed strategies to enhance their brands. In Kenya, the National Tourism Blueprint 2030 recognizes that the tourism industry plays an important role in Kenya’s economy. It also acknowledges that various tourism circuits in Kenya are at different levels of tourism development, which is attributed to each circuit’s place brand equity. The purpose of this study therefore, was to examine the role of brand perceptions and entrepreneurial self-efficacy in influencing place brand equity in the WKTC. The study was guided by the four specific objectives:- to determine the influence of tourism entrepreneurs’ brand perceptions on place brand equity; to evaluate the relationship of customers brand perceptions on place brand equity; to explore the influence of entrepreneurial self-efficacy on place brand equity and to investigate the moderating effect of the industry context on the relationship between entrepreneurial-self efficacy and place brand equity. The study employed a cross sectional descriptive survey design, using a mixed methods approach. Secondary sources, questionnaires and interview schedules were to collect data. The study’s sample size was 316 managers of various tourism enterprises, and 309 customers to tourism enterprises in the four Counties Kakamega, Kisumu, Kisii and Busia in the WKTC. Ten (10) interviews were held with key tourism public sector officials and industry stakeholders. The overall response rate was 79.75% and was deemed to be appropriate for the study. Data collected was analyzed in SPSS 21, using descriptive statistics to infer variable characteristics. Pearson correlation was used to infer pattern of relationship between the variables used in the study while regression analysis was used to determine significant variable predictors and test hypothesis. Directed content analysis using NVivo 12, was used to analyze qualitative data. The results of the Pearson correlation coefficient analysis $r=0.588$, $p=0.000$, adjusted $R^2=0.343$ showed that 34.3% variation in place brand equity can be explained by customer brand perceptions with the most significant predictors being brand awareness and brand loyalty. The regression analysis coefficient $R=0.842$ and adjusted $R^2=0.706$ showed that 70.6% of variation in place brand equity can be explained by tourism entrepreneur brand perceptions, entrepreneurial self-efficacy and the moderating effect of industry context. The findings of the study show that tourism entrepreneurs brand perceptions;
customers brand perceptions; entrepreneurial self-efficacy and the moderating effect of industry context, statistically significantly influence place brand equity in the WKTC. Industry context on its own did not statistically significantly influence place brand equity in the Western Kenya Tourism Circuit. The study also identified 14 predictor variables with the most significant (p≤0.000≤0.05) contribution to the model. These predictor variables could be used by destination stakeholders in managing the WKTC's place brand equity based on the impact (coefficient) of each of them and the prevailing circumstances. The study recommends that the WKTC County Governments and the national government spearhead development and management of the WKTC destination brand. This will enhance awareness about WKTC and improve loyalty to the destination. Tourism entrepreneurs in the region also need to take advantage of the numerous resources such Lake Victoria and cultural heritage that abound in the region in order to enhance the WKTC brand. The study suggests further research on place brand equity in other tourism circuits.

CONTRIBUTION OF EDUCATIONAL TOURISTS' CONSUMER BEHAVIOUR TO SUSTAINABLE TOURISM DEVELOPMENT IN SELECTED UNIVERSITIES IN NAIROBI METROPOLIS, KENYA

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Educational tourism enables potential learners to acquire new knowledge from programmes in foreign locations. Educational tourism started with the wealthy and upper class in Europe with participants engaging in study tours for many years in European countries between the seventeenth and nineteenth centuries. In recent years students are taken from Europe other parts of Europe, South pacific, Middle East, Africa and to all major attractions globally. Africa has a high potential of this market due to its rich biodiversity and beautiful varied scenery. The programmes include outbound, faculty-led study abroad programmes. The students were referred to as international, overseas or foreign. Africa recognizes educational tourism as a promising niche market segment to cushion out the fluctuating numbers of other market segments. The region receives about 14% foreign scholars yearly to add to those existing in their institutions of learning. Kenya receives approximately 50,000 of the students distributed as 1% admissions to public universities and 12% to private universities, a constant 200,000 international students annually. The study purposed to establish the contribution of educational tourists' consumer behaviour on sustainable tourism development in Nairobi metropolis, Kenya. The specific objectives of the study were to; evaluate the effects of the consumer behaviour of educational tourists, determine
their understanding of sustainable tourism, find out tourist activity options available for them and the effects of consumer behaviour and their activity options on sustainable tourism development in Kenya. This study used the survey design utilizing both quantitative and qualitative data and the mixed method model. 345 international students, 6 heads of ISLCs and 15 representatives of CBTOs were sampled from a target population of 2890 respondents. Open and close ended questionnaire, an interview guide and a focus group discussion were used to collect data. Pretesting was done to reduce errors on the variables. Validity of factor loadings >0.5 were accepted and a Cronbach alpha coefficient of >0.7 was accepted for the reliability of the questionnaire. Data was analyzed through descriptive statistics, Chi-square, other cross tabulations and regression. Data was presented through tables, charts, graphs and qualitative reporting. The response rate for questionnaires was 330 at 95.7%, 6 interview guides at 100% and 12 focus group discussions at 86.7%. The first null hypothesis was rejected after Chi-square tests were carried out on 12 consumer factors where; 11 factors yielded P<0.05. The second null hypothesis was also rejected when a summary crosstab was generated on the understanding of sustainable tourism by educational tourists at 0.019 (P<0.05) on the average rate of responses from the social-cultural, economic and environmental impacts. The respondents felt that the activity options available influenced the understanding of sustainable tourism environment as indicated by the impacts on the environment at 0.029 (P<0.05) and the economic impacts at 0.301 (P>0.05). A regression model indicated the P-value for the model was 0.000 (P<0.05). This study concludes that the consumer behaviour of international students is significant in determining the choice of destination by the students. Strong policies should govern sustainable tourism practices. Kenya’s institutions of higher learning should improve and increase the host capacity within its campuses. Tourism as a course should be incorporated in all levels of study curricular in Kenya.

AN INTEGRATED SERVQUAL AND GAP MODEL IN EVALUATING CUSTOMER SATISFACTION IN BUDGET HOTELS IN NAIROBI CITY COUNTY, KENYA

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Increasingly, hotel industry has witnessed rapid growth in the 21st century and as a result competition within the industry has also intensified. This competition has been fueled by the preoccupation of service quality to add value and strengthen the complete guest experience. However, a major challenge facing the sector is the aspect of service quality particularly in budget hotels which target price sensitive customers. These hotels provide the customers with satisfactory core product at a reasonable price but tend to focus more on profits than on customer satisfaction. The services offered are not standardized and service quality variability is
a challenge. The study used an integrated SERVQUAL and Gap model to evaluate customer satisfaction in budget hotels in Nairobi City County, Kenya. The specific objectives of the study were to determine the effect of service design on customer satisfaction, establish the effect of service delivery on customer satisfaction and determine the moderating effect of management perception of service quality on customer satisfaction in budget hotels in Nairobi City County, Kenya. The study adopted a cross sectional survey design and was conducted in 50 budget hotels. A sample size of 334 drawn from the hotel managers, customers and employees were involved in this study. Systematic random sampling technique was used to select the study sample for customers and employees. Data were collected through use of questionnaires and interviews. Both descriptive and inferential statistics was used in data analysis. The study hypotheses were tested was tested using multiple regression (ANOVA) and qualitative data from management perception was analyzed using qualitative data analysis (QCA). The regression analysis indicated that all five dimensions of service quality in service design were significant (0.000) when tested at 95% confidence level. The model was found to be significant. Correlation analysis indicated that the service design factors that had significant impact were realization of assured service in reliability (p = .044 < .05), responsiveness in informing the customers about the time of service delivery (p = .000< .05) and empathy in that operating hours are convenient to customers (p = .030 < .05). The other variables did not have significant values. The results indicate that there are gaps in the budget hotels under study between service design and customer satisfaction. Relationship between service delivery and customer satisfaction was found to be positive but not all the variables were significant. The study findings indicated that four variables; good location (p = .115 > .05), closeness to main city facilities (p = .527 > .05), someone recommended hotel (p = .665 > .05), and good experiences from the hotel (p = .458 > .05) did not have no significant values. This implied that these variables did not have an effect on customer satisfaction resulting in a gap between service delivery and customer satisfaction. This indicated that the service delivery did fully not meet customer expectations. Management perception was found to have a moderating effect between service quality and customer satisfaction. The study concluded that although managers seemed to have a reasonably good understanding of the customer and developed service designs for quality service delivery, the services delivered still fell short of customer expectations. The study therefore recommends that to enhance customer satisfaction, management needs to focus on the changing needs of their customers and develop service designs that will offer service delivery that satisfies the customer. The study makes some contribution to the body of knowledge as an integrated model in evaluating customer satisfaction.

PSYCHOLOGICAL EMPOWERMENT AND ITS INFLUENCE ON JOB SATISFACTION OF GUEST HOUSE SUPERVISORS IN MOMBASA COUNTY, KENYA
Psychological empowerment and job satisfaction are critical human resource issues in guest house operations. Compared to classified hotels, guest houses have a larger percentage of untrained personnel. Employees who might have some hospitality training are usually the supervisors. However, the owners of guest houses tend to dictate and control almost all the operations, thus low employee empowerment. Lack of empowerment is a major cause of job dissatisfaction and eventually high staff turnover. Hence, this study sought to determine the influence of psychological empowerment and extrinsic factors on job satisfaction among guest house supervisors in Mombasa County. The study used a descriptive survey study design. The research focused on the seventy-six registered guest houses in Mombasa County. The study utilized census, where all the supervisors in all the registered guest houses in Mombasa County were included. Secondary data was collected by reviewing documented information concerning the study variables. Primary data was collected through a semi-structured questionnaire and an observation checklist. Pre-testing was done in three guest houses and the remaining seventy-three were included in the study. Data analysis utilized quantitative tests such as means, percentages and standard deviations. Pearson correlation coefficient, linear and multiple regressions were used to establish the relationship between the study variables. The response rate for the supervisors’ questionnaire was 94%. Findings from the questionnaires revealed that there existed a positive and significant influence (p< 0.05) of „competence“ on job satisfaction (r= 0.554); „impact“ on job satisfaction (r= 0.868); „meaning“ on job satisfaction (r= 0.765); and „choice“ on job satisfaction (r= 0.734). The overall job satisfaction was mean rated at 3.52 out of a total score of 5. From the model, (R2 =.857) showed that the overall psychological empowerment accounted for 85.7% variation in job satisfaction of guest house supervisors and hence there was a positive relationship between the variables. The age of supervisors had a weak positive relationship with job satisfaction (β= 0.054, p> 0.05) while gender (β= -0.151, p< 0.05), number of years worked (β= -0.140, p< 0.05) and education (β= -0.063, p> 0.05) had negative relationships with job satisfaction. Results from the observation checklist revealed an above average level of the dimensions of „meaning“ and „impact“ at 65% and 69% of the guest houses respectively. However, observations for „competence“ and „choice“ were below average at 49% and 24% of the total number of guest houses respectively. The major extrinsic factors identified to affect job satisfaction were salaries, working conditions, terms of employment and employee welfare. This study would be of critical importance to the various stakeholders of the hospitality industry. For instance, it would be of great help to guest
house entrepreneurs and managers who would be able to formulate and implement empowerment strategies for their supervisors and other staff. In addition, this study would be helpful to organizations such as Federation of Kenyan Employers, Kenya Association of Hotelkeepers and Caterers and Pubs Entertainment and Restaurant Association of Kenya in sensitizing their members on the importance of employee psychological empowerment. The study recommends that guest house supervisors should be accorded necessary support in terms of empowering them in their work tasks. This would go a long way in enhancing their job satisfaction.

EMPLOYEE RETENTION FACTORS ON CAREER SUSTAINABILITY IN TRAVEL AND TOUR COMPANIES IN MOMBASA COUNTY, KENYA

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Career sustainability studies are gaining momentum especially on how employees can develop ways to achieve them. Employees in organizations that have mechanisms for employee retention can experience higher career sustainability. However, there is limited literature that can provide more understanding on the link between employee retention and career sustainability. The tourism organizations are also facing a challenge in holding their best employees in order to keep trend with the current competition. The specific objectives of this study were to establish the relationship between intrinsic and extrinsic motivation on career sustainability, to assess the effect of employee retention strategies on career sustainability in the travel and tour companies, and to establish the moderating effect of employee engagement on the relationship between employee retention and career sustainability among employees in the travel and tour companies. This study was grounded on Super’s Self-Concept Theory, Herzberg’s Two-Factor Theory and Maslow’s Hierarchy of Needs Theory. The target population was comprised of 2,800 employees from 121 tour operator companies and 40 travel agent companies in the county. Using mixed research methods; stratified random sampling technique was used to select respondents to participate in the study. Interview schedules were conducted on 20 human resource managers and questionnaires administered to 350 tours and travel agency company employees. Four questionnaires were not filled fully, thus 346 fully filled questionnaires were used in the analysis. Descriptive statistics indicated that the male gender was highly represented at 62% than the females owing to the high number of tour guides who are predominantly male. The means from the analysis of career sustainability factors showed that employees have more desire to achieve success in their career [3.63], and improve their income [3.65]. Correlations of intrinsic factors and career sustainability indicated that employees with challenging job tasks \( r = 0.572, n = 346, p<0.05 \) and freedom to make and implement own decisions \( r = 0.641, n = 346, p<0.05 \) had a higher career sustainability. Content analysis showed that career sustainability would highly improve when employees are provided with
commendations for completing tasks in time (5) and having good working relationships with their supervisors or co-workers (7). Multivariate regression was used to analyze the quantitative data and all the null hypotheses were rejected and the alternative hypotheses accepted. The study findings showed that intrinsic motivation factors \[ r = 0.651, n = 346, p = 0.000 \] and employee retention strategies \[ r = 0.788, n = 346, p = 0.000 \] have a stronger influence on career sustainability than extrinsic motivations \[ r = 0.615, n = 346, p = 0.000 \]. Furthermore, the findings demonstrate that employee engagement has a moderator influence on the relationship between employee retention and career sustainability \[ r = 0.667, n = 346, p = 0.000 \]. The study recommends that tour operator and travel agent company employees should be intrinsically motivated with challenging work that center on short-term wins, and be extrinsically motivated through forging effective interpersonal working relationships with their supervisors, peers and subordinates. This study provides a platform for policy makers to assess and compare levels of career sustainability among employees in the tours and travel sector with other sectors in the tourism industry in Kenya.

**SCHOOL OF PURE AND APPLIED SCIENCES**

**PROFILES, DIVERSITY AND ANTIBIOTIC RESPONSE PATTERNS OF BACTERIAL ISOLATES FROM FISH AND PROCESSED FISH PRODUCTS RETAIRED IN KIRINYAGA COUNTY, KENYA**

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Fish contain omega 3 polyunsaturated fatty acids (PUFA’s), vitamins and other micronutrients. However, fish and seafood rank among foods highly associated with food borne disease outbreaks especially in poor hygienic conditions while handling or processing foods. The objectives of this study were to determine the risk factors associated with fish contamination, levels of microbial contamination and molecular profiles of bacterial isolates. In addition, antimicrobial response patterns were also determined against commonly used antibiotics. A semi-structured questionnaire was administered randomly to individual fish handlers while fish products (raw fish, samosa, sausage, cake, skewer, hot dog, fried fish, fish balls, fingers and burger) were randomly sampled from fish vendors. Microbial load was determined using serial
dilutions and the load determined by pour plates. The bacteria were enumerated and sub-cultured to obtain pure cultures on Nutrient media. Bacterial morphologies were determined and confirmed by biochemical characterization using citrate utilization, methyl red, SIM, urease, indole and carbohydrate fermentation tests. Total genomic bacterial DNA was extracted using boiling extraction method and 16S rRNA gene was amplified using PCR while the amplifications were confirmed using gel electrophoresis. The amplified products were then directly sequenced using Sanger method in both directions using the same primers as in the PCR amplification. Kirby-Bauer agar diffusion method was used to test antibiotic susceptibility test. Data was analyzed using ANOVA and means were separated using Tukey’s HSD test at 5% significance level (SAS version 9.0). The generated sequences of 16S rRNA gene were analyzed and edited using Finch-Tv software Ver. 1.4.0. Data analysis was carried out using SAS software Ver. 9.4. There was a significant difference (\( p = 0.001 \)) and interaction (\( p = 0.037 \)) of average bacteria count obtained from different fish products and markets. Fish treatment resulted to a significant difference (\( p = 0.001 \)) total CFUs. Based on morphological characteristics, a total of 64 morphogroups were obtained. Based on molecular characterization, most of the identified bacterial isolates belonged to Bacillus sp. Other identified bacterial isolates comprised of B2SmCTM1, which was identified as Klebsiella michiganensis, isolate C1FCTM1 identified as Salmonella enterica, isolates F3WTRM5, M10SmCTM1 and M10SaCRM5 identified as Escherichia coli. In addition, isolates J6BCTM5, L10WTTM5 and J6WTTM5 were concluded to be Staphylococcus xylosus. The study revealed that respondents were aware that high temperatures promoted bacterial growth thus majority (68%) refrigerated their fish products. The storage of fish products in display units and shelves without ice may justify high levels of
contamination experienced in the region. Fish and fish products sold in various markets in Kirinyaga county-exhibited varied bacterial contamination with fish samosas having the highest bacterial count. There was a significant difference in the action of tetracycline, streptomycin, ampicillin, ciprofloxacin, gentamycin and penicillin against the bacterial isolates (P = 0.001). Ciprofloxacin was the most effective antibiotic based on antimicrobial response patterns of the selected bacterial isolates while penicillin was the least effective antibiotic. Extensive empowerment of the fish handlers and hoteliers on the proper handling of the raw fish and fish products to minimize the instances of microbial contamination should be promoted.

CHARACTERIZATION AND EFFICIENCY IMPROVEMENT STUDIES OF TiO2 BASED DYE-SENSITIZED SOLAR CELLS

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Dye-sensitized solar cells (DSSCs) offer an economically reliable and suitable alternative in moderating the challenges presented by the existing convectional photovoltaic cells. Whereas, for convectional solar cells the semiconductor adopts both the duty of light absorption and charge carrier transport, these two functions are separated in DSSCs. This is useful in the identification of back reactions. However, the efficiency of DSSCs has remained relatively low. For this reason, this research was aimed at how to improve the efficiency of DSSCs. To achieve this, nano-porous TiO2 particles were synthesized by both sol-gel and hydrothermal methods. In the sol-gel case, mixtures of titanium (IV) isopropoxide, 2-propanol, glacial acetic acid and water, in the ratio 8:16:11, were vigorously stirred for an hour. The white precipitate mixture that formed was heated at 80ºC, stirred magnetically for 8 hours and allowed to cool. TiO2 nanotube powder was purchased from Sigma Aldrich and made to be in paste form by dissolving it in ethanol. TiO2 compact layer was deposited on a conductive glass substrate by using spray pyrolysis and then TiO2 nanoparticles and nanotubes were deposited by screen printing technique on top of a glass slide with or without the TiO2 compact layer. The Hall Effect measurement revealed that F:SnO2 coated glass and the screen printed TiO2 nanoparticle thin films had Hall voltage values of 6.218×10⁻² V and 3.62 V, respectively. X-ray diffraction revealed that TiO2 nanoparticles had tetragonal crystalline structure which had cell parameters a = 3.7710 Å and c = 9.4300 Å. SEM micrographs showed
that TiO2 nanotubes had a skein-like morphology with abundant number of nanotubes intertwined together to form a large surface area film. Optical characteristics of TiO2 films showed that TiO2 had both direct and indirect band gaps of 3.81 eV and 3.67 eV, respectively. Solar cell performance properties revealed that introducing compact layer to the solar cell improved the performance by 145% (from 1.31% to 3.21%), TiCl4 post-treatment of DSSCs increased efficiency by 68% (from 1.65% to 2.77%) while TiCl4 treatment on compact layered DSSCs increased the efficiency by 29% (from 0.66% to 0.85%). Finally the experimental data was validated using a single diode theoretical model and non-linear fitting routine fminsearch optimization function implemented in MATLAB software. From the efficiency results obtained, it was recommended that compact layer be embedded onto the front electrode in the DSSC fabrication as it improved the performance of the solar cell greatly.

RANKS, SUBDEGREES, CYCLE INDICES AND STRUCTURES ASSOCIATED WITH THE ACTION OF PGL(2; q) AND PSL(2; q) ON THE COSETS OF THEIR SUBGROUPS

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The action of the groups PGL(2; q) and PSL(2; q) on the cosets of their subgroups has been studied by several researchers. Most of them concentrated on the action of the groups on the cosets of the maximal subgroups, leaving the non-maximal subgroups. In this thesis, the cycle index formulas of the groups acting on the cosets of the subgroups PGL(2; e) and PSL(2; e), where q is an even power of e, have been derived using disjoint cycle structures. The cycle index formula of the action of PGL(2; q) on the cosets of PSL(2; e), where q is an odd power of e has also been derived. The rank and subdegrees of the PGL(2; q) acting on the cosets of Pq and Cq+1; and PSL(2; q) acting on the cosets of Pq and Cq+1 have been determined using the conjugation approach. The study has employed the method of tables of marks to determine the rank and subdegrees of the
actions of the groups on cosets of other subgroups. In particular the method has been applied in the action of $\text{PGL}(2; q)$ on the cosets of each subgroup in the set $\text{NPGL}(2; q)(P_q); \text{D}_2(q+1); \text{PGL}(2; e) : q$ is an even power of $e$; $\text{PSL}(2; e) : q$ is any power of $e$, and in the action of $\text{PSL}(2; q)$ on the cosets of each subgroup in the set $\text{NPSL}(2; q)(P_q); \text{D}_2(q+1)$; $\text{PGL}(2; e) : q$ an even power of $e$; $\text{PSL}(2; e) : q$ is an even power of $e$. The non-trivial suborbital graphs arising from the action of the $\text{PGL}(2; q)$ and $\text{PSL}(2; q)$ on the cosets of $\text{NPGL}(2; q)(P_q)$ and $\text{NPSL}(2; q)(P_q)$ respectively, were found to be complete. The conjugation approach has been applied in construction of the non-trivial suborbital graphs arising from the action of $\text{PSL}(2; q)$ on the cosets of $P_q$ and those of $\text{PGL}(2; q)$ on the cosets of $P_q$, $\text{D}_2(q+1)$ and $C_{q+1}$. All the suborbital graphs of $\text{PGL}(2; q)$ on the cosets of $\text{D}_2(q+1)$ and $C_{q+1}$ are found to be undirected. The girths of the graphs corresponding to suborbits of length $q + 1$ are either equal to 3 or 4 while those corresponding to the suborbits of length $q + 1$ are either equal to 3, 4 or 5. Moreover in both actions of $\text{PGL}(2; q)$ on the cosets of $C_{q+1}$ and $P_q$, the girths of all graphs corresponding to the suborbits of length greater than 1 are either equal to 3 or 4. This study has majorly considered the non-maximal subgroups where in each action, there exists at least one disconnected non-trivial suborbital graph. Other studies worked on the actions on the cosets of maximal subgroups and all the corresponding non-trivial suborbital graphs are connected.

ASSESSMENT OF PAST AND FUTURE CLIMATE CHANGE AS PROJECTED BY REGIONAL CLIMATE MODELS AND LIKELY IMPACTS OVER KENYA

Philip Obaigwa Sagero-PHD
Climate change and variability is one of the global challenges that is affecting development worldwide. In the recent time, Regional Climate Models have been relied upon to give high-resolution climate projection at a local scale for impact assessment and development of adaptation strategies. These models are used to downscale the Global Climate Models which are used in the preparation of Intergovernmental Panel on Climate Change assessment reports. To provide local scale information for impacts assessment, vulnerability analysis and adaptation strategies, projection of future climate change must be of high resolution. This study was able to assess the past and future projections in climate as projected by the Coordinated Regional Climate Downscaling Experiment, Regional Climate Models, with a 50 km spatial resolution over Kenya. To achieve the objective of the study, analysis of the past rainfall and temperature pattern and trends over Kenya was done using observed station data and gridded datasets. The skill of the models to simulate the observed pattern and variability was determined using gridded datasets (Global Precipitation Climatology Center and Climate Research Unit) for both rainfall and temperature (minimum and maximum). Interannual rainfall variability over Kenya is controlled by large-scale systems, therefore the ability of the models to capture these teleconnections was analyzed by use of the composite method. After testing the skills and abilities of the regional models, then an assessment of the future changes on rainfall and temperature as projected by the models under Representative Concentration Pathways (RCP) 4.5 and 8.5 emission scenarios was done. Also, the future change in climate extreme was also analyzed by use of climate extreme indices. Finally, an analysis of the likely impacts of the projected changes on different sectors of the economy over Kenya was also done. The results show that rainfall and temperature over Kenya is variable from one place to another. The regional models were able to simulate rainfall and temperature well over Kenya. They also capture well the spatiotemporal patterns of rainfall and temperature over Kenya. An increase in temperature of about 5°C is projected by the end 21st Century under RCP4.5 and RCP8.5 scenario. The minimum temperature is expected to increase more than maximum temperature thus increase/decrease in warmer/colder nights. All the models show a better agreement on temperature projections. 70% of the models projected a decrease in March April May rainfall and an increase in October November December rainfall under RCP8.5. And a decrease in both season under RCP4.5. There is no significant change in the precipitation extreme indices except for Consecutive Dry Days and Consecutive Wet Days which are projected to increase and decrease respectively. Nevertheless, there is a clear decrease in annual precipitation totals. The models project high rainfall variability with a small shift of increasing trend. These projected changes will negatively impact agriculture, health, water and energy sectors and there is need for development of adaptation strategies at local level. The findings of the study can be used by government to develop adaptation strategies that will increase resilient of local communities. The models were not coherent in their rainfall projection, therefore further studies should be carried out on based on an ensembled model and the physics of the models should also be looked at, to find out whether the mesoscale system that affects rainfall over Kenya are well included in the models.
ANTHROPOGENIC IMPACTS ON DISTRIBUTION AND ABUNDANCE OF MOUNTAIN CATFISH (AMPHILIUS URANOSCOPUS, Pfeffer, 1889) AND OTHER FISHES, IN THE SAGANA AND THEGO STREAMS, NYERI, KENYA

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The clearance of forest for agriculture, settlement and grazing has had some of the most widespread human impacts on natural ecosystems globally. In Kenya large tracks of indigenous forests continue to be cleared to give way for human settlement and exotic tree plantations. The catchment on the slopes of Mt. Kenya has experienced such major losses that have affected the aquatic ecosystem. The objective of this study was therefore to document the extent of impact of anthropogenic activities on the distribution, abundance and population sizes of the mountain catfish (Amphilius uranoscopus Pfeffer, 1889) and other fish species along two second order tropical forested streams, Sagana and Thego on the slopes of Mt. Kenya. This study was done from June 2016 through May 2017. Fish samples were caught using an electrofisher and recorded for distribution, population sizes, reproductive strategies and feeding habits. Water samples for physiochemical parameters were determined in situ and a socio-economic survey of the riparian community carried out using a structured questionnaire. The smallest sized catfish were caught in November 2016 at the Thego station T2 midstream while the largest specimen electrofished was a 19.0 cm fork length (92.19 female caught in the downstream station (T3) of the Thego. There was a significant difference (t-test, t : -3.35; p:0.007) in the mean number of catfish caught per hour of electrofishing between the Thego stations (T2 and T3). A comparison between Catch per unit effort (CPUE) in Sagana and Thego (ANOVA, F : 6.82; p : 0.004) showed a significant difference in
catches between the two streams. Results from this study shows that there have been major significant changes in the distribution patterns of both the native species as well as the salmonid species in the two streams and that the mountain catfish has expanded its territory while the introduced salmonid species zones have shrunk or become thin. Catfish exhibited a wider food base overlapping with those of the other species such as rainbow trout, brown trout and barbus. The occurrence of the mountain catfish (Amphilius uranoscopus), Barbus sp. and Labeo sp. in the midstream of the Thego and downstream of the Sagana and Thego, the absence of rainbow trout in the midstream of the Thego and the restriction of the brown trout to the near pristine reaches of the Sagana at an altitude above 2150 metres are some of the changes that have occurred since 1960s due to the impact of human settlement in the watersheds of streams in the slopes of Mt. Kenya. Major factors associated with the variation in catfish distribution and abundance among the study stations included increased temperatures, elevated stream water conductivity and decline in water discharge. These clearly show that the catfish population is likely to move further upstream in Thego than in Sagana unless urgent measures to control human related anthropogenic activities in Thego catchment area are adopted. This study supports the hypothesis that the mountain catfish distributional range will continue to expand at the expense of other fish species unless corrective measures are considered to control anthropogenic human driven settlement activities in the watershed of the Sagana and Thego. Management strategies should focus on the values of the society and recognize that the continuous expansion of mountain catfish home range is an indicator of environmental perturbation arising from change in landuse and increase in human activities.

EVALUATION OF GENETIC DIVERSITY, DRUG RESISTANCE MUTATIONAL AND CYTOKINE PATTERNS ON HEPATOTOXICITY MARKERS AMONG HIV PATIENTS IN NORTHWEST REGION, CAMEROON
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Highly active anti-retroviral therapy (HAART) has been known to cause hepatotoxicity despite its benefit to improve the morbidity and mortality associated with HIV infections. However, the impact of HAART on HIV subtypes, drug resistance mutations and cytokine profiles, is not yet fully elucidated especially in the Northwest Region (NWR) of Cameroon. Therefore, this study was carried out with aim of determining the effect of HIV-1 subtypes, drug resistance mutations, cytokine profiles and risk factors on hepatotoxicity markers among HIV-1 drug naïve adults in the NWR of Cameroon. This was a longitudinal study conducted from February to November 2016 and newly diagnosed HIV-1 drug-naïve patients were recruited into the study. Stratified and simple random sampling techniques were used in selecting the five study sites. Blood samples were collected prior to HAART initiation Day (D) 0 and at D30 and D180. The participants were placed on either Tenofovir (TDF) + Lamivudine (3TC) + Efavirenz (EFV) or Zidovudine (AZT) + 3TC + Nevirapine (NVP) or AZT+3TC+EFV regimens. Serum levels of alanine aminotransferases (ALT), aspartate aminotransferases (AST) and alkaline phosphatase (ALP) were analyzed. Human Th1/Th2/Th17 cytokines were measured using a cytometric bead array assay. Genotypic and transmitted drug resistance (TDR) analyses were performed by sequencing HIV virus using an in-house protocol. Data were analyzed using SPSS vs. 23 and Graph pad prism 6. HIV-1 subtypes were determined phylogenetically using MEGA vs. 7 while TDR and resistance-associated mutations (RAMs) were identified using the Stanford HIVDR interpretation program. The level of significance was set at 5%. In all, 100 individuals participated in the study with a mean (age range) of 36.5 (18-61) years. Of this, 37(37%) and 49(49%) patients presented with hepatotoxicity while 15% and 28% of patients had severe hepatotoxicity at D30 and D180 respectively. Serum levels of ALT, AST and ALP increased significantly (p<0.05) with increased treatment duration and in patients on AZT+3TC+NVP treatment. Multivariate analysis showed that age <30 years, low BMI, low monthly income and the use of AZT+3TC+NVP regimen were independent risk factors for severe hepatotoxicity. Mean interleukin (IL)-6 and IL-17A, were significantly (p<0.05) high in patients with hepatotoxicity compared to patients without hepatotoxicity at D30 and D180. HIV-1 subtype revealed that CRF02_AG (75.3.0%) was the most predominant subtype. The prevalence of hepatotoxicity was highest at 70.3% (26/37) among individual harboring CRF02_AG virus. This study shows that 9 (11.1%) patients were infected with HIV variants that carried RAMs associated with NRTI; 8.6% (7/81), NNRTI; 4.9% (4/81) and PI; 1.2% (1/81). Seven of the nine patients with TDR developed hepatotoxicity of different grades at D180. Thus the use of NVP based regimen should not be recommended for patients less than 30 years and with low baseline BMI. IL-6 and IL-17A seem to play a significant role in the pathophysiology of hepatotoxicity. CRF02_AG
was the most predominant HIV strain. Despite the sample size, these findings highlight a caution in the management of hepatotoxicity and the need for continuous surveillance for TDR.

RESIDUAL EFFECTS OF INSECTICIDE-BASED MALARIA CONTROL INTERVENTIONS ON MALARIA VECTORS AND THE STATUS OF INSECTICIDE RESISTANCE IN WESTERN KENYA

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Malaria is a human disease caused by a sporozoan from the genus Plasmodium, transmitted by a bite of Anopheles mosquitoes. Insecticides remain the major tool for control of malaria vectors in Kenya and therefore the potential of such programs to be compromised by the reported insecticide resistance is a major concern. Studies in western Kenya have reported reemergence of morbidity and malaria attributed child mortality which has been linked to reported spread of insecticide resistance in anophiline mosquitoes. The aim of this study was to evaluate the residual effect of insecticides used for indoor residual spraying and impregnated on long lasting insecticide nets, and also determine the status of insecticide resistance in malaria vectors from western Kenya. Wall bioassays were performed on mud slabs and filter papers sprayed with lambdacyhalothrin and deltamethrin using mosquitoes collected from Ahero, Kisian, Chulaimbo, Emutete, Emakakha, Iguhu and Kabula. Net bioassays were performed on long lasting insecticide nets (LLINs) collected from the field using wild caught mosquitoes from Emutete and Kabula. Kisumu strain, a susceptible reference strain was used as a control. Chemical analysis of the netting material was performed using gas chromatography. World Health Organization tube bioassays was conducted using standard diagnostic dosages of Lambdacyhalothrin, Deltamethrin, Permethrin, DDT, Bendiocarb and Malathion tested on Anopheles mosquitoes collected from Ahero, Kisian, Chulaimbo, Emutete, Emakakha, Iguhu and Kabula. Biochemical assays, where the enzymatic activity of three enzymes (monooxygenases, esterases and Glutathione S-trasferases) were performed on susceptible and resistant mosquitoes preserved after WHO tube bioassays. Mosquitoes were identified to species level using Polymerase Chain Reaction. Genotyping was done on the susceptible and resistant mosquitoes after the WHO tube bioassays using Real-Time Polymerase Chain Reaction. Pyrethroid susceptible An. gambiae and An. arabiensis colonies from Bungoma and Ahero was raised and their genetic and biochemical changes monitored from generation to generation. The mortality of mosquitoes from all sites decreased significantly with time after spraying (75% mortality after six months) and with the age of the LLINs (60% mortality after 24 months). Insecticide concentration decreased significantly from 0.14 µg/ml in new LLINs to 0.077 µg/ml in LLINs older than 18 months. WHO susceptibility tests indicated that An. gambiae has developed high level of resistance to pyrethroids and DDT in Ahero, Kisian, Chulaimbo, Emutete, Emakakha, Iguhu and Bungoma. Resistant to bendiocarb in Iguhu and Kabula and susceptible to Malathion (100% mortality) in Ahero, Kisian,
Chulaimbo, Emutete, Emakakha, Iguhu and Bungoma. There was an elevation of monooxygenases and esterases enzymatic activities in resistant An. gambiae mosquito populations exposed to Lambdacyhalothrin, Permethrin, Deltamethrin and DDT but no elevation in glutathione s-transferases. A high frequency of L1014S allele was detected in An. gambiae s.s. population but there was no kdr allele found in An. arabiensis mosquitoes. Successive selection for deltamethrin resistance showed a steady increase in the mosquito mortality with 100% mortality in fifth and third generations for Kabula and Ahero mosquitoes respectively. The frequency of the homozygous ss (L1014s) allele was high in the first generation of Kabula mosquito populations but reduced in the subsequent generations. Long lasting insecticide nets should be replaced with new nets every three years and not five years as recommended and also high levels of ITN coverage and usage should be maintained. There is also an urgent need for development and deployment of non-pyrethroid based vector control tools.

HEAT AND MASS TRANSFER PAST A SEMI – INFINITE VERTICAL POROUS PLATE IN MAGNETOHYDRODYNAMICS (MHD) FLOW IN TURBULENT BOUNDARY LAYER.

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Turbulent flows in electrically conducting media (MHD) remains one of the last unresolved problems in engineering industry and classical physics, but has general importance for the evolution of astro and geophysical plasmas. Turbulence in plasmas, i.e. ionized gases, also offers valuable insights into the not yet fully understood nonlinear dynamics of spectral cascades and structure formation due to the presence or generation of magnetic fields. These allow additional diagnostic access to the underlying nonlinear interaction of turbulent fluctuations. In experimental devices for thermonuclear fusion the magnetically confined hot plasma is basically collisionless and requires kinetic treatment. Exceptions are the thin and comparably cool edge layer near the vessel boundaries and plasmas in reversed-field pinch configurations. Turbulent plasmas in or beyond the earth often allow a fluid description due to the immense size of the dynamical regions and associated timescales of interest compared to the effective mean-free-path and the frequencies related to the plasma particles. Since plasma turbulence is a fully nonlinear problem comprising the
dynamics of many interacting degrees of freedom, the relatively simple single fluid
description of magnetohydrodynamics (MHD) represents a sensible starting point for
theoretical and numerical investigations. The interesting properties of MHD turbulence lies
mainly in its potential universality, that is to say the inherent properties of turbulence might
well be important for the dynamics of systems involving gravity, radiation, rotation, or
convection. Many authors have studied the theory of magnetohydrodynamics (MHD) flow
problems as well as to various methods of solving these problems though mostly addressed
heat and mass transfer with Hall and ion-slip currents in laminar boundary layer and
rotating turbulent system past a semi-infinite vertical porous plate. In this research work
we address the problem of heat and mass transfer of unsteady free convection
incompressible fluid flow past a semi-infinite vertical porous plate in (MHD) flow in
turbulent boundary layer, in the presence of a strong magnetic field inclined at an angle $\theta$
to the plate with Hall and Ion-Slip currents. The determination of the concentration,
temperature and velocity profiles' distribution for fluid flow, the rate of heat transfer, the
skin friction, rate of mass transfer and effects of various flow parameters on the turbulent
boundary layer fluid flow field are carried out. An explicit finite difference approximation
method is used to analyze the partial differential equations governing the flow for a heat
generating fluid with Hall and ion-slip effects. The computation of skin friction, rate of
heat and mass transfers at the plate is achieved by Newton’s interpolation approximation
over the first five points. In both cases when $\text{Gr} < 0$ (in the presence of heating of the plate
by free convection currents) and $\text{Gr} > 0$ (in the presence of cooling of the plate by the free
convection currents) have been discussed extensively. The effects of various flow
parameters on the convectively cooled or convectively heated plate restricted to turbulent
boundary layer is considered. The results demonstrate that, Hall current, Schmidt number,
Modified Grashof number, Heat source parameter, Suction velocity, Time, Angle of
inclination, Ion-Slip current on the convectively cooled or convectively heated plate affect the velocity, temperature and concentration profiles. Increases in Hall current parameter cause a decrease in both primary and secondary velocity profiles while increase in Ion Slip current, decreases primary velocity profiles but increases secondary velocity profiles. As a result, skin friction, rate of heat and mass transfers are altered by their variations.

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EVALUATION OF BENZENE AND TOLUENE LEVELS FROM SPRAY PAINTING AND EXPOSURE SYMPTOMS AMONG INFORMAL AUTO-GARAGE SPRAY PAINTERS IN NAIROBI, KENYA.

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Volatile Organic Compounds (VOCs) are naturally occurring as well as man-made chemicals. They range from harmless, to highly mutagenic and carcinogenic types. Benzene and toluene are among the widely used VOCs as solvents and diluents in products such as paints. Users of benzene and toluene are at risk of hazardous exposure from the two VOCs. In informal small scale auto garages, unavailability of data on exposure, and lack of exposure control to benzene and toluene may lead to risk of acquiring ill-health symptoms associated with benzene and toluene exposure. The aim of this study was therefore, to evaluate the levels of benzene and toluene and, their exposure symptoms among spray painters in informal small scale auto garages, through a cross-sectional and analytical method of study. The study population comprised of eighty seven active and non active spray painters and based on three objectives; levels of benzene and toluene emitted into the ambient air, levels of hippuric acid and phenylmercapturic acid as biomarkers of toluene and benzene exposure respectively and, Forced Vital Capacities (FVC%), Forced Expiratory Volume in one second (FEV1%) and the ratio of FVC%/FEV1% as spirometry parameters of exposure symptoms. Benzene and toluene gases were sampled by use of passive air samplers. The average amounts of benzene and toluene were 73.46ppm and 61.22ppm respectively, against WHO’s recommended maximum of 0.5ppm for benzene and 50ppm for toluene. The amounts of benzene and toluene were significantly high, (P = 0.0001) and (P = 0.001) respectively. Urine samples collected from spray painters were analyzed for hippuric acid and phenylmercapturic acid as biomarkers of exposure to toluene and benzene respectively. The results for active spray painters yielded an average of 0.3466g/gcr of hippuric acid and 2.25µg/g of phenylmercapturic acid, while the results for non active spray painters yielded 0.183g/gcr of hippuric acid and 0.960µg/gcr phenylmercapturic acid. The amount of hippuric acid and Phenylmercapturic from active spray painters
were significantly high ($P = 0.010$) and ($P = 0.0001$) respectively ($P < 0.05$) compared to non active spray painters’. Spirometry method was used to evaluate respiratory symptoms of exposure among spray painters. Active spray painters’ FEV1% was an average of 78.6%, while non active spray painters’ had 88%. The results indicated a significant difference in the levels of FEV 1 % for the two groups ($P = 0.013$). Also active spray painters’ average FVC% was 76.07%, while non active spray painters’ was 85.25%. The results indicated a significant ($P = 0.004$) among the two groups. The active spray painters had a low FVC% and FEV1% compared to WHO recommendations of 80%-120%. In addition, active spray painters’ FVC% decreased with the increase in number of years and hours worked. The study concluded that active spray painters had reduced lung capacities and obstructions due to exposure to benzene and toluene from spray painting and, recommended the results to guide policy on benzene and toluene exposure control and awareness creation among small scale auto spray painters and, further study on prevention methods.

EFFECT OF NUTRITION EDUCATION ON COMPLEMENTARY FEEDING PRACTICES AND NUTRITION STATUS OF INFANTS: A CLUSTER RANDOMIZED-TRIAL IN ONDO STATE, NIGERIA

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Malnutrition during infancy has been linked to lack or poor knowledge of appropriate feeding practices among caregivers. This study investigated the effect of nutrition education on adequate complementary feeding practices among caregivers as well as the nutrition status of infants (5-11months) in Ondo State, Nigeria. The study adopted cluster randomized controlled trial design. The study participants were assigned to two groups. One intervention and one control group in a ratio of 1:1. The sample size was 142 for intervention group and 142 for the control group. Nutrition education on complementary feeding was carried out among the caregivers in the intervention group and the control group received no nutrition education from the research team. The participants in the intervention group received four (4) lesson sessions per group. The lesson sessions were based on timely introduction of complementary feeding, meal frequency and planning, dietary diversity, minimum acceptable diet, hygiene and responsive feeding. To determine the complementary feeding knowledge, attitude and practices of the caregivers as well as the nutrition status of the infants, data were collected from caregivers at the infants’ age 6, 8 and 11 months. For knowledge and attitude, complementary feeding knowledge and attitude based questionnaire were used. For complementary feeding practices, 24-hr dietary recall was used and nutrition status assessment instruments were used to determine the infants’ nutrition status. Focus group discussions and key informant interviews were conducted for qualitative data. Data were analyzed using SPSS version 22.0. From the analysis, there was no significant difference in demographic and socio-economic status of the caregivers. There was a significant difference in the complementary
feeding mean knowledge score of the caregivers after the intervention at the endline (4.0; p<0.001) and the (Difference in Difference (DID) between baseline and the endline was 4.06 (p<0.001) and the complementary feeding mean attitude score of the caregivers was 3.82; p<0.001) at the endline. The mean nutrients intake of the infants in the intervention group was higher than the control group as analyzed by nutri-survey. The mean energy intake of infants in the intervention group was higher both at the midline (259g±20.67) and at the endline (366.7g±23.03) than those in the control group both at the midline (121.1g±17.05) and the endline (212g±22.04), these were both significant (p<0.001). From Kaplan-Meier analysis, continued breastfeeding survival at age 11 months was 94.4% in the intervention group and it was 69.7% in the control group (p<0.001). Adjusted Relative Risk (ARR) was used to determine the effect of nutrition education on the intervention group and control group for variables such as Minimum Acceptable Diet (ARR: 3.13; CI:2.53-5.16; P<0.001) at the endline. There was a significant difference in WAZ (t.test; p<0.001), WHZ (t-test; p<0.001) and in HAZ (t-test; p=0.049). The infants in the intervention group had improved nutritional status than the infants in the control group. This study concluded that nutrition education based on complementary feeding guidelines improved the feeding practices of the caregivers. Therefore, the study recommends that Ministry of Health in Ondo State should encourage complementary feeding training for caregivers and CHEWs at the various Basic Health Centers in the State.

EFFICACY OF ORTHOTICS AND EXERCISE IN ALLEVIATING OCCUPATION-RELATED LOW BACK PAIN AMONG SECONDARY SCHOOL TEACHERS IN NAIROBI CITY COUNTY

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Low back pain is a major concern in many occupations; Depending on workplace characteristics, some individuals are more at risk than others. Low back pain among teachers may be attributed to working conditions which involve standing, walking, bending, twisting, writing on the board as well as sitting for a long period of time. The presence of flatfoot may aggravate low back pain because of the role that the foot plays in absorbing and transmitting forces during weight bearing activities. The current study therefore, sought to investigate the efficacy of foot orthotics and core stability exercises in alleviating low back pain among the teachers. It also investigated the prevalence of low back pain and incidence of flat footedness among teachers in public secondary school in Nairobi City County, Kenya. The study adopted a sequential mixed methods research design, comprising an initial survey phase followed by an experimental phase. 250 teachers from 15 public secondary schools were sampled for the survey phase of the study and 62 teachers presenting with low back pain and flat foot were identified and randomly placed into the control and experimental groups. Data was collected using questionnaires and observation protocols and later analysed using statistical package for social sciences (SPSS, 20). Data was presented in charts and frequency distribution tables. The chi-square, dependent t-test and one-way ANOVA were used to test the hypotheses. The results indicated that: more female (55.6%) than male
(44.4%) teachers took part in the study, the teachers ranged from 1-5 to above 30 years of teaching experience. Majority of the teachers (63.2%) suffered from low back pain and that more female teachers (36.4%) than male teachers (26.8%) reported the pain. Duration of employment significantly ($X^2 (6) = 22.9, p=0.001$) influenced the occurrence of low back pain among teachers who had worked for 16-20 years reporting the highest prevalence (14.8%). It was also evident that majority (71.2%) of those who presented with low back pain reported minimal disability, that more female (38.4%) than male teachers (32.8%) reported minimal disability and 11.6% male teachers and 16.8% female teachers reported moderate disability. Duration of employment significantly influenced low back pain disability ($X^2(6) =34.62, p=0.001$). It was evident that teachers who had worked for a longer period of time had a significantly higher disability index than those that had worked for a shorter period. The occurrence of low back pain among the teachers did not have a significant influence ($X^2 (1) =0.24, p=0.63$) on teaching in relation to gender; however it was significant in relation to duration of employment ($X^2 (6) = 15.86, p=0.015$). It was also noted that 40% of the participants had flat feet; 22.4% were female while 17.6% were male. The occurrence of low back pain was also associated with the presence of flat feet ($\phi=0.3, p<0.001, OR=4$). Low back pain disability index differed significantly before and after the intervention ($t (61) 6.98, p<0.05$): significant improvements were reported in both gender and across duration of employment. Significant differences were reported between the control and the experimental group. In addition, the orthotics and exercise group seemed to have led to the greatest improvement. It was therefore, concluded that a large number of the teachers who took part in the study suffered from low back pain, a large percentage had flat foot and that foot orthotics and core stability exercises helped effectively in reducing low back pain among the teachers.

PREVALENCE OF PSYCHOLOGICAL TRAITS OF OVERTRAINING AMONGST ELITE MALE FIELD HOCKEY AND SOCCER PLAYERS IN TOP NATIONAL LEAGUES IN KENYA

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The literature supports that overtraining is characterised by psychological disturbances. The purpose of this study was to assess the prevalence of psychological markers of overtraining amongst elite male hockey and soccer players in top national leagues in Kenya. The study was limited to selected mood states of anger, confusion, depression, fatigue, tension and vigour that are applicable when assessing the mood states of athletes in exercise settings. Association between mood states of elite male hockey and soccer players and demographic characteristics of type of sport, age category, playing experience, playing position and starting status were also examined. The study hypothesized that there is no significant difference in players’ demographic characteristics of type of sport, age, level of experience, playing position and
starting status on the mood states of anger, confusion, depression, fatigue, tension and vigour among elite male hockey and soccer players in the Kenyan top National leagues. The study provided information on markers of overtraining amongst elite male hockey and soccer players in Kenyan top National leagues. There is paucity of literature regarding overtraining in Kenya and thus a gap exists in establishing the prevalence of psychological markers of overtraining amongst elite male field hockey and soccer players in top national leagues. The target population for the study comprised elite male hockey and soccer players in top national leagues in Kenya. In both groups (hockey and soccer), a total of 324 participants (162 hockey players and 162 soccer players) were sampled through stratified random sampling at the beginning of the league (pre-test). A total of 232 participants (116 hockey players and 116 soccer players) were included in the study resulting into response rate of 71.6%. The research adopted quasi-experimental research design. The research adopted the standard version of the Profile of Mood State questionnaire (POMS). Data were coded and analyzed using Statistical Package for Social Sciences (SPSS version 22.0). T-test was used to determine whether there was any significant difference between the mood state profiles of hockey and soccer players and between starters and substitute players. One-Way ANOVA was used to test the data relating to age, playing experience and playing position and the subscales of overtraining at a significance level of Ps 0.05. Results indicated that the two groups (elite male hockey and soccer players) differed significantly as far as mood state profiles were concerned. Also, the results indicated that in hockey, there was a significant difference in change in tension between players in 1-3 years’ level of playing experience and those who were in the 7-9 years’ level of experience. In addition, results revealed that there was a significant difference between defender and attacker positions with regards to change in fatigue in soccer. The results further showed that there were no significant differences in the mood state profiles among players in varying age groups, playing experience and starters and substitute players of hockey and soccer players. In conclusion, the study revealed that psychological markers of overtraining were prevalent among elite male hockey and soccer players unlike on the demographic characteristic of age, level of experience, playing position and starting status. The study therefore recommended that there is need for coaches and other stakeholders to assess their players’ mood states during the season, examine players’ mood states in different experience levels as well as investigate players’ mood states in different playing positions. The study makes recommendations for policy, practice and further research.

EFFECT OF EXERCISE AND MAGNESIUM ON BLOOD PRESSURE AND HEART RATE IN HYPERTENSIVE ADULTS IN NAIROBI AND KIAMBU COUNTIES, KENYA

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Physical exercise and magnesium have both been shown to independently cause reductions in blood pressure (BP). The primary objective of this study was to investigate the combined effect of exercise and magnesium on blood pressure. The secondary objective was to investigate the effects on resting heart rate (RHR) over a 6-week period. Forty-seven (47) hypertensive adults (25 males and 22 females) who were recruited from Kenyatta University and Thika Level 5 hospital, were randomly assigned to an exercise only group (EX; n=15), magnesium only group (MGS; n=18), and a combination of exercise and magnesium (EMG, n=14). The EX and EMG group performed moderate intensity circuit training (40≥60 VO2max) for 45 minutes, 5 times a week, with intensities being monitored using a heart rate monitor (Garmin, Olathe, Kansas, US). The EMG group also took magnesium citrate supplements (Now, Bloomingdale, IL, US) (500 mg/day) concurrently with the MGS group. This was a pretest-posttest experimental study where Brachial BP (using a Mercury Sphygmomanometer: Rudolf Reister GmbH, Bruckstr, Jungingen, Germany), RHR, and anthropometric measurements (Height, weight, hip circumference and waist circumference) were taken at baseline, mid-point and posttest. Data were analyzed using SPSS version 25 and Microsoft Excel 2013 for Windows. The significance levels were set at p<0.05. Data were tested for normal distribution using the Shapiro-Wilk test while the Levenes test were used to test for data normality, which classified all the data as parametric. A paired t-test was used to compare mean differences within the groups, while a two-way ANOVA were used to compare mean differences from baseline, mid-point and post-test between the groups. If the differences between pretest and posttest were statistically significant,
the Bonferroni post-hoc test was used for pairwise comparisons. A linear regression analysis was used to determine the relationship between BP and RHR. The EMG group had the largest reduction in SBP (-7.1 ± 2.2 mmHg, p<0.001) followed by the EX group (-4.6 ± 3.1 mmHg, p<0.001) and then the MGS group (-2.3 ± 2.7 mmHg, p<0.05). At midpoint (3 week), the EMG group were the only group to have a significant (p<0.05) reduction (-3.57 ± 3.2 mmHg) in SBP. There were reductions in DBP within the EMG group (-4.9 ± 4.4 mmHg, p<0.001) and EX group (-3.4 ± 3.9 mmHg, p<0.05) however none differed significantly between the two groups (p>0.05). They were however higher than the reductions in DBP in the MGS group (-1.0 ± 5.2 mmHg, p>0.05). The reduction in RHR were the highest in the EMG (-10.9 ± 4.0 bpm, p<0.05) followed by the EX (-6.0 ± 4.9 bpm, p<0.001), while the MGS (-2.9 ± 6.1 bpm, p>0.05) group did not have a significant reduction. At the end of the study 19 individuals had achieved pre-hypertension status (SBP 120-139 mmHg and DBP 80-90 mmHg) (EMG; n=7, EX; n=7 and MGS; n=5) from grade 1 hypertension status. Our findings suggest that a combination of exercise and magnesium causes a larger reduction in SBP than exercise or magnesium alone. This combined method also enhances the speed with which this BP reduction occurs. This study suggests that individuals with hypertension can get an enhanced BP lowering effect by combining exercise and magnesium rather than using either one of the methods independently. Secondly, a combination of magnesium and exercise is more effective at reducing RHR than exercise alone, while magnesium supplements do not cause any significant reduction. The study recommends implementation of a combined exercise and magnesium regimen as part of the treatment plan for individuals with Grade 1 hypertension within lower and middle income countries.

EFFICACY OF PSYCHO-EDUCATIONAL NUTRITION INITIATIVE ON ENERGY AND MICRONUTRIENT INTAKE, PHYSICAL ACTIVITY AND PREGNANCY OUTCOMES IN MIGORI COUNTY, KENYA
A large number of pregnant women in many parts of the world enter pregnancy at sub-optimal weight and height. A third of Kenyan population suffer from food insecurity that is further complicated by factors such as adverse weather conditions and increases in food prices. The result is malnutrition which primarily affects pregnant women and children under five years and significantly contributes to their morbidity and mortality. Maternal nutrition is critical for both mother and child as it lays fundamental foundation for the successful outcome of pregnancy. Kenya’s high rate of undernutrition among women of reproductive age are due to sub-optimal feeding practices, heavy workload, inadequate micronutrient intake and insufficient awareness and knowledge on nutritionally adequate diets among pregnant women leading to preterm births, low birth weight, high mortality and morbidity, impaired growth, and increased risks during childbirth for both mother and child. This study sought to investigate socio-demographic characteristics, determine nutrition knowledge and health conditions and effect of nutrition education on nutrition knowledge and dietary practices, assess energy and micronutrient intake, determine physical activity levels, and determine pregnancy outcomes and associations between psycho-educational nutrition initiative and nutrient intake, physical activity and pregnancy outcomes among pregnant women in Migori County. A prospective cohort study design was used and simple random sampling was used to obtain a sample of 150 pregnant women from three sub-county hospitals purposively selected for study. Pregnant women of GA ≤26 weeks were recruited and enrolled into psycho-educational nutrition intervention study. Data was collected by 24 hour recall, International Physical Activity Questionnaire, biochemical analysis, anthropometric measurements and secondary data. Data was collected at baseline and after intervention for each woman and analyzed by Nutri-Survey computer package, IPAQ scoring protocol and SPSS. Data was summarized by descriptives and relationships between variables was tested by Chi square, regression model and pearson’s product moment correlation. ANOVA and t-tests were used to test for differences between means. Findings showed that the pregnant women were of low economic status. Nutrition education had positive significant associations with nutrition knowledge and practices. Most women had good health with conditions interfering with their food consumption. Generally, there was improved dietary intake of all nutrients after the intervention although some did not meet the RDA even after intervention There was a slight reduction in physical activity factors and increased time for rest was observed after intervention although there was no significant reduction in activity levels (p ≤ 0.05). Weight gain (5.98 kg) was lower than recommended, mean gestation age was normal (37.74 weeks) but lower for preterm births category and mean BW (3039±489.5 g) was normal although 7% of new bornes had LBW. The study found significant effects of nutrition knowledge from the psycho-educational initiative on nutrient intake and pregnancy outcomes but found no effect on physical activity. The study concludes that nutrition education can be used to enhance pregnancy outcomes and nutrient intake among pregnant
women. The finding is important to central and county governments, civil society, intergovernmental agencies, research groups, business enterprises and community under study.

**SCHOOL OF ECONOMICS**

INNOVATION CAPABILITY AND GROWTH OF MICRO AND SMALL ENTERPRISES IN KENYA

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Dr. Paul Gachanja

EFFECT OF POVERTY ON HEALTHCARE UTILIZATION, CHOICE OF HEALTHCARE PROVIDERS AND HEALTH STATUS IN KENYA

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The importance of good health cannot be underestimated. However, presence of high poverty rates can lead to underutilization or lack of utilization of health care thus hindering achievement of good health. Thus, poverty reduction and improvement of health care utilization are important in ensuring enjoyment of good health. Despite Kenya’s commitment to reduce poverty and improve health status of her citizens, between 1982 and 2014, poverty remained high above 40 per cent. However, in 2015/2016, poverty was estimated to have reduced to 36.1 per cent. This was against the Millennium Development Goals target of halving poverty by 2015 and the Sustainable Development Goals target of eradicating poverty by 2030. Kenya’s health indicators have also not been impressive. Infant mortality rate, for instance, stood at 39 deaths per 1,000 live births in 2014 against Millennium Development Goals target of 22 by 2015. Maternal mortality rate remained high at 362 deaths per 100,000 live births in 2014 against Millennium Development Goals target of 147 by 2015. The Sustainable Development Goals target is to have less than 70 deaths per 100,000 live births by 2030. This poor performance in health indicates that the country needs to address the health challenges otherwise it will miss on the development goals by 2030. Health care utilization has also been low. Household members who reported illness and never sought health care stood at 22.8 per cent in 2003, before dropping to 16.7 per cent and 12.7 per cent in 2007 and 2013, respectively. Those who fell sick and reported lack of
finances as the main reason for not seeking medical attention constituted 44 per cent in 2003, 38 per cent in 2007 and 21.4 per cent in 2013. These statistics point to poor health care utilization due to poverty. The aim of this study, therefore, was to investigate the effect of poverty on healthcare utilization, choice of healthcare providers and health status in Kenya. The study employed a non-experimental cross-sectional research design. The study used the Kenya Household Health Expenditure and Utilization Survey dataset of 2013. To achieve objective one, the study used Negative Binomial Regression Model, while Multinomial probit was used to address objective two. Objective three was addressed using ordered probit model. In all the three objectives, Two Stage Residual Inclusion and Control Function models were used to control for possible endogeneity and unobserved heterogeneity. Study findings showed that increase in wealth increases health care utilization. Further, the results revealed that as wealth increased, the probability of visiting private hospitals increased while those of visiting government, mission and other health facilities declined. The results also revealed that, those with higher wealth index were more likely to report better health status compared to those with lower wealth index. The results, therefore, indicates that increase in wealth increases healthcare utilization, motivates individuals to seek healthcare from providers considered to offer high quality health services and improves health status. Thus, although Kenya missed some health related Millennium Development Goals, if poverty is addressed, the country can do better in its efforts to achieving the Sustainable Development Goals and the country’s development plan, Kenyan Vision 2030.

SCHOOL OF ENVIRONMENTAL STUDIES

IMPACTS OF DECENTRALIZED GOVERNANCE ON FOREST CONSERVATION AND COMMUNITY LIVELIHOODS IN KAKAMEGA AND LOITA FORESTS, KENYA

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There is a global trend towards decentralizing the management of forests. Forestry decentralization in Kenya is relatively new with enabling legislation having been promulgated in 2007. The impact of decentralization on forest management and livelihoods has not been adequately studied. The study overarching aim was to assess the impacts types of forest governance on forest conservation and community livelihoods, analyse the institutional factors that support and constraint decentralization of forest governance and recommend how to appropriately implement decentralized forest management in Kenya. The study was conducted in three sites: community regime in Loita Forest, full government control (government regime) in Kakamega Forest National Reserve (KFNR) and Participatory Forest Management (PFM) regime in Kakamega Forest Reserve (KFR). Households adjacent to the forests under study were randomly selected and questionnaires administered. Recall questions were administered to
households in the PFM regime in order to attribute any observed livelihood impact at household level to PFM; Key informants from government departments as well as local and international non-governmental institutions were interviewed. Changes in forest condition and area over the last 30 years were determined through interpretation of satellite images using fragmentation analysis and confirmed through ecological studies. Data were analyzed using descriptive, parametric and non-parametric statistics and evaluated at P=0.05 level of significance. Chi-square tests and simple linear regression were conducted to explore perceived decentralization management scenarios and to check the relationship between quantity of resource accessed and distance into the forest as well as other quantitative characteristics of the household respectively. It was observed that promulgation of The Forests Act, 2005 revised to The Forest Conservation and Management Act (2016) was a bold step that signalled the start of decentralization of forestry governance in Kenya. The households in the government regime (84.5%) and the community regime (78.2%) indicated that the forest was better managed compared to 55.7% in the PFM regime. Joint community and government management individually did not contribute optimally to better forest management but it was perceived to have more benefits. The households and policy-makers respondents indicated that there was change in forest condition with the community noting a significant decrease of forest size across the different forms of management ($\chi^2 = 27.614$, p<0.05). This was confirmed by satellite images analysis. Though the government regime approach was good for biodiversity conservation, it contradicted concepts of sustainable development, does not enhance equity and impoverish communities. In the PFM regime, the policy-makers indicated forestry management was under decentralization (87.2%) and PFM was the major management approach (58%) applied in Kenya. Though the study indicates that each regime was appropriate in its own context, PFM regime was indicated to be the preferred regime because it: facilitates better forest management and improved household livelihoods; ensures that the five types of property rights are not the preserve of one stakeholder; was drifting towards devolution; was facilitating the subsidiarity principle and does not negatively impact on the greater common good; was empowering the partners at all levels; ensures the communities have tenure rights over some forest products and there are incentives in place to manage the forest sustainably. The PFM regime ensures the State decentralize power to Community Forest Associations (CFAs). It confers legitimacy through election of CFA by members whom they all interact with and whom they are accountable to. This enables the community to build social capital necessary for better forest management and improved household livelihoods.

DROUGHT, LAND USE CHANGE AND LIVELIHOOD DIVERSIFICATION AMONG PASTORAL COMMUNITIES IN OLTIASIKA, KAJIADO COUNTY, KENYA

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Supervisors: Prof. Simon Onywere

Prof. Chris Shisanya
This study investigated the implication of drought and land use changes on pastoral livelihood in Oltiasika area of Chyulu-Amboseli ecosystem. The study objectives were to assess the relationship between drought and vegetation conditions, assess biophysical changes that have occurred in Oltiasika between 2009 and 2016, and analyse the effect of livelihood diversification on household drought resilience. Rainfall data was obtained from Soil and Water Assessment Tool (SWAT) climate database, Moderate Resolution Imaging Spectro-radiometer (MODIS) Normalized Difference Vegetation Index (NDVI) data was obtained from the University of Natural Resources and Life Sciences (BOKU) in Vienna, while land use changes detection was analysed using Google Earth images. Primary data was generated through a cross-sectional survey carried out in January-February 2015 in a sample of 354 households. Auto regression analysis of Normalized Difference Vegetation Index (NDVI) and Standardized Precipitation Index (SPI) was carried out to investigate the relationship between drought and vegetation greenness. Herfindahl-Hirschman Index was computed to measure the degree of household livelihood diversification and Ordered Logit Regression analysis was performed to examine the effect of diversification on household resilience. The results showed that between 1983-2014 145 months were categorized as drought based on their Standardized Precipitating Index (SPI). Months with severe drought (SPI value between -1.50 and -1.99) were the most common (69 months) followed by those with mild drought (SPI ranging between -1.00 and -1.49) in 57 months, while extreme drought (SPI less than -2.00) occurred in 19 months. The vegetation greenness for the period 2000-2016 produced Normalized Vegetation Difference Index (NDVI) with a mean of 0.34, which is below the normal mean (0.5). The driest period in the area was observed in September 2004 when the NDVI value was 0.193, while the wettest was in December 2006 with NDVI value of 0.62. The study found a significant relationship between NVDI and SPI with an R2 of 59.6% and revealed that vegetation condition responded positively to drought with a lag period of two months. In the sampled sites between 2011 and 2016 the area under cultivation increased by 707% while the number of Manyatta settlements increased by 37.5%. Results of the Herfindahl-Hirschman Index showed that 22.73% of the households had an index of less than 0.25 and only 2.84% had an index greater than 0.5. Further, household’s capacity to meet food requirements decreased with age and household size, while, education, total assets and net non-farm income had no effect. A unit change in the degree of diversification was associated with a 17.1% more likelihood for a household to fall in a strong category to meet food requirement, a 13.5% less likely to belong to a moderate category and 9.2% less likely to fall in a low category. Biophysical changes taking place in the area had limited the availability and accessibility of pasture upon which pastoralism thrive. While crop farming may provide answers to the immediate challenges confronting pastoral communities, the prevailing cultural and physical limitations makes this livelihood an ecologically destructive system. Pastoralism remain the most suitable livelihood activity in dry lands and adaptation actions, which complement rather than substitute it, should be encouraged.

SCHOOL OF CREATIVE ARTS, FILM & MEDIA

PARTICIPATORY FILM AS A TOOL FOR SOCIAL CHANGE AMONG DRUGS AND SUBSTANCE USERS IN KIAMBU COUNTY, KENYA

Susan Nyawira Gitimu-PHD
Drugs and substance use in Kenya has reached crisis levels. Kiambu County has been especially cited as a hotspot for this catastrophe. Whereas different stakeholders have responded to this vice through legislative, legal and social methods, its persistence suggests a need to rethink the methods of mitigating this problem and their efficacy. This is precisely the justification for this study that examined the use of participatory film as an alternative tool for motivating social change among drugs and substance users in Kiambu County. Specifically, the study’s main objective was to establish the extent to which participatory film can be productively used as a pedagogical tool, to render and publicize the clearly sidelined views of drugs and substance users, and finally, as an exercise that can empower these users. The study used social change theory, qualitative research method, and descriptive study design to achieve these objectives. Using both probability and non-probability sampling, it selected two hundred members from fourteen self-help groups comprised of drugs and substance use victims in Kiambu County. Participants were recruited as experts out of their lived experiences, and guided to generate participatory data, as part of the primary data for the study. Other primary sources of data included participatory observation, focus group discussions (FGD), and interviews. Secondary data was collected through review of literature. As argued throughout this thesis, the findings affirmed that participatory film can be used as a tool for motivating social change among drug and substance users in Kiambu County. Through this argument, the study joins scholarship on film and social change and recommends the use of participatory film to other researchers and practitioners in the fields of film for development and the wider development communication. This approach is also recommended as beneficial to filmmakers and social change activists aiming to motivate change among different marginalized groups.

ASSESSMENT OF ADOPTION OF TEACHERS’ SERVICE COMMISSION DRESS CODE BY FEMALE TUTORS IN PUBLIC TEACHER TRAINING COLLEGES IN KENYA

Dorothy M. Munyua-PHD

In an effort to maintain clothing styles within the teaching fraternity, Teachers Service Commission came up with design sketches for incorporation in dress code in 2006. The TSC manual of code of conduct and
regulations, states that tutors should dress decently and be presentable. Numerous studies have been done in Kenya on clothing selection among teachers and other groups; however, there is limited documentation regarding dress code for tutors. This gap inspired a study to assess the extent of adoption of TSC dress code among female tutors in Teacher Training Colleges in Kenya. The purpose of the study, therefore, was to establish factors influencing clothing preference and adoption of dress code. The following objectives guided the study: to identify the socio-demographic characteristics of tutors, to establish the level of awareness of the TSC dress code, to identify functional, expressive and aesthetic garments elements that female tutors consider, and to establish the relationship between selected variables and adoption of TSC dress code among others. A cross-sectional survey research design was employed where a mixed method design was used to collect and analyze the data. Cluster and random sampling methods were used to select from a target population of 613 female tutors in all twenty-four public teacher training colleges in Kenya. The sample size comprised of 184 female tutors. Data was collected using questionnaires and observation checklists. Data were analyzed, and results presented using tables, frequencies, and percentages. Chi-square test of independence was used to establish the relationships among independent variables and the dependent variable. Qualitative data were summarized by grouping the responses of open-ended questions thematically based on each question. The results revealed that majority (62.8%) of the respondents in this study were lecturers, with a master’s degree and the average age of 47 years old. Most of the tutors were married (79.8%), with between one and three dependents and 56 percent earned up to Kshs 55,000 monthly. The study established that a higher percentage of those who were aware of the TSC dress code requirement was conforming. However, observation revealed that the majority of female tutors had close-fitted garments, 51.7% had clothes exposing cleavage, and 3.3% wore transparent garments. In terms of hypothesis testing, there was a significant relationship between the net monthly income (Chi-Square value 8.336 and p-value of 0.004), levels of awareness of TSC dress code (Chi-Square value of 18.878 and p-value of 0.000) and adoption of the TSC dress code. In conclusion, factors that influenced clothing preference and adoption of TSC dress code were the age of respondent, net income, and the level of awareness. Functional, expressive, and aesthetics garment elements were a comfortable garment, well-constructed garment and one’s personality. A manual of clothing styles was developed based on the clothing styles most preferred by female tutors that could be incorporated into the TSC dress code. The study recommends that the Teachers’ Service Commission should put into account the views of tutors and fashion trends when revising and implementing a formal dress code.

CONFIGURATION OF KENYAN FILM ACTING: A STUDY OF EIGHT SELECTED DRAMA FILMS

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Dr. Kisa Amatse

Acting is one of the most obvious items that one observes in a play or film. Indeed, when one goes to watch a play or film, one usually observes the characters acting so as to tell the story dramatically.
However, it ought to be appreciated that actors/actresses perform differently according to their abilities, creativity, social contexts and culture. Hence, this study aimed at analysing the techniques of acting as employed in selected Kenyan films by establishing their characteristics and comparing them to established theoretical frameworks. This research analyses eight films, namely: Killer Necklace (2008) by Judy Kibinge, Weakness (2009) by Wanjiru Kairu, Maisha (2010) by Andrew Odera, Taharuki (2011) by Ekwa Msangi-Omari, Pulse (2011) by Erick Wanyama, Madam Chief (2011) by Joan Kabugu, Blurred Birth (2011) by Victor Ogolah and My Faith (2014) by Bruce Makau. This is a descriptive study, which employed System Acting, External Acting Method and Speech Act Theory as its base theories. The study employed the theories with the aim of verifying the effect of the social environment on the actor/actress and identification of patterns inherent in the acting techniques. The first Chapter of the study acts as an introduction, with the second Chapter analysing the actor’s/actress’ use of voice. The third Chapter examines the actor’s/actress’ use of facial expressions, gestures and postures. The fourth Chapter deals with the actor’s/actress’ use of movements, stage business and proxemics. The final Chapter forms the conclusion and it observes that there are discernible patterns employed in acting and although most of the actors and actresses interviewed had attended short topical workshops conducted by various directors and academicians on performing, they were not grounded in acting theory. Hence, most of the time they performed their roles through their understanding and observations of how individuals operated in society. Finally, the study notes that acting techniques employed by the actors/actresses had a communicative value as focus group participants were able to accurately identify the facial expressions, gestures, postures, movements and proxemic elements in the frames and short video clips derived from the selected films.

CINEMA AS CULTURAL DISCOURSE: A STUDY OF CULTURAL SYMBOLS IN SELECTED CONTEMPORARY GĩKŬYŬ COMEDIES

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This study examined how cultural symbols are deployed in selected contemporary Gĩkũyũ vernacular comedies. The study sampled the following comedies; Mũci na Kũhĩĩ (He who steals with uncircumcised man), Kũrĩro kũ Mũna (A Cry for a Child) by Wandahuhu; Mũtikũnyarira (You will not torment me) and Ngũṅga Mũbote (A featherless guinea fowl) by Kũhenjo and Mũndũrũme nĩ Mũgamu (A Voice confers authority to a man) and Mũũthuri nĩ Mũtu ng (Character makes a man) by Machang’i. The study is conducted through reading and analysing the filmic texts, Focused Group Discussions, detailed content analysis and analysis of both primary and secondary data. This study investigated cultural symbols in Gĩkũyũ vernacular films by using film semiotics that assisted to investigate and explicate the film as cultural narratives, where the dialogue is a site for defining cultural voice, ideology, identity formations and individual sensibilities. The study concludes that emergence of Gĩkũyũ vernacular films is expediting cultural paradigms by documenting and exposing hitherto inert cultural nuances and discourses to light,
predominantly among the young urban dwellers and educated Gĩkũyũ speakers. Some of themes that are identified and discussed; rites of passage, gender relations, religion, social stratification, cultural expressions, and material culture. This thesis has also endeavoured to bring out salient observations arising from the study and accompanying recommendations as well as areas of further research in this academic front. Thus, this study contributes, in a modest way, to suggesting a systematic approach to the study of Gĩkũyũ vernacular films to appreciate and evaluate their symbolic and aesthetic impact as a powerful mass medium using semiotic discourse practices.
throughout the semester with majority teaching 14 hours per week. Additionally, some academic staff were involved concurrently in instruction of students within the university and supervision of others on teaching practice. Add to this the requirement to conduct research and publish. Such a huge workload makes it hard for all the obligations to be performed adequately. The respondents also admitted that increase of part-time academic staff was a disadvantage to the quality of B.Ed program since part-time staff were not involved in quality assurance and other important administrative tasks. Majority of the academic staff observed that on many occasions students failed to achieve 75% class attendance meaning that such students were not adequately instructed. It was noted that the proportion of self-sponsored students had surpassed that of government sponsored ones over time. Some classes, especially those involving common units, went as high as 400 students. Another problem affecting the B.Ed program is inadequate space in lecture halls. This was more prominent in common units such as those shared in the school of education including educational foundations and educational psychology. The study recommends that the universities management should adopt the model of mentor supervisors and regulate their recruitment, incentives and reporting in order to reduce the burden of B.Ed Academic Staff participation in teaching practice.

PEER-MEDIATED SUPPORT STRATEGIES FOR ENHANCING SOCIAL INTERACTION SKILLS OF CHILDREN WITH AUTISM SPECTRUM DISORDERS IN PUBLIC PRIMARY SCHOOLS, MIGORI COUNTY, KENYA

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A fundamental feature of social life is social interaction, or the ways in which people act with other people and react to how other people are acting, which is a deficit in learners with Autism Spectrum Disorders in Public Primary Schools in Kenya. It sought to establish peer-mediated strategies enhancing social interactions of children with Autism in Migori County, Kenya. The objectives were: peer-mediated strategies currently used by teachers, the extent to which play activities enhance social interactions of children with ASD, the influence of peer buddy approach on social interactions of children with ASD, the effect of peer networks on social interactions of children with ASD, and investigation of peer implemented pivotal response training on enhancement of social interactions in children with ASD. Observational Learning Theory was adopted and a descriptive survey design in this study. The sample size constituted 30% of target population: 10 schools, 10 head teachers and 37 assistant teachers. Thirty-four children with Autism and 64 typically developing peers also participated in this study. Five Educational Assessment and Resource Centre coordinators from each Sub-County education office in Migori County and 5 parents of children with Autism also participated in the study. The sampling techniques used in this study were stratified random sampling and purposive sampling. Mixed method approach was used to gather data. The research instruments used were questionnaires, interview schedule, Focus Group Discussion, and observation checklists. Piloting of the study was done at Senye Primary school in Nyatike Sub-County and analysis of instruements revealed a reliability of 0.80. Validity
of the instruments was judged by the experts. The data collected was analyzed using both descriptive and inferential statistics. The main techniques used to analyze the data were Predictive Analysis Software (PASW) formerly Statistical Package for the Social Sciences (SPSS) software version 22 and Chi-Square. The major findings of this study were that peer-mediated strategies such as play activities, peer buddy approach, peer networks, and peer-implemented pivotal response training, enhanced social interactions of children with Autism Spectrum Disorders. This study recommended that: Ministry of Education should develop programmes to ensure retention of children with Autism in public primary schools and initiate a competence-based curriculum that allows children with Autism to learn at their own pace and interest; parents of children with Autism should be trained on peer-mediated strategies to use with their children to enhance social interactions at home; the findings of this study should inform active formulation of policies and legislation relevant to the plight of children with Autism; Teacher Training Institutions and Universities should incorporate in their curriculum peer-mediated strategies enhancing social interactions in children with Autism to promote inclusion. Further research should be carried out in all counties in Kenya on peer-mediated strategies enhancing social interactions in children with Autism. In addition, further research should consider other areas of functioning in children with Autism. A similar study should be conducted in special schools serving children with Autism in Kenya.

EFFECT OF LEARNER-CENTERED INSTRUCTIONAL STRATEGIES ON ACADEMIC PERFORMANCE OF STUDENTS WITH CEREBRAL PALSY IN SECONDARY SCHOOLS FOR PHYSICALLY DISABLED- KENYA

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This study sought to establish the effects of different learner-centered instructional strategies on academic performance of students with Cerebral Palsy (CP). It further sought to determine the most preferred learner-centered instructional strategy that enhances academic performance of learners with cerebral palsy in selected special secondary schools in secondary schools for the physically disabled in Kenya. Four objectives were formulated to establish use cooperative learning, games, intermediate technology and role play to enhance academic performance. Academic performance of students with Cerebral Palsy in special schools for the physically disabled in Kenya has been found to be below average and progression to higher level of learning is negligible. The study was based on a constructivist theory, which states that learners obtain knowledge through self-direction and interaction with their environment. The study adopted descriptive survey design and mixed methodologies in both data collection and data analysis. The target population was 315 students 72 teachers and 6 head teachers from 6 special secondary schools in Kenya. The sample size was 3 head teachers, 18 teachers and 63 students from 3 special secondary schools. Purposive sampling was used to sample special secondary schools with the highest number of students with CP. Stratified sampling, purposive sampling and simple random sampling were also used to get a sample of teachers and students with Cerebral Palsy from
every school. Tools used comprised of a questionnaire to teachers, focus group discussion schedule for students with closed ended items and Interview guides for head teachers. Observation checklists were used to identify the effects of learner-centered instructional strategies on academic performance. Observation of lessons was done and the behavior of the students during the lesson recorded. Piloting of the study instruments revealed a reliability of 0.75, while the validity of the instruments was judged by the experts. Data collected was analyzed using both descriptive and inferential statistics. The main techniques used to analyze the data were Statistical Package for the Social Sciences (SPSS) software version 22, Chi-Square and regression model. Qualitative data was analyzed thematically while Quantitative data collected was analyzed descriptively using statistical tools and presentation given in visual displays. The key finding of the study revealed that the most preferred and effective learner-centered strategy used by teachers was cooperative learning. Conclusion made was that there were other strategies that were also used such as games, Intermediate Technology and role play to enhance academic performance but these strategies did not stand alone. It was recommended that there is need to empower teachers to acquire skills to use learner-centered instructional strategies for students with Cerebral Palsy. Teachers’ colleges should be well staffed with relevant personnel to train teachers on skills of teaching students with CP. Special schools should also be fully funded to enable the teachers to get relevant resources for better academic performance of students with Cerebral Palsy.

PRINCIPALS’ LEADERSHIP STYLES AND THEIR RELATIONSHIP WITH TEACHERS’ JOB SATISFACTION IN SIAYA, KISUMU AND KAJIADO COUNTIES IN KENYA

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While there is general agreement the world over, that the principal’s leadership style has a remarkable effect on teachers’ job satisfaction, little is known about Kenya particularly in the area of full-range leadership. The purpose of this study was to examine principals’ leadership styles and their relationship with teachers’ job satisfaction in public secondary schools in Siaya, Kisumu and Kajiado counties, Kenya. The specific objectives of the study were: to find out the predominant leadership style practised by principals in public secondary schools in Siaya, Kisumu and Kajiado counties, Kenya; to determine the level of teachers’ job satisfaction in Siaya, Kisumu and Kajiado counties, Kenya and to establish the relationship between principals’ leadership styles and teachers’ job satisfaction in Siaya, Kisumu and Kajiado counties, Kenya. The study was guided by the Full Range Leadership theory and the Herzberg’s two factor theory. The study adopted correlation research design. The target population comprised of all the 397 principals, 389 deputy principals, 1,190 heads of departments and 2,208 teachers in public secondary schools in Siaya, Kisumu and Kajiado counties who had served for at least two years in the same school. Proportional stratified and simple random sampling were used to sample 39 secondary school principals, 35 deputy principals, 97 heads of departments and 181 secondary school teachers giving a total of 352 respondents. The data for this study was collected using Teacher Job Satisfaction
Survey Questionnaire which assessed the intrinsic and the extrinsic factors of job satisfaction. The Multifactor Leadership Questionnaire Form 5X was used to classify the leadership styles of principals as laissez-faire, transformational and transactional. The data was condensed and summarized before being analyzed using percentages, means, standard deviations, chi-square and Pearson Product Moment Correlation Coefficient. The findings of the study have shown that transformational leadership was the predominant leadership style practised by the principals. The study found out that most teachers were satisfied with their job in relation to the leadership style in place. The study established a positive and significant correlation between transformational leadership style and teachers’ job satisfaction, no significant correlation between transactional leadership style and teachers’ job satisfaction and a negative significant correlation between laissez-faire leadership style and teachers’ job satisfaction. The study concluded that the leadership style practiced by a principal has a significant effect on teachers’ job satisfaction. It was recommended that Teachers’ Service Commission should organize regular teacher professional development programs to train principals on the importance of using transformational leadership style as opposed to transactional and laissez-faire leadership styles.

EFFECT OF MENTORS’ PERCEPTIONS ON STUDENTS’ SELECTION OF OPEN LEARNING MODE AT PUBLIC UNIVERSITIES: THE CASE OF KIAMBU AND NYERI COUNTIES, KENYA

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The problem of this study is that despite open learning degree programs in public universities being more flexible in terms of where one learns from, relaxed admission criterion and more affordable tuition fees, the uptake of these programs by the form four students after their Kenya Certificate of Secondary Examinations is still low. This is despite the fact that over 91,378 students with minimum university qualification grade of C+ were left out during 2015/2016 Universities Joint Admission Board intake to the face-to-face delivery mode. Despite all these advantages the Kenyatta University Digital School of Virtual and Open Learning had a total population of 5,757 students (8.2%) of a total student population of over 70,000 in 2015. The purpose of this study was to examine the effects of mentors” perceptions on students’ selection of open learning programs at public universities in Kiambu and Nyeri Counties in Kenya. The objectives of the study were to: determine the mentors and form four students perceptions and selection of open learning programs, determine the influence of mentors’ background factors on their perception and also find out if there was any significant difference in perception and selection between mentors and their students. This study was guided by the Social Constructivist Theory by Lev Vygotsky. The study adopted a mixed method research design of the convergent parallel design variant where the quantitative data was collected using questionnaires while qualitative data was collected using an interview schedule. Stratified sampling technique was used to pick a sample of 384 (172 career guidance teachers, 40 principals and 172 students) from the two counties of Kiambu and Nyeri. Quantitative data was also analysed using Statistical Package for Social Scientist. The descriptive
statistics such as the means and percentages as well as inferential statistics such as Pearson Product Moment Correlation Coefficient and the t-test were used. The qualitative data was analyzed using discourse and narrative analytical techniques. The study indicated that the mentors’ perception and awareness level on advantages of open learning programs was better than that of the students. Among the mentors, career guidance teachers had a better perception. It was also noted that educational level, professional training and experience of the mentors significantly influenced their perception and selection of open learning. The t-test results indicated that there were significant differences in perception and selection between the mentors and students on areas like employability of open leaning graduates (t=2.360 p<0.05), quality of education offered through open leaning (t=2.745 p<0.05) and on the ability of open leaning to meet the needs of the students (t=2.43 p<0.05). Lastly, the significant difference in perception and selection between mentors and students indicated that either the mentorship programs were not held or they were not effective enough to significantly change the students’ perception and selection of open learning programs positively. This could explain the low awareness level and poor perception and selection among the students leading to the low uptake of open learning programs in public universities among the secondary students in the two counties. The study recommends that the universities undertake campaigns to raise awareness on the existence and advantages of open learning programs among the mentors and Kenyan public as whole. The study is expected to raise awareness among the public universities administrator, education planners and society at large on the important role the open learning programs can play in increasing the country transition rate from secondary school to university.

IMPLEMENTATION OF QUALITY ASSURANCE GUIDELINES AND THEIR INFLUENCE ON QUALITY EDUCATION IN SELECTED PUBLIC UNIVERSITIES IN KENYA

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Despite the Inter University Council of East Africa (IUCEA) and Commission for University Education (CUE) providing guidelines for assuring quality of education in universities, there have been concerns by various stakeholders on the quality of graduates from universities in Kenya getting into the job market. This study sought to determine the extent to which quality assurance guidelines by CUE have been implemented in public universities and their influence on the quality of education in Kenya. The study had four research objectives: (i) to assess the level of implementation of policies and procedures necessary for quality of education (ii) to examine the influence of existing physical and human resources on quality of education (iii) to assess the influence of learner-support services on quality of education and (iv) to assess the level of stakeholders’ involvement in curriculum development and revision in public universities in Kenya. The study was informed by the Comprehensive Educational Quality Assurance Model by Boyle and Bowden (1997) and Systems Theory by Ludwig Von Bertalanffy, later on adapted by Robert Owens (1981) in educational institutions. The study was Exploratory using Mixed
Methods Design. The study was carried out in two public universities in Kenya which were purposively sampled. The sample constituted the following: 21 deans of schools, two quality assurance officers and 411 fourth year students. Three types of research instruments were used in data collection: questionnaires for deans of schools and fourth year students, interview guide for the quality assurance officers and document analysis. The data were analyzed both quantitatively and qualitatively. Quantitative data were analyzed using descriptive statistics aided by Statistical Package for Social Sciences. Quantitative data were presented in medians, percentages, correlations and tables while qualitative data were organized into thematic areas according to the objectives of the study. Quantitative data were displayed first and then corroborated by qualitative data. The study established that: universities had put in place policies and procedures on internal and external quality systems. However, these guidelines were not uniformly and adequately implemented across the universities; teaching staff in both universities possessed requisite qualifications and experience for teaching but all universities engaged part-time lecturers in teaching; physical facilities such as accommodation, lecture halls and ICT facilities were inadequate; student support services such as guidance and counseling, academic advisory and financial advisory services were not satisfactorily implemented across the universities. Finally, universities occasionally involved stakeholders in curriculum development and revision. It was established that inadequacy and poor implementation of some of these quality assurance guidelines affect the quality of education. The study recommends that universities adequately implement quality assurance guidelines to enhance quality of education.

EFFECTIVENESS OF PRINCIPALS’ INSTRUCTIONAL SUPERVISION IN ENHANCING TEACHER PROFESSIONAL DEVELOPMENT IN PUBLIC SECONDARY SCHOOLS IN NAIROBI AND KAJIADO COUNTIES, KENYA

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Schools are the suitable and central places where formal education can be accessed and sustained. In order to achieve high standards of education in a country, the utmost aim of schools therefore, should be to improve the quality of teaching and learning. This can only be achieved through an effective supervision in schools’ instructional program, which should improve students’ performance and also enhance teachers’ professional development. This study was aimed at establishing the performance of principals in their instructional supervisory role with regard to enhancing teacher professional development. The objectives of the study were to establish the effectiveness of principals’ instructional supervision as perceived by the principals themselves, heads of departments and teachers in public secondary schools; identify challenges faced by principals in undertaking instructional supervisory role in public secondary schools; establish how instructional supervision has enhanced teacher professional development in public secondary schools; examine the strategies used by principals to enhance instructional supervision in public secondary schools. This study adopted Developmental Supervision
Theory by Glickman et al. Descriptive survey design which embraces both quantitative and qualitative approaches, was used. The study was carried out in public secondary schools in Nairobi and Kajiado counties in Kenya. The sample size was as follows: 38 principals, 151 heads of departments and 289 teachers. This gave a sample size of 478 respondents. Stratified random sampling was used in selecting schools according to the following strata: boys’ public secondary schools, girls’ public secondary schools and mixed public secondary schools. Simple random sampling was used to select heads of departments and teachers for the study. The instruments used to collect data were: Questionnaire for principals, heads of departments and teachers. There was also an Interview guide for principals. Content validity was determined by seeking expert judgment from specialists in the department of educational management, policy and curriculum studies; while the reliability of the instruments was ascertained by using Cronbach’s alpha technique. Qualitative data was analyzed thematically, while Quantitative data was analyzed using descriptive statistics and presented in frequencies and percentages. Null hypotheses were analyzed using Kruskal-Wallis H test statistics. The key finding of this study was that majority of principals’ performed diligently but did not use appropriate skills or lacked knowledge on how to conduct effective instructional supervision. The finding also established that lack of funds hindered the extent to which principals performed in enhancing teachers’ professional development. Based on the findings, the study recommends the need for TSC to introduce a policy on instructional supervision so that the principals who are selected to head schools can gain skills and knowledge to enable them effectively perform their tasks and responsibilities related to instructional supervision. Secondly, adequate funds should be allocated for in-service courses, seminars and workshops in order to improve teachers’ professional development.

IMPLEMENTATION OF CHILD-FRIENDLY SCHOOLS INITIATIVE AND ITS INFLUENCE ON QUALITY EDUCATION IN PRIMARY SCHOOLS IN NAIROBI AND KAJIADO COUNTIES, KENYA

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The quality of education provided in Kenyan public primary schools is reportedly on a downwards trend. It is out of this concern that the Ministry of Education, in partnership with United Nations Children’s Education Fund (UNICEF) introduced the Child-Friendly schools initiative as an intervention aimed at improving the quality of education provided in terms of the environment, processes, content and learners. The purpose of this study was to establish the implementation of child friendly schools initiative (CFSI) and its
influence on the quality of education. Further, the study sought to examine the
following objectives: To establish the implementation of inclusion of learners
with special needs in regular schools and its influence on the quality of
education; to find out the quality of education in public primary schools; to
determine the implementation of active participation of parents, pupils and the
community in school governance and how it had influenced the quality of
education, to establish the implementation of effectiveness in teaching and
learning and its influence on the quality of education; to determine the
implementation of gender sensitivity and its influence in the quality of
education and to find out the implementation of creating hygienic, safe and
protective school environments and its influence on the quality of education
in public primary schools in Nairobi and Kajiado counties. The study was
informed by the Social Systems theory and the rights-based approach to
education. This study is significant in that it may inform the Ministry of
Education on the influence of CFSI on the quality of education. This research
adopted mixed methods design specifically the explanatory sequential design.
The study was carried out in Nairobi and Kajiado Counties. The sample size
comprised of 25 headteachers, 150 teachers, 300 pupils and 4 QASO’s.
Purposive sampling was used to select pupils and QASO’s while stratified
random sampling was used to select teachers. Data was collected by use of
questionnaires, an interview guide and an observation checklist. Content
validity was determined through expert judgement and Cronbach’s Coefficient
Alpha was used to establish the reliability of instruments. Qualitative data
was analysed thematically while Quantitative data was analysed using
descriptive statistics namely, means and percentages. For inferential statistics,
simple linear regression was used. The major finding of this study is that all the five CFSI dimensions positively influenced the quality of education. The study recommends that schools should have committees in place to oversee the implementation of the CFSI dimensions

SELECTED PREDICTORS OF ACADEMIC ACHIEVEMENT AMONG FORM THREE STUDENTS IN PUBLIC SECONDARY SCHOOLS IN KIAMBU COUNTY, KENYA

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In the last five years (2013 to 2017), poor academic achievement has been experienced in Kiambu County. This is despite government’s interventions and education being an important sector in individual and national development. Most researchers attribute this to socio-cultural and classroom environmental factors. Yet there could be certain personal factors affecting students’ academic achievement. The study was therefore designed to determine the relationships among students’ achievement goal orientation, perceived competence and academic achievement in Kiambu County. Differences in achievement goal orientation and perceived competence due to school type were also tested. The study was guided by the goal orientation theory and intelligence theory. The research adopted mixed methods sequential explanatory design. The study targeted all Form Three students in Kiambu County in 2017. Purposive sampling was used to select Gatundu South Sub-County. Using stratified random sampling, 12 schools were selected. Through proportionate stratified sampling, one girls” only and one boys” only boarding, one co-educational boarding and nine co-educational day schools were selected. Simple random sampling was used to select 665 participants. Achievement goal orientation and perceived competence scales were adopted and used to measure achievement goal orientation and perceived competence respectively. A pilot study on 40 students was conducted in a school within the County. Purposively, 40 respondents were selected from those who filled the questionnaires for an interview to cross check the quantitative data. Academic achievement was inferred from students’ examination grades obtained from school records. The quantitative data was analyzed using SPSS version 21. Qualitative data was analyzed thematically. Data collected was analyzed using both descriptive and inferential statistics. To examine relationships among variables and school type differences, Pearson Product Moment Correlation Co-efficient and Analysis of Variance were used.
respectively. Hypotheses were tested p < .05 level of significance. To determine a prediction model, multiple regression analysis was used. The findings revealed that all the domains of achievement goal orientation significantly correlated to academic achievement (r (630) = .310, p < .05). The highest relationship was observed between performance avoidance (r (630) = .355, p < .05). All the two sub-scales of perceived competence were found to be negatively correlated to academic achievement. The highest relation was found between entity perceived competence r (414) = -.192 p < .01). The findings also revealed significant differences in the four domains of achievement goal orientation and flexible perceived competence given the categories of school types (F(12, 1872) = 10.334, p < .05); F(3, 409) = 3.980, p < .05) respectively. The difference for perceived competence was in favour of co-educational day and boys’ boarding. In addition, the equation for predicting academic achievement from achievement goal orientation and perceived competence was significant (F (5, 624) = 32.497, p < .05). Performance avoidance had the highest significant predictive value on academic achievement. In the exploratory part of the study, a significant gender difference was found with regard to perceived competence. Based on the findings, it was recommended that teachers, parents and all concerned stakeholders should create conducive environments that enhance students’ achievement goals. Overall, schools should have interventions to enhance students’ perceived competence in order to improve academic achievement.

EFFECTIVENESS OF AUTOMATED SPEECH TRAINING SYSTEM IN ENHANCING SPEECH AMONG HARD OF HEARING LEARNERS IN SELECTED SCHOOLS IN NAIROBI CITY COUNTY KENYA

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Dr. Patrick M. Karimi

Speech training of learners who are hard of hearing in Kenya has been lacking necessary attention since 1980s. Education of learners with hearing impairment including learners who are hard-of-hearing has been skewed towards manual communication. The purpose of this study was to investigate the effectiveness of an Automated Speech Training System in enhancing speech among learners who are hard of hearing in selected schools in Nairobi City County. Objectives of the study were to: establish the level of speech perception and production of learners who are hard-of-hearing before using Automated Speech Training System, establish the effects of Automated Speech Training System on enhancing speech perception and production among learners who are hard of hearing, compare the effects of Automated Speech Training System on speech perception and production of learners who are hard of hearing with traditional methods of speech training, Find out the role played by selected demographic factors in the effectiveness of ASTS in enhancing speech among learners who are hard-of-hearing, establish the views of learners on communication modes and Speech training using traditional methods and Automated Speech Training System, and to find out the opinions of teachers on speech training of
learners who are hard-of-hearing. The study adopted a mixed research design combining single-subject research design and descriptive survey design. Single-subject research design was considered for this study to allow systematic testing of the effects of the Automated Speech Training System on perception and production of speech among learners who are hard-of-hearing. The target population for the study was ninety four learners with hearing impairment and thirteen teachers in the selected schools. Using purposive sampling technique, thirty two learners who are hard of hearing and thirteen teachers were sampled. To collect data, the Automated Speech Training System was used and two semi-structured interview guides one for the learners and one for teachers. Statistical Package for Social Sciences was used to analyze quantitative data. Qualitative data was analyzed by means of descriptive statistical techniques. Major research finding of the study was that Automated Speech Training System which utilizes 3-D animation technology with both visual and audio components significantly enhanced speech among learners who are hard of hearing. Based on the research findings, the study recommended that the government should put in place policies and proper mechanisms of ensuring that speech training forms an integral part of curriculum for learners who are hard-of-hearing. This will not only help to address some of their communication challenges but also incorporate the new technology to the already existing methods of speech training to enhance speech of all learners who are hard-of-hearing.

CAUSAL ATTRIBUTIONS AND ACADEMIC EXPECTATIONS AS CORRELATES OF ACADEMIC ACHIEVEMENT IN SECONDARY SCHOOLS IN KIAMBU COUNTY, KENYA

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This study investigated the explanations that students give on achievement outcomes and their academic expectations in Thika Sub-County, Kiambu County. The main objective of the study was to find out if academic achievement was related to causal attributions and academic expectations. Gender differences in causal attributions and academic expectations were also tested. The study also established the interaction effect of causal attributions, academic expectations and academic achievement. The research was guided by Weiner’s model of Achievement Attribution and the Expectancy Value theory. A correlational research design was used. The study population consisted of 21 schools with a population of 2660 (1540 boys, 1120 girls) students. The schools were stratified based on whether they were national, extra-county or county and whether single or co-educational. Simple random sampling was used to select ten schools and 600 form three students (320 boys, 280 girls) through proportionate allocation. The research instruments included Multidimensional Causality Attribution Scale and Academic Expectancy Scale questionnaire. The research instruments were piloted using 25 students who did not participate in the actual study. Reliability was tested by computing cronbach alpha coefficient (α). Data were analyzed using SPSS version 20. The statistics used were means, standard deviations and analysis of variance (ANOVA), t-tests, Pearson’s product moment correlation coefficient and multiple regression. The major finding was that causal attributions and
academic expectations were significantly correlated to academic achievement. The strongest correlation was between controllable attributions for failure and academic achievement \( (r (583) = -0.34, p<.01) \). In addition, there were significant positive relationship between positive academic expectations \( (r (583) = 0.28, p<.01) \) and a negative significant relationship between negative academic expectations \( (r (583) = -0.38, p<.01) \) and academic achievement. Significant gender differences in causal attributions for failure \( (t (583) =3.59, p<.05) \) and negative academic expectations \( (t (583) =3.45, p<.05) \) were also found. The results indicated that there was an interaction effect between causal attributions and academic expectations in determining the academic achievement. The model involving both factors yielded a higher predictive ability for academic achievement. The conclusion was that students formed maladaptive causal attributions and biased academic expectations that negatively affected their academic achievement. The study made recommendations to the teachers, parents and educators to come up with intervention measures such as, attributional retraining, encouraging and helping students form positive academic expectations. The researcher also recommended for further research in the area of causal attributions and academic expectations.

COMPUTER AIDED INSTRUCTION AND PERFORMANCE IN KISWAHILI LANGUAGE SKILLS AMONG PUBLIC SECONDARY SCHOOLS IN NAKURU COUNTY, KENYA

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The Ministry of Education initiated the integration of computer technologies in teaching of school curriculum in order to enhance quality of education in Kenya. Poor performance in Kiswahili subject skills has been experienced for a while, among majority students in sub-county secondary schools in Nakuru County, Kenya. The integration of CAI in teaching of Languages, helps to transform pedagogical skills in order to improve learners’ performance. The purpose of this study was to determine the difference in performance in Kiswahili language skills between students, taught Kiswahili subject using CAI and those students taught the same content using TTM. Four objectives guided this study, namely; to determine the difference in performance in Kiswahili in a) grammar, b) reading comprehension, c) writing skills between students taught Kiswahili language skills integrating CAI and those students instructed the same content using TTM and d) develop a theory explaining the use of CAI on performance in Kiswahili language skills. This study was guided by Constructivist Learning Theory and employed a causal-comparative design. This study was conducted in public sub-county secondary schools in Nakuru County, with a target population of 13290 subjects, comprising Kiswahili teachers, form two students, and principals. A sample of 839 participants comprising 750 students, 59 teachers and 30 principals was drawn using stratified, purposive and simple random sampling methods. Questionnaires, semi-structured interview schedules and documentary analysis guide were used to collect data from principals, teachers, and students. Piloting was done on questionnaires and interviews in secondary schools from a different county. Piloting helped to determine the validity and reliability of the instruments. This was done two weeks before the commencement of the actual study. The study confirmed the instruments valid and reliable. Reliability from questionnaires was each computed...
separately using Cronbach’s Alpha Formula. Teachers’ coefficient yielded a correlation coefficient of 0.73; while students’ yielded a coefficient of 0.76 that were all considered reliable for the study to be conducted. Descriptive statistics were used to analyze quantitative data from objectives; while the hypotheses were tested at 95% confidence interval using t-test in order to determine the difference in performance in Kiswahili language skills between students taught Kiswahili using CAI and those students taught the same using TTM. Quantitative data were presented and interpreted in frequency table distributions, bar graphs, and pie-charts; while qualitative data was summarized into differences and analyzed in text. The findings showed that CAI improves performance in grammar by higher mean of 21.79 than lower mean of 16.94 scored by TTM. Additionally, CAI improves performance in reading comprehension by higher mean of 21.08 than lower mean of 10.79 scored by TTM students. Also, CAI enhances performance in writing by higher mean of 22.95 than lower mean of 13.07 scored by TTM students. All the hypotheses were rejected at 95% confidence interval (p=0.000<0.05) indicating that the students’ mean performance in grammar, reading comprehension and writing taught using CAI and TTM are significantly different. The differences were in favor of those students taught grammar, reading comprehension and writing using CAI than those taught using TTM. Based on these findings, the study concluded that those students taught Kiswahili using CAI performed better in grammar, reading comprehension and writing than those students taught Kiswahili using TTM. It was recommended; that the MOE should review the Policy on integration of CAI in teaching of Kiswahili subject with regard to making it mandatory for all secondary schools and updating CAI. These results could be useful in increasing teachers’ CAI integration for Kiswahili subject instruction purposes in order to enhance students’ performance, thereby improving quality of education.

SCHOOL PSYCHOLOGICAL ENVIRONMENT, ACHIEVEMENT GOALS AND LEARNING STRATEGIES AS PREDICTORS OF FORM THREE STUDENTS’ ACADEMIC ACHIEVEMENT IN NAIROBI COUNTY, KENYA

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Secondary school students’ performance in KCSE over the last four years (2013 to 2016) has been skewed towards low grades nationally and Nairobi County specifically. Much research effort has been directed at investigating psychological factors such as weak academic motivation and self-handicapping as possible causes of poor academic performance. Less focus has been on school psychological environment and achievement goals which may contribute towards students’ academic performance. The purpose of this study was therefore to examine school psychological environment, achievement goals as predictors of academic achievement of form three students in public secondary schools in Nairobi County, Kenya. The study also examined the mediating role of learning strategies in the relationship between the school psychological environment and achievement goals. It also determined the gender differences in
school psychological environment and achievement goals. The trichotomous achievement goal framework and the self-worth theory of achievement motivation formed the theoretical framework. The study adopted a correlational research design to establish predictive relationships among the variables. The target population was all the year 2016 Form three students in public secondary schools in Nairobi County. The study sample consisted of 602 students selected from 13 schools using purposive, stratified, proportionate and simple random sampling procedures. The study used a questionnaire developed to obtain information on students’ biographical data. Students’ school psychological environment, achievement goals and learning strategies scales were adapted to measure school psychological environment, achievement goals and learning strategies. Students’ examination scores obtained from the school records were used as a measure of academic achievement. A Pilot study was conducted on 40 form three students selected from a public secondary school in Nairobi County that was not part of the sample. Both descriptive and inferential statistical techniques were used to analyse the data. Specifically, Pearson Product Moment Correlation Coefficient (r) and multiple regression analysis were used to analyse data. The results obtained from correlation analysis showed that the school psychological environment as mastery-focused was positively correlated to academic achievement (r (595) = .17, p< .05). Mastery goals (r (595) = .17, p< .01) and performance-approach (r (595) = .18, p< .05) goals were both positively correlated to academic achievement. Performance-avoidance goals, on the other hand, were negatively correlated with academic achievement (r (595) = -.15, p< .05). Results obtained from multiple regressions showed that the school psychological environment predicted academic achievement (F (1, 595) = 17.47, p< .05). The contribution of school psychological environment as mastery-focused in the prediction equation was (β = 0.33, t = 4.18, p< 05). Personal achievement goal predicted academic achievement (F (3, 595) = 18.32, p< .05. All the three achievement goals predicted academic achievement; performance- approach (β = .28, t = 5.03, p < .05); performance-avoidance (β = -.38, t = -4.14, p< .05); mastery goals (β=. .25, t = 3.40, p < .05).

The mediation analysis indicated a partial mediation of deep learning strategies in the relationship between mastery-focused school psychological environment and academic
achievement. There was also a partial mediation of deep learning in the relationship between mastery goals and academic achievement. Partial mediation of surface learning strategy was equally reported in the relationship between performance-approach goals and academic achievement. The findings may help teachers to design mastery-focused learning environments where all learners may feel appreciated.

INFLUENCE OF ORIENTATION AND MOBILITY TRAINING ON SOCIAL INTEGRATION OF ADULTS WITH VISUAL IMPAIRMENT IN KANO STATE, NIGERIA

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The purpose of this study was to investigate the Influence of Orientation and Mobility Training (OMT) on Social Integration (SI) of Adults with Visual Impairments (VI) in Kano State. The study sought to achieve the following objectives: influence of OMT on Self-Esteem; Self-reliance; Community Participation and Economic participation of adults with VI aged 25 to 45. Havighurst’s Developmental Task Theory was used to guide the study. The study used descriptive survey research design. Three geographical zones of Kano State had been selected as the location of the study that is, South, Central and Northern regions. This locale was chosen due to significant number of persons with VI and rehabilitation centers. The population of the study was 512 adults with VI, 44 Social Welfare Officers and 72 Parents, the total of 628 target populations. Stratified random sampling technique was used in selecting 18 out of 44 local governments. Simple random sampling and purposive sampling techniques were used in selecting 200 adults with VI out of 512, 18 Social welfare Officers out of 44 and 22 Parents out of 72, totaling to 240 sample sizes out of 628 target population. The instruments for data collection were questionnaires including: State Self-Esteem Scale, Self-Reliance Achievement Scale, Likert scale instrument for Measuring Community Involvement. Focus Group Discussion and Interviews were also used. To ascertain validity and reliability of the instruments, test retest was done and pilot study conducted. Quantitative and Qualitative methods were administered to analyze the data. Questionnaires were analyzed quantitatively using a Statistical Package of Social Sciences (SPSS) version 20, while interviews and Focus Group Discussion were coded and presented in a narrative form qualitatively. Findings were presented using descriptive methods. The major finding was most of respondents believed that OMT influences SI of Adults with VI. Findings revealed that O&MT has positive influence on social integration of Adults with visual impairment. The study recommended that Government through the Ministry of Education should include orientation and mobility training in regular school curriculum. This will burst the self-esteem of persons with visual impairment and a harmonious relationship between them and the society. Government through the ministry of women affairs should provide more gadgets be it a traditional collapsible white canes or the electronic collapsible white canes as well as relevant instructional materials to improve their access to toilets and birth rooms. Government through the Ministry of Women Affairs should established more rehabilitation centres and keep on providing orientation and mobility training to ensure that the training is adequate. And to adopt expanded core curriculum used in United State of America to replace the existing one which does not future O&M as a
training subject. Finally, Government through the ministry of labor, Nongovernmental organizations and the wealthy individuals should provide adequate funds for professionals to provide training and sheltered workshops to increase employment for adults with visual impairment in the public and private sectors. This will facilitated their fully integration in the society.

INTERACTION OF SELECTED SOCIAL COGNITIVE VARIABLES IN PREDICTING MUSICAL CREATIVITY AMONG FORM FOUR STUDENTS IN NAIROBI CITY COUNTY, KENYA

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The main objective of music education is enhancement of students’ musical creativity. However, over the last six years (2012 to 2017) there has been a declining trend in the Kenya Certificate of Secondary Education music performance. This is compounded with consistent underachievement in prime creative areas like composition, aural and harmony, which signifies a decline in musical creativity among students. Although studies have associated psychological factors with musical creativity, limited local studies have examined how social cognitive attributes within the students may predict musical creativity. The purpose of this study was to determine the relationships among musical self-concept, achievement goal orientation and learning strategies, and musical creativity of secondary school music students in Kenya. The prediction equation of musical creativity given the three constructs was also established. Framed upon componential theory of creativity, musical self-concept theory and the (2 x 2) achievement goal orientation model, the study adopted an ex post facto research design. The study targeted all the year 2017 form four music students in Nairobi County. The study used purposive sampling and a census to select 201 participants (139 females and 62 males) with a mean age of 17.24 years (SD = .78). A pilot study involving 20 students was conducted. Quantitative data were collected by use of Musical Self-perception Inventory, Music Achievement Goal Questionnaire, Music Learning Strategies Questionnaire and Consensual Musical Creativity Assessment Scale. Data were analysed using both descriptive and inferential statistics. Descriptive statistics comprised of frequency distributions, percentages, measures of central tendency and variability. Inferential statistics including Pearson’s correlation coefficient and multiple regression analysis were used in hypotheses testing. Results indicated a significant positive correlation ($r(199) = .25, p < .01$) between musical self-concept and musical creativity. A significant positive correlation ($r(199) = .39, p < .01$) was also observed between mastery-approach goal and musical creativity. In contrast, there were significant negative correlations ($r(199) = -.19, p < .01$) and ($r(199) = -.28, p < .01$) between performance-approach and performance-avoidance goals respectively, and musical creativity. The results also indicated a significant positive correlation ($r(199) = .52, p < .01$) between deep processing learning strategy and musical creativity, and a significant negative correlation ($r(199) = -.24, p < .01$) between surface processing learning strategy and musical creativity. However, nonsignificant correlations were revealed among persistence and peer learning strategies, and musical creativity. The equation for predicting musical creativity was significant ($F(8,192) = 18.47, p < .01$). Deep processing learning strategy had the highest positive predictive value ($\beta = .47, p < .01$) on participants’ musical creativity. The study recommended that parents and teachers should create conducive home and school environments, which fosters positive musical self-concept, mastery-approach goal orientation and deep processing learning, to enhance musical creativity among students.
THE RELATIONSHIP BETWEEN JOB SATISFACTION AND JOB PERFORMANCE AMONG UNIVERSITY ACADEMIC STAFF IN TANZANIA

Simon Peter-PHD

Job satisfaction and job performance have aroused interest in scholarly debates due to their importance and impact on organizational productivity. The purpose of this study was to examine academic staff’s job satisfaction and assess the extent to which this influences their performance. The main objectives of the study were: (a) to examine the relationship between recognition job satisfaction and job performance of academic staff in universities in Tanzania (b) to assess the relationship between responsibility job satisfaction and job performance of academic staff in universities (c) to determine the relationship between remuneration job satisfaction and job performance of academic staff in universities (d) to examine the relationship between promotion job satisfaction and job performance of academic staff in universities. The study was motivated by the situation in Tanzanian universities over the past three decades when universities encountered numerous challenges including funding shortage which negatively impacts teaching and research functions in universities. Consequently, strikes by academic staff have been on the rise demanding better terms of service as they are dissatisfied with the lack of recognition, low wages, responsibility and promotion practices, which ultimately cause high job turnover as a number of academic staff pursue other seemingly financially promising non-academic jobs, such as politics. The study was based on Herzberg’s Two-Factor theory. The study is significant because its findings may contribute to universities enhancing their motivation strategies so as to make academic staff satisfied and hence perform better in their teaching and research functions. The study adopted a correlational research design, which embraced both qualitative and quantitative approaches. The data for this study were collected using questionnaires from 826 academic staff from six universities, with a response rate of 50% (411 academic staff). The data was analysed using statistical package (SPSS) version 16. In addition, semi-structured interviews were conducted with 6 Deputy Vice Chancellors – Administration, 12 senior academic staff and 2 leaders of the academic staff union. Content validity was determined by seeking the expert judgement of an educational management specialist. Purposive sampling was used to select universities based on the following factors; geographical location, mode of academic programmes delivery, year of establishment and size of the university. Cronbach’s technique was used to ascertain reliability of the instruments. Qualitative data were analysed in themes while quantitative data were analysed using descriptive and inferential statistics. The findings indicated that there is no statistically significant relationship between recognition, responsibility, remuneration and promotion job satisfaction indicators and job performance of university academic staff. The study recommends that university management need to recognize academic staff’s efforts so as to encourage them to perform better in their job and hence increase universities’ performance.

EFFECTIVENESS OF ASSISTIVE TECHNOLOGY ON TEACHING MATHEMATICS TO LEARNERS WITH VISUAL IMPAIRMENTS IN SPECIAL PRIMARY SCHOOLS IN KENYA

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There has been a problem in Mathematics of learners with VI as a result of inadequate AT and reluctance of teachers to apply appropriate teaching strategies when teaching Mathematics using AT in
special primary schools. To address these problems, four objectives were formulated to identify types of AT that were available, teaching strategies, their role and factors that had influenced their use of the AT. Therefore, the purpose of this study was to evaluate on effectiveness of Assistive Technology on teaching Mathematics to learners with visual impairments in special primary schools for learners with VI in Kenya. The study was guided by the Theory of Didactical Situations in Mathematics (Brousseau, 1997). A descriptive research design was adopted to carry out the study. The study was conducted in five counties namely: Kisumu, Siaya, Mombasa, Meru and West Pokot. Purposive and stratified random sampling techniques were used to sample the study participants. The researcher sampled the following study participants, all from whom the study’s data was collected: twenty learners with VI selected from classes seven and eight, their ten teachers of Mathematics and the five deputy head teachers of the selected special primary schools. The total study sample therefore, comprised of thirty five participants. Interview guides, observation schedule and observation checklist based on the four study objectives were used to gather the information. Study data was analysed manually through narrative means using thematic information arrangement approach following the order or chronology of the study’s six research objectives. The results were also presented through tabulations and brief interpretation statements. The qualitative data generated from the structured interview guides was analysed through descriptive statistics based on Statistical Package for Social Sciences (SPSS) version 18.0. Main study finding was scarcity of AT in special primary schools for learners with visual impairments in Kenya. Largely, Low-Tech Assistive Technology was available while modern Mid-Tech and High-Tech Assistive Technology were visibly lacking. Major factors noted to influence the use of AT were; TOM lacked training in Mid-Tech and High-Tech AT, high cost of AT, costly maintenance and no time set on the time table to teach AT skills. The findings also indicated that many learners with VI had positive attitudes towards the use of AT in their learning of Mathematics. The study concluded that; inadequate use of AT especially Mid-Tech and High-Tech is real and this has contributed to lack of interest in working out Mathematics problems leading to a decline of Mathematics performance; there is a training gap among teachers of Mathematics on modern Mid-Tech and High-Tech AT and AT plays a vital role in teaching Mathematics to learners with VI. Based on the findings, the main recommendations were that: the government through Ministry of Education to allocate more funds for the physical supply of AT to special primary schools for learners with VI, ensure teachers of Mathematics are trained and also conduct regular classroom supervisions to ensure efficient use of all available AT in the special primary school.

DETERMINANTS OF TEACHERS’ USE OF INSTRUCTIONAL RESOURCE IN TEACHING PRE-PRIMARY SCHOOL SCIENCE AND MATHEMATICS ACTIVITIES IN MACHAKOS COUNTY, KENYA

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The continuous poor results of science and mathematics in Athi-River Sub-County of Machakos County, Kenya has yielded to the study of determinants of pre-primary school teachers’ use of instructional resources in teaching science and mathematics activities. The effects of use of the instructional resources in learning achievement which has led to poor performance in science and mathematics activities in the current study locale. The major purpose of the study was to establish the extent of teachers’ use of instructional resources in teaching pre-primary science and mathematics activities in
Athi-River Sub County of Machakos County, Kenya. The study also found out the effects of teachers’ training level in the use of instructional resources in teaching science and mathematics, Teacher- gender and use of instructional resources, Teacher’s attitude and use of instructional resources in teaching science and mathematics activities and teacher- motivation on the use of instructional resources in teaching science and mathematics in pre-primary schools. This study employed Bruner’s learning theory (1966), which matched well with the determinants of pre-primary teachers’ use of instructional resource. The study targeted 40 pre-primary head teachers, 600 pre-primary teachers and 1800 pre-primary children in Athi-River Sub-County, Machakos County. Athi-River Sub-County was sub-divided to 5 bases and stratified sampling technique was used to select 6 pre-schools from each base translating to a total of 30 pre-schools. Random sampling was used to select 6 pupils from each of the sampled schools for focused study giving a sample size of 1800 pupils. Purposive sampling was also used to select 2 teachers for science and mathematics activities from each of the sampled schools. All head teachers from all the 30 sampled schools were selected leading to a sample of 30 head teachers. A sample size of 270 respondents including 60 teachers, 30 head teachers and 180 pupils) was used in the study. Questionnaires and oral-interviews were used to collect data. Validity of the instruments was determined through examining of the items using content validity. A. Pilot test of the research instruments was done in two schools in the neighboring sub county. Quantitative data was generated from the close-ended items from the questionnaires. Descriptive statistics was used to analyze data such as frequency; standard deviation and mean data analysis was analyzed according. The data was presented in tables. Qualitative data produced from the questionnaire, interview schedules, focused group discussion, as well as data obtained through the observation checklists was analyzed with regards to relevant themes and discussed in line with the research objectives. The findings of the study were as follows: teachers with higher training qualifications were more likely to use instructional resources in teaching science and mathematical activities than their counterparts with less or no training. Male teachers were found to use instructional resources more often in teaching science and mathematics than their female counterparts. Teachers with positive attitude towards science and mathematics were also found to use more instructional resources than teachers with negative attitude. The study recommends that the ministry of education should facilitate pre-primary school teachers to advance their studies through in-service training and that the government of Kenya should motivate pre-primary teachers by paying them reasonable salary. All stakeholders should ensure that instructional resources are made available for better pupil achievement in science and mathematics.
level of teacher job satisfaction, the influence of head teachers’ leadership practices, and the influence of head teachers’ leadership practices on teachers’ job satisfaction components. The study was guided by the path goal theory. Path goal theory recognizes that the actions of a leader (head teacher) have direct influence on the subordinates (teachers). Mixed methods research approach was used. The mixed method approaches combine quantitative and qualitative data in a single study. This study adopted the convergent parallel design. In this design quantitative and qualitative research is conducted simultaneously in a single study. The target population was 74 head teachers and 1184 teachers in the 74 Catholic private primary schools in Nairobi and Nakuru dioceses. Stratified sampling was used to categorize schools into two strata, the urban and rural schools. From each stratum, 40% of the head teachers and 20% of teachers were sampled. Simple random sampling was used to sample two teachers from each of the 6 teaching subjects. The study sampled 31 head teachers and 248 teachers. The research instruments were questionnaires for head teachers and teachers, interview guide for head teachers and focus group discussion guide for teachers. Content validity was determined by seeking expert judgment from specialist in Educational Management. Cronbach alpha was used to ascertain reliability of the instruments. Qualitative data was analyzed thematically while Quantitative data was analyzed using descriptive and inferential statistics. The study established that the nature of work, coworkers, supervision and communication had highest levels of job satisfaction. Dissatisfaction emanated from pay, contingency rewards and fridge benefits. Supportive and achievement oriented leadership practices had the highest influence on teachers’ job satisfaction. Head teachers’ leadership practices had insignificant influence on teachers’ satisfaction with pay, nature of work, communication and coworkers. Teachers’ job satisfaction component that was highly influenced by head teachers’ leadership practices was supervision. Directive leadership practices had no significant influence on any job satisfaction component. The study recommends that the Catholic institutions formulate by-laws to regulate school processes for example teachers’ pay, promotions and fringe benefits. In addition induction courses and regular in servicing of head teachers is recommended. The study suggests further study be conducted on the influence of head teachers’ leadership practices on teacher job satisfaction in more Catholic private schools and tertiary institutions. Further, a study on the influence of the school managers on teachers’ job satisfaction in Catholic private institutions is recommended.

INFLUENCE OF BEHAVIOURAL INTERVENTION STRATEGIES ON ACADEMIC ACHIEVEMENT AMONG FORM THREE STUDENTS WITH LEARNING DISABILITY IN NYERI COUNTY, KENYA

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Behaviour management has remained a challenging issue among learners with Learning Disabilities. Effective behavioural management strategies are critical in the academic success of the learners. Therefore, the aim of this study was to investigate the behavioral intervention strategies used in dealing with behavioural problems among students with LD. Specifically, this study sought to investigate the behavior intervention strategies on academic performance of a complex category of learners with learning Disabilities (LD) and behavior problems. The study sought to identify the following: behavioural problems manifested by learners with LD; the school factors that contribute to behavioural problems among learners with LD; the effects of behavioural problems among learners with learning disabilities on academic achievement. A descriptive research design was applied. The study was carried out in Nyeri
County, Kenya. Piloting of the study tools was done in Kirinyaga county. The study population was drawn from form three students and class teachers in the 25 extra county schools in the County. Data was collected using analysis of students documents, questionnaire and interview schedules. After fieldwork, the primary data obtained from the questionnaires was checked for omissions, legibility and consistency before being coded for analysis. SPSS (Statistical Package for Social Sciences) was used to organize and analyze both quantitative and qualitative information. Other inferential statistics were used to analyze the data. Factor analysis was performed on the questionnaires’ results from the assessed students to ensure internal reliability by ascertaining that all factors identified within the construct were factors that directly relate to the construct in question. The findings showed that there are ranges of school factors that contribute to behavioural problems among learners with LD such as lack of proper identification processes, irresolute policies on behavior management, improper implementation of existing policies and unsuitable classroom management strategies by teachers. Some of the effects of the behavioural problems were found to include poor academic performance; development of negative attitude towards studies; and limited interaction especially on academic matters hence decline in performance. The study recommends that in order to mitigate against some of the school factors that contribute to behavioural problems among learners with LD, there is need for a concerted effort at school and home (the parents). The study recommends that approaches to intervention should be solution-focused through a model that targets both learning and behavior change for the well-being of the learner. To achieve academically, the affected learners are assisted by implementing behavioural intervention programmes that are unique for every learner.

EFFECTIVENESS OF INSTRUCTIONAL SUPERVISION

BY QUALITY ASSURANCE OFFICERS ON QUALITY OF EDUCATION IN SECONDARY SCHOOLS IN NAIROBI AND MACHAKOS COUNTIES, KENYA

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Dr. Florence M. Itegi

The concern of guaranteeing quality education provision in educational institutions has aroused scholarly interests globally. In Kenya, with the creation of the Directorate of Quality Assurance and Standards (DQAS) whose mandate is to act as the national custodian of standards and quality of education in basic education, there are concerns on whether instructional supervision of teachers by Quality Assurance and Standards Officers (QASOs) has improved their instructional capacity to offer quality education. The purpose of this study was to investigate the effects of instructional supervision by QASOs on provision of quality of education in Nairobi and Machakos Counties. The objectives of the study were: to seek the perceptions of teachers on the instructional supervisory competences of QASOs; to assess the instructional supervisory practices exercised by QASOs in schools; to examine the influences of QASOs instructional supervisory practices on the instructional competences of teachers; and to assess the utilization of the QASOs’ recommendations and reports in public secondary schools. The Collegial theory was selected to guide this study. The study adopted ex post facto survey design and employed both qualitative and quantitative approaches. Target population of this study was 1481(N) persons (365 school principal teachers, 17 SC-QASOs, 2 C-QASOs, 2 N-QASOs and 1095 HOD teachers; from which a sample of 460 (n=31%) respondents comprising of teachers (110 Principal teachers & 329 HOD teachers) and 21 QASOs were drawn. Purposive sampling was used to select the two counties
where the study was conducted while stratified and simple random sampling was used to select the schools where the study was conducted. Respondents for the study were selected purposively because of their relevancy to the study. Data were collected using questionnaires and interview schedules. Content validity of the instruments was determined by seeking expert judgment from specialist in educational management. Reliability of the research instruments was ascertained through Cronbach technique. Qualitative data was analyzed thematically and presented via narration and verbatim while quantitative data was analyzed using descriptive statistics such as frequencies, percentages and means and presented using figures, tables and charts. The major finding of this study was that effectiveness of QASOs in teachers’ instructional supervision was found to be inadequate. Specifically, the study established that teachers perceived QASOs as having partial technical and conceptual competences; they don’t do sufficient preparations for conducting instructional supervision in schools and spend most of the time for instructional supervision checking teachers’ professional records; they are unable to adequately enhance teachers’ pedagogy and instructional material utilization competences; and have not spearheaded optimal utilization of their instructional supervision recommendations and reports to enhance provision of quality education. The study recommends that: QASOs should be taken through intensive training in technical subject areas related to their areas of specialization; instructional supervision of schools should always be based on previous recommendations and reports; and QASOs instructional supervision findings should always inform agenda for QASOs’ organized teachers’ seminars and workshops.

INSTRUCTIONAL STRATEGIES AND RESOURCES USED IN TEACHING READING: AN IMPLICATION ON GRADE THREE PUPILS’ READING SKILLS IN NAIROBI COUNTY, KENYA

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Dr. Yattani Buna

Reading skills are vital to lower primary school pupils because it is the foundation for learning. However, studies worldwide indicate low levels of reading skills in schools and little has been done to find out how different instructional strategies used in lower grade schools influence learners’ acquisition of reading skills. The purpose of this study was, therefore, to establish the use of instructional strategies and resources on acquisition of reading skills among Grade Three Pupils in Embakasi, Nairobi County, Kenya. The study objectives were: to establish levels of reading skills among the Grade Three Pupils, to explore selected instructional strategies used in Grade Three teaching of reading in Nairobi County and to examine the teachers’ use of instructional resources in teaching and learning reading with the Grade Three Pupils in Nairobi County. The research was guided by Holdaway’s Theory of Literacy Development and supported by Instructional Theory by Robert Gagne. The study used mixed methodology approach on a target population of 225 headteachers from 225 primary schools, 675 Grade Three teachers and 30,000 Grade Three Pupils, totaling to 30,900. Sample size of this study comprised 10 head teachers, 30 Grade Three teachers and 150 Grade Three Pupils. Research instruments were questionnaires for Grade Three teachers, interview schedule for head teachers, class observation checklist and a reading test for the Grade Three Pupils. Pilot study was done to pre-test the instruments and content validity was determined. Reliability was ensured through test retest and a Cronbach Alpha Coefficient with index of 0.7 obtained. Data was collected from head teachers, Grade Three teachers and Grade Three Pupils and its analysis began by coding the field data. Qualitative data were analyzed thematically following the
research objectives while the quantitative data were analyzed using descriptive statistics whereby frequencies and percentages were used. Inferential statistics used ANOVA and data presented using frequencies, tables, percentages and charts. The study established that 50% of the pupils were below average in reading of letter and letter sound recognition, 57.1% in sentence and paragraph reading, 53.6% in story reading and a mere 60.7% in comprehension skills. The study also revealed that majority 78% of the teachers agreed that small reading groups as opposed to large groups are effective in improving class three reading skills. Most of the teachers 60.7% indicated that reading books were scarce. The study recommended that MoE should provide refresher courses to teachers on teaching methodologies that would improve reading skills among the Grade Three pupils and that teachers should form small reading groups which provide every learner with an opportunity to actively participate in reading activities. Other stakeholders like parents and teachers should come together and develop learning resources to help in better acquisition of reading skills.

DEPENDABILITY OF STUDENTS LEARNING OUTCOMES ON PERFORMANCE APPRAISAL FOR TEACHERS IN PUBLIC SECONDARY SCHOOLS IN KISII COUNTY, KENYA

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Supervisors: Prof. John Aluko Orodho
Dr. Joseph Mungai

The underlying purpose of performance appraisal for teachers is to promote quality teaching and student learning outcomes. However, there is a dearth of research-based literature on dependability of student learning outcomes on performance appraisal for teachers in public secondary schools in Kisii County hence the need for this study whose objectives were to establish the relationships between performance appraisal variants of teacher qualifications, professional development, teacher experience, appraisal ratings and student survey ratings with student learning achievement. The theoretical framework was based on Locke's (1968) goal-setting and Vrooms' (1964) expectancy theories. The study adopted the explanatory sequential mixed methods research design. The population was 50,379 comprising of 3,759 teachers and 46,620 students. In phase one, principals, deputy principals and heads of departments participated in their capacity as teachers. Using the simple random sampling technique, a sample of 758 consisting of 362 teachers and 397 students was determined using Slovene’s formula. In the second phase, a sample of 27 comprising of 9 principals, 9 deputy principals and 9 heads of department was purposively selected on the basis of their roles as appraisers under the TPAD framework. Questionnaires for teachers and students were used to collect data in phase one while a semi structured interview schedule for principals, deputy principals and heads of department was used in phase two. The instruments were piloted on 1% of the sample and their validity assessed by two experts in research and educational management respectively. Reliability of the teacher questionnaire was found to be .749 and .771 for the student questionnaire for 7 items in each instrument. Reliability of the semi-structured interview schedule was ascertained using the constant comparative method. Data collected was analyzed with the aid of the Statistical Package for the Social Sciences (SPSS) computer programme. Data was presented in contingency tables and analyzed in terms of frequencies,
percentages, Pearson’s correlation coefficient, chi-square and linear regression based on teacher appraisal variables and student learning achievement. Qualitative data was analyzed thematically using direct respondent quotations that were triangulated with findings from phase one. The findings show that the contribution of teacher performance under the TPAD framework to learning achievement was minimal at R=.085. The R² computed yielded a value of .007, suggesting that teacher performance explained .7% of students’ learning achievement in the study locale. However, the multiple regression model constructed to measure influence of performance appraisal on student learning achievement yielded R=.475 while R² computed was .226 suggesting that the model could explain 22.6% of student learning achievement in the study locale. As a result, all the five null hypotheses of this study were upheld. These findings led to the conclusion that TPAD contributes minimally to student learning achievement in public secondary schools in Kisii County. The findings of this study are significant because they provide research-based information useful to TSC and other education stakeholders in developing programmes to elevate and motivate teachers through professional development. Based on the findings, it is recommended that TSC together with other education stakeholders should consider the re-engineering of teacher appraisals to fit within the broader school performance management system that incorporates variables influencing student learning achievement. Finally, further research is recommended to develop a performance management model for schools in which performance appraisal for teachers shall be integrated.

INFLUENCE OF TEACHER PARTICIPATION IN DECISION-MAKING ON JOB MOTIVATION IN PUBLIC SECONDARY SCHOOLS IN NYERI, NAIROBI AND KAJIADO COUNTIES, KENYA

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The extent to which teachers participate in decision-making is a determining factor on their job motivation. The way principals relate with teachers is important in management of schools. Shared governance is identical to participative decision-making and it affects the stability of the school. The purpose of this study was to assess the influence of secondary school teachers’ participation in decision-making on their job motivation in Nyeri, Nairobi and Kajiado counties. Study objectives were to find out the decision-making styles used by principals, examine extent to which secondary school teachers are involved in decision-making, determine the level of teachers job motivation and determine the relationship of teachers participation in decision-making and their job motivation. Shared decision-making theory and motivation-hygiene theory were employed to explain influence of participation decision-making on job motivation. The study used descriptive design which embraced both quantitative and qualitative approach. The target population consisted of 277 principals and 9,108 teachers totaling to 9385. A sample size of 496 respondents comprising of 111 principals and 385 teachers were used in the study. This study population represented 5.3% of the target population. Study schools were stratified, and then random sampling with proportional allocation was employed to select the
respondents. A semi-structured decision-making questionnaire for teachers and interview guide for principals were used to collect data on participatory decision-making styles and level of motivation. This followed piloting which was done to test the tools and necessary adjustments made to achieve objectives of the study. Cranbach’s alpha was used to ascertain reliability of instruments while content validity of instruments was determined by specialists in Education Administration. Quantitative data was analyzed using descriptive statistics which included generating frequencies, percentages, weighted mean. Meanwhile, inferential statistics included independent sample t-test was used to determine the relationship between teacher participation in decision-making and their job motivation levels. Qualitative data was analyzed using content analysis. Finding of the study revealed that public secondary schools in the study Counties practiced participatory decision-making moderately. The dominant common decision-making area that teachers were involved was student’s affair. The study recommended that teachers should be actively involved in decision-making in their schools and principals should establish collaborative relationship with teachers.

EVALUATION OF TEACHERS’ ATTITUDES TOWARDS ACADEMIC PERFORMANCE OF STUDENTS WITH DISABILITIES IN SELECTED REGULAR SECONDARY SCHOOLS IN BAUCHI STATE, NIGERIA

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The purpose of this study was to evaluate teachers’ attitudes towards academic performance of students with disabilities in selected regular secondary schools in Bauchi state, Nigeria. The objectives of the study were to investigate the teachers’ attitudes toward inclusion of students with disabilities into regular classrooms, assess the instructional strategies used by teachers, explore the teachers’ previous work experience, examine administrators’ support and provisions towards teachers work and compare the academic performance of students with and without disabilities in regular school settings. The study was guide by Albert Bandura Social Learning Theory and supported with Lev Vygotsky’s Guided Learning Theory. Survey and correlational designs were used. The location of the study was the three geographical zones of Bauchi state (South, Central, and North). The target population of the study was 746 regular teachers, 34 principals, 9812 students without disabilities and 614 students with disabilities. Stratified random sampling technique was employed in selecting the schools, simple random sampling was used in choosing the teachers, purposive sampling technique was used in selecting the principals, simple random sampling was used in sampling students with and without disabilities. The sample size of the study was 15 schools, 75 regular teachers, 90 students with disabilities, 90 students without disabilities and 15 principals. The instruments used for data collection were survey scales (ATIAS and LSAS), Questionnaire on Instructional Strategy (QIS), interview, Students’ Examination Records (SER) and observation checklist. Both quantitative and qualitative techniques were used in data analysis. Data collected using scales, questionnaires and students’ examination records were analyzed quantitatively using SPSS descriptive and correlational statistics. While the data gathered using interviews and
observation checklist were analyzed thematically. The results of this study revealed that regular teachers hold negative attitudes towards including students with special needs, teachers with more years of work experience appeared to be more positive than those with fewer years and finally, students without disabilities outperformed students with disabilities in the selected secondary schools of Bauchi State, Nigeria. It is recommended that the regular teachers should be given more training on inclusive education; this study can be replicated in other States of Nigeria and other studies should be conducted in primary school to find out the attitudes of teachers towards the inclusion of learners with disabilities.

DETERMINANTS OF ACADEMIC PERFORMANCE AMONG CHILDREN WITH LEARNING DISABILITIES IN PUBLIC PRIMARY SCHOOLS IN BAUCHI STATE, NIGERIA

Auwal Muhammad Tuggar-PHD

Department: Early Childhood & special needs

Supervisors: Dr. Mary Runo,
Dr Jessina Muthee

The study assessed the Determinants of academic performance among children with learning disabilities in primary schools in Bauchi state, Nigeria. Specifically, the study examined the effects of teachers’ perception, parents’ perception, teachers’ motivation and teachers-parents’ collaboration on the academic performance of children with learning disabilities. The study employed Social Cognitive Theory of Bandura of (1986), descriptive survey design was adopted. The study used purposive sample and simple random sampling techniques with the sample size of 873 teachers and 20 parents. The study used a checklist, profile records, questionnaire and interview schedule to collect data from the respondents. The study used descriptive statistics to analyze the data through the application of Statistical Package for Social Science Research (SPSS) where figures and percentages were presented in the study findings while the qualitative data were analyzed based on the study objective and the result were presented in a form of narrative based. The findings established that most of the teachers perceived children with learning disability as other students though they required special attention while parent perceived it as their teachers fault or childrens lack of concentration in class. The study found out that teachers lack support from stakeholders to uphold the performance of children with learning disabilities. The study also found that if the teacher and parent work together children condition would be improved, the study established lack of contact among parents and the teachers. In conclusion, teachers perceived children with learning disabilities as generic predicament, due to children being lazy or lack the needed motivation to work hard, parents fault for being too busy with their personal issues while the parents blamed teachers for not playing their role as teachers and the government who contributed to such circumstances due to inadequate teachers welfare required by the law. The study recommended that teachers need to acquire more training and the government should support them in funding, provision of resources, materials and staff development. The study also recommend for adequate motivation to the teachers required by law, parents should improve their relationships with teachers for the sake of their children and further studies in the area should be undertaken in other Northern states in Nigeria.
Globally, for the past decade there has been continuous growth of body of research on women in prisons with USA setting the pace. The studies have gained insights on female pathways to prison (see Collica-Cox, 2018; Bloom, Owen & Covington, 2005) necessitating the development and implementation of programs that are gender responsive to specific needs of women offenders. Such programs are those that address issues that may hinder rehabilitative success and eventually the reintegration of the women back to the society. Ineffective rehabilitation of women offenders remains one of society’s concerns all over the world today, Kenya included. However, few studies had examined women offenders in Kenya and a little extent the rehabilitation programs that address their psychological needs. The study sought to determine the effectiveness of rehabilitation programs in addressing the psychological needs of the women prisoners in Kenya. Therelational rheory of women’s psychological development and the Risk-Needs-Responsivity (RNR) model for offender rehabilitation were used to inform the study. The study adopted a cross-sectional descriptive research design, employing a mixed concurrent triangulation method of data collection. The target population included all convicted women prisoners within the 17 correctional facilities of women prisoners in Kenya with a minimum of class 8 education level. Purposive and simple random sampling techniques were used to select 350 study participants. Quantitative data was gathered through use of questionnaire while qualitative data were collected from focus group discussions (FGD) guide and interview schedules. Quantitative data collected was analyzed using descriptive statistics and presented in form of frequencies, means and standard deviations. Textual thematic analysis was done for qualitative data from FGDs and interview schedules. The study revealed that majority of women offenders in Kenya associated their criminal behaviors with psychological needs such as: histories of physical abuse - 46.8% in childhood and 51.3% in adulthood; 78.95% scored on posttraumatic stress disorder while parental distress was highly indicated with 62.6% having financial constraints to provide basic needs for their
children, and 87% were constantly worried of their children’s future. The study established that there are few underdeveloped rehabilitation programs targeting psychological needs, with most programs focused on economic empowerment of offenders. The study finding led to a conclusion that the rehabilitation programs within the Kenyan women prison are not effectively addressing women offenders’ unique psychological needs contributing to their criminal behaviors. This is due to lack of gender responsive programming, lack of in-depth research on women and crime in Kenya, lack of curriculum training on gender responsive treatment to the wardresses and lack of proper planning and management of available funds both from the government and income generating from the prisons’ projects. The study notes as important the introduction of alternative rehabilitative practices for less risky and petty offenders to decongest the prisons. The study further recommends contextual researches on women and crime that would lead to the development and implementation of gender-responsive programs in women’s correctional facilities in Kenya. The study contributes to knowledge gap by providing useful information that the prisons department and stakeholders may use to improve policy and rehabilitation practices for rehabilitation of women prisoners in Kenya.

PUBLIC PERCEPTIONS OF THE EFFECTIVENESS OF POLICING AND THE SOCIAL COSTS OF CRIME IN NAIROBI POLICING REGION, KENYA

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Supervisors: Dr. Dickson Ombaka

Dr. Samuel mwangi

Over the last few years, there has been a concern among the public in Kenya about increasing rates of crime and the rising social costs of crime. This study assessed public perceptions of the effectiveness of policing and the social costs of crime in Nairobi policing region. The research adopted a cross sectional study design. It targeted both middle and low income residential areas of Nairobi policing region in jurisdictions of two police divisions, namely; Buruburu and Kajiado. In Buruburu Division, the middle class was represented by Buruburu Estate while the lower class was represented by Dandora Estate. In Kajiado Police Division, the middle class was represented by Kerarapon Estate while the lower class was represented by Gichagi slum. Stratified random sampling design was used to select a sample that comprised 384 informants. The household was the main unit of analysis because the brunt of the social costs of crime is first felt at family level. The study also included police officers, victims who were living in pain and community policing committee members. Questionnaire, Pain Assessment Scale and Focused Group Discussion guides were the main tools of data collection. The study tested four hypotheses using Chi-Square as the test statistic. Out of the four hypotheses tested, two showed significant difference in perceptions of police effectiveness and that of the social costs of crime between the Kajiado and Buruburu police divisions; The second hypothesis results showed a significant difference in public perceptions of what constitutes effectiveness of policing in Kajiado police division relative to Buruburu police division ($\chi^2 = 15.004, p=0.001$). The third hypothesis which sought to test for differences in public perceptions of the social costs of crime between Kajiado and Buruburu police
divisions also showed significant results ($\chi^2 = 6.69, p=0.01$). There were two major components of effective policing in the Kenyan context but which were lacking in Nairobi policing region; professionalism and adequacy of coverage. In addition, as a result of criminal victimization, there were increased perceptions of the social costs of crime that contributed to suffering and pain at both individual, family and community levels. The study concluded that ineffectiveness of policing was also costly to the police service itself. According to the study there were perceptions that increase of police effectiveness would automatically reduce that of the social costs of crime. The study made major recommendations to improve police effectiveness that include the establishment of a national team whose job is to frequently gather public views, refine them and turn good ones into government policy. In consultation with the National Police Service Commission (NPSC), this national team may also be tasked with frequent benchmarking especially from developed countries on best policing practices and modern state of the art equipment to improve on police effectiveness. On a professional front, and to restore Police integrity; credibility, public trust and confidence, there is need to establish human rights policies in the National Police Service. This may include frequent inter-institutional fora between National Police service, National Police Service Commission, Independent Policing Oversight Authority, and Kenya National Commission on Human Rights body to enforce on human rights especially with regard to the right to life. This would avert police excesses such as extra judicial executions.

ENDANGERED LANGUAGE IN NIGERIA: A CASE STUDY OF GERA LANGUAGE OF BAUCHI STATE

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This study investigated the endangerment of Gera language. It investigated the level of the endangerment of Gera language; the demographic variables associated with the endangerment, the impact of the shift on the structure of Gera language, and endeavored to find out if the Gera language is useful in defining the Gera identity. This was achieved through the use of two theoretical approaches: Sasse’s Theory of Language Death and Gile’s Ethno-linguistic Identity Theory (ELIT). The research adopted the descriptive research design in which the data was obtained and analyzed quantitatively and qualitatively. The sampling procedures adopted were the Stratified Random Sampling, Purposive Sampling and Snowball Sampling. The data collection procedures included interviews, focus group discussion, language use and attitude questionnaire (LUAQ), Informant-Aided Participant Observation and Secondary data. The data was collected from five Gera settlements; namely Gilliri, Dabe, Tirwun Kangere and an area within Bauchi town which was mainly populated by Gera. The quantitative data was analyzed by using frequencies of the languages used in domains, patterns of language use, while the qualitative data from the interviews and the observation was grouped into themes which was formulated in accordance with the objectives of the study. The thesis has four analysis chapters: Chapter four identifies the level of endangerment of the Gera language; Chapter five investigated the demographic variables associated with the endangerment; Chapter six examined the impact of the shift
on the structure of the Gera language; and Chapter seven endeavored to find out if the Gera language is useful in defining the Gera Identity. Theories adopted in the study were used to interpret the results. From the analysis, the study notes that only older respondents who are above 40 years can speak the Gera language. Also, that there are more male than female Gera speakers. It was also noted that those with little or no formal education and those residing in rural areas have the highest number of Gera speakers, compared to well educated people and those residing in urban areas. Also noted is that the Gera language borrowed heavily from Hausa, and a lot of code-switching and code mixing happens during speech by the Gera speakers. There is also a mophotactical adjustment of the borrowed words, and also the substitution of some Gera words for some Hausa words in speech. Finally the study observes that despite the dwindling of the number of the Gera speakers to a small number due to the shift to Hausa, Gera language remains the only way of identifying a Gera. Chapter seven presents the summary of findings, conclusions and recommendations for further studies.

HOUSEHOLD PARTICIPATION, LABOUR AND NETWORKS IN THE DEVELOPMENT OF FISH FARMING IN BUSIS COUNTY, KENYA

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Dr. Parvin Walji Moloo

Fish farming has and continues to play a vital role in improving nutrition and creating employment. The purpose of the study was to investigate the sociological aspects manifest in the households as well as the centre of focus in the study aimed at establishing the households and networks in the development of fish farming in Busia County. It sought to document the benefits of fish farming to the households, the adoption levels, to find out the importance of household support in fish farming, to investigate the contribution of consumption on the success of fish farming and to assess the importance of networking among farmers to the development of fish farming. The social network theory as propounded by Friedkin (1993) and the rational choice theory as propounded by George Homans, (1961) and Friedmann and Hetcher, (1990 1990) as well as the human capital theory as propounded by Gary Becker (1964) were used to explain the sociological relevance of the study. The target population was the farmers who were registered under the Economic Stimulus Pack (ESP) and were actively involved in fish farming as well as a number whom through their own initiative, ventured into the enterprise. The target population was that of farmers who were registered and were actively involved (800) in fish farming as well as a number whom through their own initiative, ventured into the enterprise. This study used a mixed-methods research approach. The survey research design that was cross-sectional in nature was used. The sample size calculated was 267. The study was able to get 298 respondents. An additional 8 key informants were also selected via purposive sampling. The data was presented in percentages in descriptive form. The Chi-Square test was also used to test the hypotheses. The findings of the study revealed that a majority of the farmers realized a development on their fish farms. On the same note, it
was observed that the farmers realized certain benefits from the practice of fish farming. The study findings revealed that there was a lack of relationship between the benefits of fish farming and the growth of fish farming in the sector. It was also established that there was a relationship between the importance of household support and the development of fish farming in Busia County. With regard to fish consumption and the development of fish farming, the study findings showed that the consumption was not significant to the development of fish farming in Busia County. Lastly, the findings also revealed that networking was a significant component in the development of fish farming in Busia County. The study recommended that policies should be put in place to promote the training offered to fish farmers and as well should be inclusive of another one or two of their household members. Equally, key components on conflict resolution and functionality should be included in the training, to be applied both at network and household level. This would enhance the synergy and efficient functioning of the farmers’ networks and households as sociological units in the optimal development of the sector. As for areas of further research, it was proposed that a study be done on the demographic variables influencing the development of fish farming in Busia County. Also, the factors explaining the variation in the significance of networks among various age-groups in the development of fish farming.

GENDER OUTCOMES OF THE COMMUNITY LED TOTAL SANITATION APPROACH IN SELECTED COUNTIES IN KENYA

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Dr. Pacificah Okemwa

Inadequate sanitation and hygiene contribute to morbidity and mortality. The Community-Led Total Sanitation (CLTS) approach is used by the Ministry of Health to increase access to sanitation and hygiene in Kenya. This study sought to assess the gender outcomes of the CLTS approach in three sub counties in Kenya. CLTS is considered successful in Kenya, yet its impact on men and women has limited literature available. Therefore, this study sought to document the impact on gender relations as a result of the CLTS implementation in Siaya, Nambale and Teso North Sub Counties. The Moser Framework, the gender socialization concept and the Gaventa Power Framework were applied. A complete census of the households was done, followed by cluster random sampling to determine the households to be interviewed. The Z-Score was used to determine the respondents. Further, 3 Focus group discussions were held with Village Health Committees and 12 key in depth interviews with Public Health Officers
from the Ministry of Health. 384 Structured interview guides and observation check lists were applied in the sampled households. Quantitative data yielded was analysed by statistical package for social science and qualitative data was analysed through Atlas t 6.0 and Open Code 3.4. The data was presented in tables. The study found that the Kenya Environmental Sanitation Policy and the CLTS Trainers’ Handbook did not address gender needs adequately yet CLTS was considered a success in Kenya. That 75% PHOs who were mandated to deliver CLTS were gender blind. That 67% of PHOs made decisions based on general data as they did not have gender disaggregated data on CLTS interventions. Further, it was found that men led in decision making at all levels of CLTS implementation. 64% of PHOs were men at county level and 85% at sub county level. 80% of the people present at community triggering were men and 70% of households reported that men led the decision-making process at the household level in relation to sanitation and hygiene interventions. Men were recognized more during the ODF celebrations as compared to women. 56% of VHCs are women who work without pay. The women provided sanitation and hygiene services in the home as part of their reproductive role and served as VHC resulting to unequal division of labour in CLTS with the women shouldering the heaviest burden. Women faced challenges with limited access to key sanitation resources, such as land and building materials where in households interviewed, 23% were women in Nambale, 15% in Teso and 25% in Siaya. Besides, women had limited access to the latrines and bathrooms, such that it curtailed the benefits at 36% in Nambale, 29% in Teso and 37% in Siaya. Participation of women in decision making in CLTS was tokenistic, whereby there was only an increase of 2.3% of women invited in the decision-making space with minimal strategic benefits, they were not able to claim any space or autonomy in CLTS implementation. The study concluded that despite CLTS being considered a great success in Kenya at 58% as reported by PHOs, it was not applied in a gender sensitive manner thus entrenching unequal outcomes. Teso registered at 23% ODF and Siaya and Nambale registered 93% ODF. The study recommends that there should be a review of the KESH policy and CLTS manual to integrate gender responsive impact assessments and initiate critical enablers. Also, all PHOs should be trained on gender mainstreaming. Similarly, gender mainstreaming should be integrated into CLTS intervention through having flexible gender strategies that would ensure equitable outcomes. The study therefore contributes to the existing literature on community led total sanitation and may inform policy formulation and implementation by the relevant stakeholders.


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Dr. Gatitu Kiguru

This study undertook to critically examine, from a linguistic perspective, the gender disparities in the National Assembly of Kenya between 2013 and 2017.
Through an idea of language as discourse, the study emphasizes the linguistic ideologies at play in producing and sustaining these disparities. The study uses Fairclough’s (2001) and Van Dijk’s (2001) approaches to Critical Discourse Analysis (CDA) in order to understand the gendered discursive realm of politics in the National Assembly. The study objectives were: to identify and describe the linguistic items and expressions used by politicians and media opinion makers to describe the 2013-2017 National Assembly politicians in Kenya; to find out how the linguistic items and expressions construct the politicians; to point out the common ideologies held by the electorate about the politicians; and to establish how the use of the linguistic items and expressions affects the participation of National Assembly politicians in Kenya. The study, through a cross-sectional research design and a purposively selected sample, collected data through one-on-one unstructured interviews with ten Kenya National Assembly politicians, reviewed newspaper and television documents from four newspaper groups and four television channels, and administered semi-closed questionnaires to eighty members of the electorate. Data were recorded by the use of a digital audiorecorder, flash disc, field notes, print outs and photocopies. Data consisted of verbal (written and spoken) and nonverbal gendered discourses, and gendered beliefs. Data were analysed qualitatively, through thematic analysis and simple descriptive statistics, and presented in written descriptions and tables. The study found out that there are gendered ideologies about the Kenya National Assembly politicians among the politicians themselves, the media and the electorate, which to a large extent portray men politicians positively and to a large extent portray women politicians in undesirable ways. These gendered ideologies, to a large extent favour men contestants, and to a large extent work against prospective and
first-time women contestants. The study also found out that women politicians are not passive recipients of the distorted constructions and gendered ideologies, but they contest the distortions and ideologies, and encourage each other. The study concludes that, although the gendered ideologies have been naturalized through language, they are mere gimmicks meant to keep women out of politics and maintain the status quo. The study findings not only complement other studies in Critical Discourse Analysis, but also equip relevant stake-holders with a language-based analysis of the key issues which affect progress towards balanced representation, decision making and resource allocation, thus providing a unique vantage point onto the questions of gender and development in Kenya.

INFLUENCE OF PSYCHOSOCIAL WELL-BEING ON ALCOHOL ABUSE AMONG PUBLIC SCHOOL TEACHERS IN NYERI COUNTY, KENYA

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Department: Psychology

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Dr. Wilfrida Olaly

Psychosocial wellbeing is important for effective functioning and plays a key role in individuals behaviour including alcohol abuse. There are few empirical studies that have examined the influence of psychosocial wellbeing on alcohol abuse. The purpose of the current study was to assess the influence of psychosocial well-being on alcohol abuse among public school teachers in Nyeri County. The objectives of the study were to establish the prevalence of alcohol abuse as well as determine the influence of environmental mastery, personal growth, self-esteem and social integration on alcohol abuse among the teachers. The study further aimed at identifying the intervention measures put in place to address alcohol abuse among teachers in Nyeri County. The study was guided by the Modified Social Stress Model (MSSM), a Theory developed by Rhodes and Jason and modified by the World Health Organisation/Programme on Substance Abuse (WHO/PSA). A mixed method approach employing correlational and phenomenological approach was used in this study. The target population consisted of teachers employed by the Teachers Service Commission (TSC) in public primary and secondary schools in Nyeri County, Kenya. The study utilized a multistage approach to obtain the sample required. The region was clustered into Sub-County and type of school (primary/secondary) after which a random sample
was used to select the schools that participated in the research. In the schools, convenience sampling was used to obtain a sample of 386 respondents from a population of 6264 teachers. A self-administered questionnaire and in-depth interviews were used to collect data. An interview schedule was conducted with the TSC County Director and teachers to capture the views concerning the alcohol situation in the county and specific school. Data were coded and analysed using descriptive and inferential statistics. Qualitative data were analysed thematically. The results from the questionnaire and interview schedules were triangulated to provide enriched data to address the concerns of the study. Results on the prevalence of alcohol use revealed that 59% of teachers consumed alcohol while 32.7% fell under the category of hazardous use as per AUDIT Scale. Chi-square test and t-test for the independence of means were used for inferential analysis. T-test results with a degree of freedom (df) of 384 showed that in the different facets of environmental mastery, there was significantly better financial resources (p=0.016), opportunities for acquiring new skills/information (p=0.002), participation and opportunities for recreation (p=0.002), and health and social care (p=0.039) among the teachers who were not abusing alcohol as compared to those who were abusing alcohol. Level of education, as well as responsibility in school, were noted to have a significant effect on alcohol abuse with teachers having lower levels of education noted to have higher levels of alcohol abuse. Self-esteem also had a significant influence on alcohol (p=0.001). The spirituality (p=0.012), bodily image/appearance (p=0.021), and negative feelings (p<0.01) facets of self-esteem had a significant effect on alcohol abuse levels of the teachers. The findings were corroborated with qualitative data in which teachers who lacked social support, social responsibility and had lower educational qualifications were found to have higher levels of alcohol use than their counterparts. Overall, both the quantitative and qualitative data showed that psychosocial factors such as environmental mastery, personal growth, self-esteem and social integration may increase or decrease teachers vulnerability to alcohol abuse. The study recommends urgent interventional strategies targeting the enhancement of psychosocial wellbeing in the management of alcohol abuse among teachers.

AN ANALYSIS OF GRAND CORRUPTION AND ANTI-CORRUPTION INSTITUTIONS IN NIGERIA AND KENYA; 1960-2015

Nenpomingyi Sarah Gowon Adelabu-PHD

Department: History, Archaeology and Political studies
Supervisors: Dr. Susan Mwangi-Owino
Dr. Washington Ndiiri

Unlike in the past when it was perceived as a political issue, corruption is now considered as a global threat and a major obstacle to development. While corruption is a global problem, it is one of the greatest challenges that Africa is grappling with. With ratings as the most corrupt country in 1996, 1997, and 2000, Nigeria has been infamously popular for corruption. Although Kenya has not been rated as the most corrupt country like Nigeria, it has equally performed dismissably on global corruption perception surveys. Owing to international and local demands for national governments to take punitive actions in fighting corruption, the two countries like their African counterparts have established arrays
of national anti-corruption institutions as antidotes to tackling the problem of corruption. In spite of the foregoing, new corruption scandals are continually reported. The study seeks to interrogate the role of anti-corruption institutions Nigeria and Kenya in fighting grand corruption with particular focus on the EFCC of Nigeria and Kenya’s EACC. The parliament in Nigeria and Kenya passed the anti-graft laws in 2003 thereby justifying the basis for the comparison. Apart from being both multi ethnic ex-colonies of Britain that gained independence during the 1960’s, Nigeria and Kenya also occupy strategic socio-economic positions in their respective regions. The utility of this study is to unravel how the institutional frameworks in both countries have curbed grand corruption and identify lessons that could be learnt from their experiences. The study examines the manifestations of grand corruption in Nigeria and Kenya and political forces that abate the perpetuation of corrupt practices in both countries. It interrogates the measures that have been put in place by EFCC and EACC to tackle grand corruption and the challenges encountered by the institutions. The Study was guided by the Neopatrimonialism Theory and the Structural Functionalist Theory. Both primary and secondary data were used in the survey with a qualitative approach. An analytical research design was applied in the study. Purposive and snowballing sampling techniques were used in selecting the research participants. The findings indicate that Nigeria and Kenya manifest similar forms of corruption by government officials using similar rent-seeking and money-laundering practices. While the range of opportunities for corruption is broader in Nigeria than in Kenya because Nigeria’s main economic asset petroleum is state-owned, the processes of converting public to private assets are largely the same. The findings also maintain that donor pressure and the need for international funding was central to the establishment of anti-corruption institutions in post-colonial Kenya and Nigeria’s present democratic dispensation. The public awareness and education initiatives of the institutions have the most significant impact as a large segment of the society is now aware of the bane of corruption. It concludes that the EFCC has been able to achieve more in prosecution because of its prosecutorial power, broader mandate and political support in its early years of establishment. This led to an improvement in Nigeria’s profile in the corruption perception index. However, prosecution of senior public officials is minimal. Both commissions are faced with challenges that include poor funding, weak legal framework, lack of independence and low political will in fighting corruption. The study thus recommends the development of strong and independent institutions such as the judiciary, and courts, a vibrant civil society, political commitment and ethical change in attitude towards corruption.

AFRICAN PERSPECTIVE OF PERSONALITY AND ITS IMPLICATIONS ON MULTI-CULTURAL COUNSELLING: A CASE OF KENYAN UNIVERSITIES.

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Genetic and environmental factors shape personality. Culture, is the most important of the environmental influences. It is a key determinant of what it means to be a person because it influences
personality throughout its life span. In an attempt to understand personality, different Euro-American theorists have come up with ways of describing, explaining, predicting and controlling it. However, these theorists have been found by some scholars to have derived their constructs and principles from the personalities they tested and handled in their culture. Despite this, they have been generalized to world populations and in the field of psychology and psychotherapy. From the literature review, the outcome of this generalization has not been very effective in meeting the needs of those who are culturally different. This study sought to find out the Kenyans’ of African descent perspective of personality and its implication on multicultural counselling. Six objectives were set to establish these perspectives of: causes of motivation to behaviour, development of a healthy and unhealthy personality/psychopathology, mature/healthy personality, and the implication of these perspectives on multicultural counselling. Symbolic interactionism and cultural relativism theories shed light into the study. This was a cross-sectional and ethnographic survey which applied both qualitative and quantitative techniques. From 2 public and 2 private universities, data was collected using multi-stage sampling techniques among a sample N= 360 which comprised teaching staff n=32, students n=320 and counselling psychologists n=8. Three data collection tools comprised: Questionnaires for teaching staff, students and counselling psychologists, Interviews for teaching staff and Focus Group Discussions for students. Data analysis was done using Statistical Package for Social Sciences (SPSS) version 23 for the quantitative data and content phenomenological analysis for the qualitative data. The quantitative data was analyzed and summarized into tables. The qualitative data was analyzed by organizing the data into themes, before it was summarized and interpreted. The results showed that the Kenyans of African descent personality was influenced by culture whose worldview embedded with cultural moral values and practices, norms and beliefs shaped personality in its motivation and development to become prosocial and more communal than individualistic. This personality’s subjective culture may be implicit or explicit in therapy and that is why the study recommends conceptualization of a client’s concern/problem in therapy to be done within the cultural context pertinent to its development. This study also recommended further research to be done using purely qualitative methods. The findings are crucial in planning for health needs of Kenyans of African descent and increasing knowledge and repertoire of skills in the field of psychological counselling. The findings could also contribute to the formulation of an African theory of personality since it also addresses the main building blocks of personality theory.

QUANTIFICATION OF GREENHOUSE GAS FLUXES AND DERIVATION OF MAIZE CROPPING CALENDAR IN CROPLANDS UNDER RAINFALL VARIABILITY IN KENYA

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Increase in global atmospheric greenhouse gases (GHG) has led to an increase in the radiative forcing resulting in climate variability. The objective of this study was to identify the best management practice
which ensures high maize productivity while emitting as little GHG fluxes as possible under the influence of rainfall variability. The study was carried out in three major parts of Kenya, that is, Kenya as a whole, the agricultural potential zones and central highlands of Kenya. The accuracy of the satellite precipitation products was determined based on data obtained between 1983 and 2013 from Climate Hazards Group InfraRed Precipitation with Station (CHIRPS), Global Precipitation Climatology Center (GPCC), National Aeronautics and Space Administration-Prediction Of Worldwide Energy Resource (NASA-POWER) and Tropical Rainfall Measuring Mission - Multi-satellite Precipitation Analysis 3B42 version 7 (TRMM). The satellite data were compared with observed data from Kenya meteorological department. The soil GHG fluxes were quantified from maize production experiment in Mbeere South sub-county for one year using static GHG chambers. The DeNitrification-DeComposition (DNDC) model was parameterised using experimental data and used to simulate GHG fluxes. The length of the cropping season, onset and cessation date in the agricultural zones of Kenya were determined using daily satellite data from NASA-POWER between 1983-2017 using RAIN software. Results show that all satellite products either overestimated or underestimated rainfall amounts on a pixel to pixel comparison. The TRMM product best estimated rainfall in the tropical cool humid (r²=0.64), tropical warm humid (r²=0.58) and tropical cool sub-humid (r²=0.39), GPCC product in the tropical warm semiarid (r²=0.46) and tropical warm sub-humid (r²=0.21), NASA-POWER product in tropical cool arid (r²=0.97) and tropical cool semiarid (r²=0.53) while CHIRPS product best estimated rainfall in the tropical warm arid (r²=0.33). Cumulative annual GHG fluxes ranged from -0.05 to -0.65 kg CH₄-C ha⁻¹ yr⁻¹, 1.31 to 3.39 Mg CO₂-C ha⁻¹ yr⁻¹ and 0.12 to 1.15 kg N₂O-N ha⁻¹ yr⁻¹ for the four different treatments respectively. Animal manure produced the highest amounts of CO₂ emissions (P<0.001) and N₂O fluxes (P<0.001) and the lowest yield-scaled emission (0.5 g N₂O–N kg⁻¹ N). Animal manure + inorganic fertilisers produced the highest amounts of CH₄ fluxes (P<0.001) and the highest YSE (2.2 g N₂O–N kg⁻¹ N). The DNDC simulated GHGs followed seasonality with peaks recorded immediately after the onset of rains which coincided with fertilisation. The DNDC simulated CO₂ was slightly higher than observed while the N₂O were slightly lower than observed though not significantly different at P=0.05. Results on cropping calendar demonstrate two key regions in Kenya, one with two seasons namely; the Long rains (LR) and Short rains (SR) and the other one with one season in a year. The LR onset is experienced in March and cessation in July; the SR onset in September and cessation in November while the one season onset in March and cessation in October. The LR and SR length of growing season ranges between 23-90 days while that of one season ranges between 192-259 days of sufficient rainfall. These results demonstrate the promising potential of the satellite data in complementing the unreliable data in Kenya. Animal manure has the ability to increase maize yields while simultaneously reducing yield-scaled GHG emissions. The DNDC model provides an accurate and cheaper alternatives for quantifying GHG for national GHG inventories and reporting to the UNFCCC. The results also derive a cropping calendar crucial for the planning of agricultural farming activities which will ultimately reduce losses and improve rainfed agricultural production.

RELATIONSHIP BETWEEN PARENTAL CONFLICT AND SOCIAL ADJUSTMENT OF ADOLESCENT STUDENTS IN SECONDARY SCHOOLS IN MURANGA COUNTY, KENYA

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Parental conflict is a prevalent problem that threatens the social adjustment of adolescence children both in developed and developing nations. Despite evidence of parental conflicts in Kenyan families, there is scarce literature on the relationship of parental conflict and social adjustment of adolescence. This study sought to establish the frequency of parental conflict in families of students in secondary schools in Murang’a County; To find out the types of parental conflicts in families of students in secondary schools in Murang’a County; To assess the level of social adjustment of students in secondary schools in Murang’a County; To examine the relationship between parental conflict and social adjustment of adolescent children in secondary schools in Murang’a County; and To find out if there is any gender differences in social adjustments of students in secondary schools in Murang’a County. The study was guided by attachment and interpersonal theories. This study employed a descriptive survey design with a quantitative approach. The study target population was 108,774 secondary school students in Murang’a County. A Stratified random sampling was applied to draw a sample size of 400 students. Standardized instruments were used to collect data from the students. The Social Adjustment Scale developed by Reda Norton was used to measure social adjustment among the students while frequency of parental conflict and type of parental conflict was assessed using the Children’s Perception of Inter parental Conflict Scale (CPIC). Data collected was coded and processed using the Statistical Package of Social Sciences (SPSS) version 21. Quantitative data collected was analyzed to generate descriptive statistics including frequencies, percentages and mean. Correlations between parental conflicts and social adjustment of adolescence were established using Pearson’s Product Moment Correlation Coefficients. The study showed that 55.8% reported low frequency of parental conflicts while 24.8% reported high frequency. On type of parental conflicts, the students reported perceiving both constructive and destructive parental conflicts with majority perceiving constructive conflicts. On social adjustment the students were predominantly pro social with 62.3% rating themselves high on pro social, 74.3% rated themselves low in offensive interpersonal behaviours and 74.8% rated themselves low in delinquency behaviours. The study revealed that there was a positive and significant relationship between type of parental conflicts perceived and social adjustment of the students. The Pearson (r) correlation coefficient between parental conflicts and both offensive and delinquent behaviours were positive and significant at (r(257) = 0.241, P< 0.05) and (r(260) = 0.171, P< 0.05) respectively. However, the relationship between parental conflicts and pro social was negative but not significant. The study also revealed gender difference in social adjustment of the students. A t test result of the students social adjustment mean scores showed that there was gender differences in delinquent behaviors at and (t= 3.384, df = 319, P< 0.05) respectively. Thus more males than females were more likely to show delinquent behaviours in response to experienced parental conflicts. However, no difference was found in respect to pro social behaviours and offensive interpersonal behaviours. The findings of the student were in support of both attachment and interpersonal theories. The study recommended that schools strengthen counseling department to help students with social adjustment challenges. The study also
recommended premarital education and counseling, couples counseling and community awareness creation on the harm of destructive parental conflicts to their entire family.

CORRELATES OF VICTIMIZATION OF PRISONERS IN MAXIMUM SECURITY PRISONS WITHIN NAIROBI COUNTY IN KENYA

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Studies indicate that victimization is practiced in the free world and in Kenyan prisons. This vice in prisons is a human rights issue. It affects the security of a prison which may impact negatively on prisoners" rehabilitation. However, the studies undertaken do not focus on the forms, nature and factors that predispose prisoners to victimization in prisons in Nairobi County in Kenya which this study set out to establish. The study used survey research design and was conducted in Kamiti and Langata prisons in Nairobi County, Kenya. Simple random sampling was used to draw a sample size of 340 from prisoners for interviews. Purposive sampling was used to draw 16 respondents from among prisoners for Focus Group Discussions and 10 Key Informants from among officers. Data was collected using an interview schedule, Focus Group Discussions and Key Informants interview guides. The study was anchored on the general strain theory which says that an individual resorts to crime due to pressure by others to his or her legitimate means of achieving goals. It was also based on routine activities theory which states that in order for a crime to occur, there must be motivated offenders, suitable targets and absence of capable guardians of persons or property. Data was analyzed using the Statistical Package for Social Sciences (SPSS) with which descriptive and inferential statistics were employed. Qualitative data was analyzed using themes and content analysis. The study findings indicate that victimization is rampant at 100% for male and 88% for female prisoners. Verbal abuse is the most common (79.4%) form of victimization. Majority of females (69.23%) and males (67.10%) were physically abused between noon and 6 pm. Age is a determining factor for sexual victimization as most (30.2%) sexually assaulted male prisoners were those aged 18-25 years. Females aged 35 years and over were not sexually victimized. Physical victimization is as a result of deals among inmates going sour. Majority of male (72.7%) and female (65%) victims did not report cases because they felt no action would be taken. Most (60%) males were victimized in the first week of their admission in prison while 56% females were victimized in the first month. It is recommended that the prison administration separates newly admitted and young prisoners from hard core, older criminals. The prison administration should provide redress mechanisms for victims and also develop more programmes to keep inmates occupied during the day.

FORMS, PATTERNS AND PREDICATORS OF ELDER ABUSE IN MACHAKOS COUNTY, KENYA
The thesis addresses itself to an emerging issue, elderly abuse, that is prevalent yet it is hidden in most communities. It is an issue affecting the elderly population who are increasingly marginalized and ignored. Modernization and attendant urbanization has weakened the social bonds that held communities together, bonds that shielded the weak and especially the elderly from neglect or abuse. Elder abuse is an emerging social problem. As the Kenyan elderly population is rising, phenomenon of elder abuse and the underlying factors contributing to elder abuse need to be understood in their totality. The study explored the forms, patterns and patterns of elder abuse, the reasons for abuse and predicting factors of elder abuse in Machakos County, Kenya. The study used two theories, Social Exchange and Power Control Theory. Cross sectional research design was employed to study phenomena of elder abuse at a specific point in time. The study adopted a mixed methods approach. A purposive sampling of two sub-counties, Machakos Town and Mwala were selected. A sample size of 317 (142 male and 175 female) elderly persons aged 60 and above were interviewed on their socio demographic characteristics (gender, age, marital status, income, occupation, living arrangements, and health status) and their experience of elder abuse. Data yielded by the study were both quantitative and qualitative. Qualitative data was collected through face-to-face interviews as well as three Focus Group Discussions and Key Informant interviews. The data collection tools were semi-structured interview and focus group discussion and Key Informant guide. Data was analysed using descriptive statistics (frequencies, means, standard deviations and percentages) and inferential statistics (Chi square, Pearson’s product- moment correlation) at 0.05 % level of confidence. Results showed the elderly experienced physical, psychological, financial, sexual abuse and neglect. The results further indicated that there was no significant influence of gender, age, income, marital status and occupation on elder abuse. All categories of the elderly experienced elder abuse. Health and living arrangements had a significant influence on the experience of abuse. The key predicting factors for physical, psychological and financial abuse were found to be ownership of land and having not subdivided it as well as family strife. Sexual abuse happened because the elderly person was found living alone as well as violation of customs like in joking relationships. Neglect was found to be caused by the fact of children having moved to live elsewhere and leaving the elderly person on their own. The study findings highlighted the nature and extent that is not clearly understood of the issue of elder abuse and the urgency to inform on policy formulation focusing on the elderly abused. A curriculum on Social Gerontology should be developed to gain the knowledge about the elderly and consequently on elder abuse. The study augments the Social Pillar of Vision 2030 and the Kenya Constitution on Social Security and Social Justice.
The changes such as increases in urban dwellers and demand for high quality and safe products being witnessed in agrifood systems around the world present opportunities for farmers to orient production to meet the emerging needs. To this end, governments in Sub-Saharan Africa have been reconstituting new trading policies. In Kenya, banana farming is a prospective activity through which small-scale farmers could exploit the emerging opportunities. This study examines the banana value chain in Meru County in order to determine the constraints and opportunities therein and the farmers’ responses.

Although agricultural value chain studies are strongly recommended as possible intervention strategies of increasing the farmers’ competitive position in their activities, past studies on banana farming in Kenya mainly focused either on production or marketing. This study focused on the following objectives: profiling the demographic-socio-economic characteristics of farmers and traders, determining the constraints and opportunities in banana value chain, and evaluating the spatio-temporal distribution of periodic banana markets. A survey design and mixed method approach were used in data collection. Research instruments included: (i) Questionnaires administered to 384 farmers and 384 traders who were purposively selected. (ii) Interview guide used for 8 key informants. (iii) Focus group discussion guide used for 2 groups. Data processing and analysis was done using excel and SPSS. Quantitative data was analysed using analysis of variance, t test, Pearson correlation coefficient and nearest neighbour index. Qualitative data analysis was guided by SWOT and Scoring cards. Results showed that: women dominated production (52.6%) and marketing (57.6%); a significant (p < .000) difference existed between earnings by men (Ksh 16,770) and women (Ksh 14,249) farmers; farms were small (1.9 acres) and significantly (p = .032) different in size across the sub counties; and 177 stools were harvested monthly but significantly (p < .001) varied across locations. Wholesalers dominated banana trading. Pests and diseases (23.2 %), and high marketing costs (24.2 %) were the leading constraints. Opportunities included; short distances (3.3 kilometres) between farms and markets which significantly (p < .000) varied with locations, and unmet demand for bananas and high prospects for value additions. Markets with a closer time dimension did not have a wide spatial distance and vice versa (r = -0.530, p = .076); and the banana markets were not uniformly distributed (Rn = 0.31). The study concluded that: (i) some demographic-socio-economic characteristics of farmers and traders influenced their activities in the chain. (ii) The chain is characterized by several interdependent constraints (iii) Banana value chain has enormous potential to benefit farmers (iv) Markets do not meet the needs of the farmers equally. It is therefore recommended that: (i) community training on production and entrepreneurship targeting women to be conducted. (ii) Meru County government to partner with private firms in helping farmers address constraints and exploit existing opportunities. (iii) Banana traders to curve out a niche market in order to promote banana value addition, and (iv) the County government to either reorganise market in synchronised way or establish new ones in areas not optimally served.
The Kenya National Drama Festival Committee usually enters into a sponsorship agreement with other institutions to help in disseminating certain messages through drama. One of these bodies is NACADA (National Agency for the Campaign against Drug and Substance and Alcohol Abuse). NACADA has sponsored a number of editions of the Festival in the hope that participants will be sensitized through the performances on the need for demand reduction and supply suppression of alcohol and drugs. It mostly targets the youth in Kenya who are said to be at the highest risk of becoming victims of drug and substance abuse. The youth are mostly in schools and
most of the participants at the Festival are school going children. This study takes the Kenya National Drama Festival as its launch pad to interrogate the theme of the campaign against drug and substance abuse among the plays presented at the Festival as sponsored by NACADA between 2013 and 2015. The interrogation of this theme is intended to offer a platform of finding the best theatrical style of telling a story against drug and substance abuse among the youth since virtually all the performers are within the youth bracket of age. Using the Semiotics theory, the study responds to the questions of how the structural makeup of the performances, their characterisations as well as their language use and production design work in synchrony as agents of the campaign against drug and substance abuse by disseminating messages that hinge on demand reduction of drugs and alcohol as well as their suppression of supply. This is a qualitative study that relied on content analysis of pre-recorded performances. Data was collected through the use of observation and interview guides. Generally, the study found out that structures of the play were not strong as directors focussed more on the rewards rather than story-telling, plots tended to be prescriptive, characters were not fully developed and lastly production techniques were deployed to enhance the construction of the theme of fight against drug and substance abuse. This study is a key plank in the generation of knowledge on the analysis of pre-recorded performances as well as on the twin issue of drama and the campaign against drug and substance abuse. It is useful to educationists, antidrug abuse campaigners, theatre researchers as well as the general reader.

SET COMPONENTS AS A MODERN NARRATIVE: A STUDY OF SELECTED FEATURE FICTION FILMS ON THE GENOCIDE AGAINST THE TUTSI.

Roger Philbert Dusabe-M.A.

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This study aims at making meaning of set components in historical fiction films on the 1994 Genocide against the Tutsi. The argument is that when it comes to historical feature films, emphasis tends to be put on the general theme that the films tackles, highlighting the major turning points of the depicted historical events at the expense of the world the event is set in. The research also adopts the idea that a society relates fully and retains knowledge of an event that happened long time ago, through understanding the conditions surrounding the event in question. This study strives to establish the validity of element of fiction films as historical sources by establishing the relationship between set components and the narrative structure in the selected films; describing the signs of historicity in the selected films using set components; and examining the sociopolitical and economic function of set components from selected films in the filmic depiction of the 1994 Genocide against the Tutsi. The study sampled films on the Genocide against the Tutsi that are feature and fiction due to the type of desired data. Making meaning of how style and technique are used to express the artist’s idea in film is the ultimate purpose of this study, a formalist approach guides the textual analysis and interpretation of the films selected which are Terry George’s Hotel Rwanda (2004), Michael Caton-Jones’ Shooting Dogs (2005), Raoul Peck’s Sometimes in April (2005), and Philippe Van Leeuw’s The Day God Walked Away (2009). The study finds that set components fulfill three (3) functions. The first is the role set components play towards highlighting other elements of the same artwork. The second function which is much larger is the specific role set components fulfill towards the artwork’s general themes and as a whole. The third function steps outside the artwork and involves the viewers as set components find meaning assigned to them in relation to the viewing audience in
a certain context. The study argues the importance attached to accuracy in film and contextualizes the impact of anachronisms vis-a-vis the intended meaning

CHALLENGES FACED BY MUSIC LEARNERS WITH CEREBRAL PALSY: A CASE OF JOY TOWN SECONDARY SCHOOL FOR THE PHYSICALLY IMPAIRED, KIAMBU COUNTY, KENYA.

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Supervisors: Dr. Timothy Njoora

Dr. Henry Wanjala,

This study was designed to investigate the challenges facing music learners with cerebral palsy (CP) in Joy Town Secondary School for the physically impaired in Kiambu County Kenya. It had been observed that interest in learning music diminished among learners with cerebral palsy as they proceeded from form one to form two. This prompted the interest to carry out a research on the causes of these changes in interest in music for these learners. The study investigated the challenges that led to the loss of interest in music among learners with CP in Joy Town Secondary School for the physically impaired. It sought to identify challenges and ways of sustaining music interest in learners with CP in this school. Joy Town was selected as it is the only special secondary school that offers music as a subject in Kenya. It currently also accommodates learners with physical challenges including CP. The concern was to interrogate the reasons why their musical interest changed as they got to form two. The main objective was to seek for information on how these learners could be assisted to overcome the challenges they faced in pursuing music in Secondary School. To achieve this objective, the study employed a descriptive research design because it sought to get a clear picture of the situation, attitude and behavior of individual students with CP. The study was guided by the Education theory of interest (1983, 1992) and Alderfer – ERG theory of learning (1969). These are significant theories in addressing the interest in learning and motivation of learners respectively. It was also guided by Human Rights model that builds upon the spirit of universal Declaration of Human Rights which declares that all human beings are born free in right and dignity. The study considered an estimated target population of 197 students and 17 teachers. However it was noted that not all students suffered from CP, therefore a non-probabilistic sampling technique was applied to select a sample of 48 students for the study. The sample size also included 17 teachers. Data was collected through interviews and questionnaires. The data gathered was analyzed using qualitative approach and the findings presented using tables, charts and graphs where it was applicable. To compute the data the statistical package for the social sciences (SPSS) was used for data analysis. Challenges faced by CP learners included: lack of appropriate music foundation for this group of students in the primary school, complex subject content considering their physical challenges, teachers, parent/their peers, attitude towards them pursuing music, a wide syllabus and limited time in teaching and learning music. Recommendations included: re-evaluation by policy makers and curriculum developers; to restructure the music curriculum to make it compulsory and examinable from the primary school; to adapt the music syllabus in order to accommodate the needs of learners with CP;
Ministry of Education science and Technology through music educators and musicians to sensitize parents, teachers and students on the importance of music in schools and especially to learners with CP. The conclusion was that the challenges faced by music learners with CP influenced their interest in music and this in turn discouraged them from pursuing the subject. However with the various strategies put in place they could be assisted.

ART MUSIC CONTRIBUTIONS INSPIRED BY KENYAN FOLKSONG REPERTOIRE: A CASE OF INNOVATION DRAWN FROM SAMIA CHILDREN SONGS

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Today, influences such as globalization, urbanization and technology have led to fast-changing trends in music. Often, social occasions that were traditionally set apart with a view to learning and engaging with cultural activities such as children game songs and other types of songs have been replaced with other social activities such as media entertainment, sports, holiday travel and other contemporary activities. One of the negative outcomes of modernization and urbanization is that former social activities for instance, performing game songs, story-telling and role modelling become less attractive and practice of such activities gradually becomes extinct. Yet, this oral tradition is a powerful tool for the transfer of societal knowledge, skills and values, which should, therefore, be preserved for future generations. However, to counter this negative development, some composers have created folk–based works for public sharing. From the review of related literature, it was evident that in Kenya, little effort had gone into composition of art music inspired by children folk songs. The aim of this study was to fill this gap through collection, transcription and analysis of selected children folk songs which were further used to create art music works. The study aimed to explore Western classical musical features compatible with Samia idiom to enable creation of art music, examine dominant features from Samia children folk music for compositional and arrangement ideas, and expose selected Samia children folksongs to the world of art music. The development of this new culture of art music had to however preserve the identity of children folk songs. Review of related literature covered: Childhood experiences with music, the role of music in the traditional culture and composition as a creative process. The study was conducted in Samia District of Busia County. The target population was Samia culture bearers, primary school teachers who trained children to perform folk songs for competitive and non-competitive festivals, pupils who participated in children folk songs, composers of art music, and children folk songs. Snowball and Purposive sampling were used to collect children folk songs from rural locations among children who currently participated in Samia oral tradition. Data were collected by use of questionnaires, interview schedules, focus group discussion, observation schedules, and recorded via tape and video recorders. Data analysis was approached through melodic, rhythmic and harmonic content in children folk music. Interviews were analyzed through reading and re-reading, comparing and scrutinizing respondents' written verbatim transcripts to identify recurrent themes. The study revealed that there
were a lot of similarities between Western classical and African music idioms. In addition, Samia children folk music had dominant musical features which enabled the composition of art music. The compatibility of Western and African music idioms enhanced the fusion of the two cultures in the composition of art music. The study also established that majority of composers had not written art music based on children folk music compared to adult folk music. The study, therefore, was expected to promote and propagate art music based on children folk songs for posterity.

CATHOLIC CENTREDNESS IN SELECTED PLAYS PRESENTED AT KENYA NATIONAL CATHOLIC DRAMA AND MUSIC FESTIVALS, 2015

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Dr. Zipporah Okoth

The Kenya National Catholic Youth Drama and Music festival is an annual festival whose idea was mooted in the year 2000 by the Kenya Conference of Catholic Bishops. It is an event whose theme is derived from the Pope’s message to the youth and then customized to fit the Kenyan situation. The main purpose of this event is to motivate the young people into the work of evangelization using their creativity. Cognizant of the fact that young people are the majority in every congregation, the Catholic Church has put in place a number of media to evangelize them. Evangelization by the young people by use of theatre reaches out to where the young people are, both physically and in their life situation, and offers a genuine response to their yearnings. Evangelization provides opportunities and conversations that deepen young people’s relationship with God, encouraging them to live as disciples and discover Christ’s invitation to full sacramental relationship with Him. Young People are to be encouraged and assisted to use many and varied creative means, drama and music inclusive, always seeking to build a bridge between the ancient faith and the contemporary world, between the tabernacle and the street, between cathedrals and theatre halls. This is the objective of the Catholic Church in establishing the Kenya Catholic Drama and Music Festivals. However, the question that needs to be answered is this; how does the Festival achieve this purpose? Are the items in the festival Catholic-centred? This is a qualitative research that used content analysis of the data that was gathered through observation, viewership and close reading of the performances and the performance texts of three (3) plays that were presented during the 2015 edition of the Kenya National Catholic Drama and Music festivals held in Embu diocese in December 2015. This study was based on theatre performance theory as propounded by Richard Schechner and supported by Eli Rozik as well as religious theatre theory as propounded by Kevin Wetmore. From a Performance Theory standpoint, this study examined; how the performance-texts made meaning in respect to the issue of Catholic centredness within the parameters of the Catholic Church. And using the religious theatre theory, it sought to interrogate how the plays were faithful to the Catholic way of evangelization. The study hopes to contribute useful and valuable knowledge in the area of theatre and the church in Kenya and elsewhere. Such knowledge will be valuable because little in-depth study has been carried out in this area either in Kenya or elsewhere.
Housing units demand in Nairobi City County has been on the rise since time memorial. The supply for housing units is 50,000 units yearly while demand is 200,000 units leaving a deficit of 150,000 units yearly. Commercial banks lending to real estate developers since 2012 to 2017 has been between 130.92 billion to 371.65 billion but the estimated real estate mortgage market requirement is around 800 billion yearly. The motive of the study was to determine how housing financing alternatives, Government policy and real estate development can benefit financially and bridge the housing gap in Nairobi City County, Kenya which was so large. This is because Nairobi being the capital city for Kenya and despite the devolution of many activities in the Counties, many industries and investors still come to Nairobi City County for investments. Urbanization expands as rural urban migration offers better income opportunities in cities. The trend as both a source and a challenge for the housing sector has continued to rise, this is because housing financing is a typical capital dependent industry. The specific objective were: to determine the effect of Mortgage financing on real estate development; to establish the effect of Public Private Partnership financing on real estate development, to determine the effect of Securitization financing on real estate development, to determine the effect of Real
Estate Investment Trusts financing on real estate development, and to determine the mediating effect of Government policy on the relationship between housing financing and real estate developments. Housing financing alternatives have become an efficient instrument for unlocking the challenges of financing to real estate developers with the necessary financial proficiency to enhance their operations. The study was anchored on Structural form theory, loanable theory, asymmetric information theory and Simulation theory. The study adopted positivism research philosophy and descriptive research design. Data was collected using a questionnaire. Stata 12 were used to analyze data using factor analysis cross tabulation, and Structural Equation Model. The study used Structural Equation Model to measure the relationship between the independent and the dependent variables. Normality tests were tested using the rule of thumb, homogeneity was tested using chi-square statistics and multicolinearity was tested using Variance inflation factor. A population of 30 real estate developers with two respondents from each firm was conducted 48 responded. The study found that Mortgage financing has no statistical effects on real estate, Public Private Partnership has a positive statistical effect on real estate development and was preferred by many real estate developers. Government policy has statistical effect on real estate development. Further the study found that REITs financing method has no statistical effect in the Kenyan real estate sector, but has a positive effect in development of housing units. This study concluded that Public Private Partnership and REITs were more preferred method of financing, Mortgage financing is not preferred financing method in real estate development in Nairobi City County Kenya.

DISCRETIONARY BENEFITS AND EMPLOYEE RETENTION IN REGULATORY STATE AGENCIES UNDER THE NATIONAL TREASURY, KENYA.

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Retention of employees in State Agencies has been cited as a big challenge that has continued to undermine service delivery. Despite the several public sector reforms with a view of improving performance of State Agencies, the most critical of those reforms addressing the Government’s ability to attract and retain employees has not been met. Notwithstanding the fact that Regulatory State Agencies have wide mandates covering the whole country, they have lean structures and are centralized making them vulnerable if the staff establishment is interrupted through exits. Employee retention is therefore key to these Agencies and thus necessary to design strategies to retain employees. Discretionary benefits are not mandated by law but offered by employers at their own free will as strategies to attract and retain talent. The main objective of the study was to establish the influence of discretionary benefits on employee retention in Regulatory State Agencies under the National Treasury, Kenya. Specifically, the objectives were to establish the influence of private health insurance, pension plans, wellness programs and work life balance on employee retention and the mediating effect of job satisfaction on the relationship between discretionary benefits and employee retention in Regulatory State Agencies under the National Treasury. The study reviewed social exchange theory, equity, Herzberg’s two factor theory and expectancy theory. Descriptive and explanatory research designs were adopted. The target population was all the 320 employees of the four Regulatory State Agencies under the National Treasury, Kenya. Proportionate stratified simple random sampling was used in selecting a sample size of 175 respondents. Quantitative and qualitative data was collected using self-administered semi-structured questionnaires. The questionnaires returned were 145 which was 83% response rate. Validity was determined using face and content validity whereas reliability was determined using Cronbach’s alpha coefficient which yielded 0.948 reliability index. Qualitative data was analyzed using content analysis whereas quantitative data were analyzed using descriptive and inferential statistics. Descriptive statistics included the mean and standard deviation while inferential statistics was analyzed using multiple linear regression models. The descriptive results indicate that discretionary benefits were offered to a high extent, job satisfaction was at a very high extent and retention was at a high extent. For the direct relationship, work life balance, wellness programmes, and private health insurance had a positive effect on employee retention whereas pension plans had a negative effect. Job satisfaction partially mediated the relationship between the discretionary benefits and employee retention. The study concluded that, discretionary benefits were offered to a high extent and the extent of Discretionary Benefits offered has a significant effect on level of employee retention and the strength of the effect of discretionary benefits on employee retention is dependent upon the level of job satisfaction. The study recommended that periodic job satisfaction surveys be scheduled to continuously monitor the levels of job satisfaction and that policies governing the administration of discretionary benefits be strengthened to increase their appeal to employees and finally involve employees in the design of discretionary benefits.
Over the last eight years, agency banking has progressively gained importance in Kenya. Agency banking has enabled banks to save on costs associated with opening bank branches and has offered convenience to bank customers who before the introduction of agency banking involuntarily had to travel long distances and incur hefty amounts on transportation in order to access a bank branch. Agency banking is facilitated by small scale enterprises who take up the role of the bank teller and offer financial services to bank customers. Research has shown that small scale enterprises face surmounting obstacles which limit their long term existence and development. Many small scale enterprises fail within the first few years as the owners are not able to meet the costs of running the business. Engaging in Agency Banking may save small scale enterprises from the problem of winding up due to financial injection from the agency business. Studies on agency banking within the country and world over have concentrated on the how agency banking has affected the performance of banks while other studies have concentrated on the customers of the agency and how agency banking has impacted on their livelihoods with little attention being focused on the effect of agency banking on the financial performance of the small scale enterprises that undertake agency banking. Scanty systematically organized studies exist on the effect of agency banking on the financial performance of banking agents and whether it is viable for small scale enterprises. Driven by this knowledge gap, this study sought to determine the effect of agency banking transactions on the financial performance of Small scale enterprises in Kiambu Town, Kenya. The specific objectives of this research examined the effect of agency financial transactions; common costs of agency and primary business and agency liquidity on the financial performance of small scale enterprises in Kiambu Town, Kenya. The study anchored on Agency theory since the small scale enterprises act in the interests of the commercial banks as they serve clients who belong to the banks. Positivism philosophy was adopted for the study and cross sectional design was the research design that was used. The study sample was identified through stratified random sampling technique where Small scale enterprises in Kiambu Town were classified into the category of the bank they operate for and a sample of 51 Small scale enterprises providing agency banking services were selected. Characteristics of the study variables were computed using descriptive statistics with regression analysis being used to test the hypothesis. The study concluded that agency financial transactions for e.g commissions received from the banks and additional business from the customers had positive significant effect on financial performance of Small scale enterprises. Common costs e.g wages, rent and security cost had negative significant effect on financial performance of small scale enterprises. The businesses engaging in agency business also save on operational costs since the same resources are used to derive additional income. The study also concluded that regulatory framework had no significant moderating effect on the financial performance of small scale enterprises. The study recommended an awareness campaign on all the financial services offered by agents as most customers seem only to engage on few of the permissible activities of agency
banking and an agent management framework be created to effectively determine and manage the number of agents within a certain radius.

BANK CHARACTERISTICS AND FINANCIAL PERFORMANCE OF LOWER TIERS COMMERCIAL BANKS IN KENYA

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The lower tier commercial banks in Kenya have been recording declining performance over the recent past especially in the wake of tight regulatory controls and shifting operating environment. Poor financial performance has cost several lower tier banks dearly to the extent that some had to be put under receivership. Recently in the financial year 2017, most banks in tier II and III posted poor financial results with previous superb performers posting big losses. To thrive, the commercial banks must reconsider their internal formations or characteristics and must adopt a redesign that best places them well to effectively compete. While studies have been done on this area, a lot of gaps remain unresolved on the need to have a detailed assessment of bank characteristics, replicate studies to the local context, use more objective measures of performance and address conflicts presented in past findings. The purpose of this study was to establish the effect of bank characteristics on financial performance of lower tier commercial banks in Kenya. Specifically, the study aimed to establish the effect of bank size, board composition, and ownership structure on financial performance of lower tier commercial banks in Kenya. Performance indication embraced profitability indicators and specifically the Return on Assets as well as Return on Equity. The study was guided by the transaction cost theory, agency theory, and stewardship theory. The descriptive survey design was applied for the study and targeted all the 36 lower tier (Tier II and III) commercial banks in Kenya. The study relied on secondary data which were collected with the aid of a document review guide or checklist. Data were analysed using descriptive analysis, correlation analysis and multiple regression analysis. The findings indicated that there was a strong positive and significant relationship between bank size and ROE, there was also a weak positive and significant relationship between bank size and ROA and firstly, there was a weak positive and significant relationship between bank size and NI. There was a strong positive and insignificant relationship between board composition and NI, there was a weak positive and insignificant relationship between board composition and ROA and there was also a weak positive and insignificant relationship between board composition and ROE. There was an insignificant negative relationship between ownership structure and ROE, there was an insignificant negative relationship between ownership structure and ROA and also there was an insignificant negative relationship between ownership structure and NI. The findings further indicated that bank size had a significant effect on financial performance, also board composition had a significant effect on financial performance, ownership structure had an insignificant effect on financial performance and lastly monetary policy did not have a significant moderating effect on the relationship between bank characteristics and financial
performance of lower tier commercial banks in Kenya. It was concluded that bank size had relatively stronger effects on ROE compared to ROA and NI and every bank should strive to have the best mix of assets and loans, and should strive to encourage more customer deposits to positively affect financial performance. Banks with a higher number of directors seem to be earning much higher returns than their counterparts despite being in same macroeconomic environment. Lower tier commercial banks managers owned a third of the banks’ equity and there was a negative and weak relationship between ownership structure and the three measures of financial performance which included NI, ROE and ROA. In conclusion, more equity ownership by the managers did not affect financial performance. Lastly, monetary policy did not have any significant moderating effect on financial performance of lower tier commercial banks in Kenya

SCHOOL OF MEDICINE

PREVALENCE OF HELICOBACTER PYLORI INFECTION AMONG PATIENTS WITH PEPTIC ULCERS AND THE ASSOCIATED RISK FACTORS IN MBAGATHI LEVEL V HOSPITAL, NAIROBI COUNTY, KENYA

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Dr. Daniel Okun

H. pylori is a microaerophilic organism and a gram negative bacterium which is found in the alimentary canal. It causes chronic gastritis and gastric ulcers. It is also linked to the development of duodenal ulcers and stomach cancer, conditions that were not previously believed to have a microbial cause. The persons infected with H. pylori usually have a 10 to 20% danger of developing peptic ulcers and a 1 to 2% likelihood of acquiring stomach cancer in lifetime. Nearly 15% of infected persons will develop peptic ulcer (duodenal or gastric) or gastric cancer as a long term end result of the infection. The outcome of infection depends primarily on the severity and topography of histological gastritis, which may possibly be determined by the age at which infection is acquired. Knowing the risk factors associated with the infection, it is necessary to put in place interventions
and advice on suitable preventive measures. The main objective of this research was to determine the occurrence of H. pylori infections in patients with chronic gastritis and gastritic ulcers attending Mbagathi level V hospital in Nairobi. The study design was a cross-sectional hospital-based study and purposive sampling technique was used.

Participants included all the patients with symptoms of ulcers and who were at the age of 6 months and above. 381 Stool samples were collected from the patients and their demographic information recorded after which, they were given questionnaires. The H. pylori stool antigen test was performed on the stool samples and the questionnaires analysed for risk factors. In conclusion, prevalence was found to be 46.2% (r = 12.28; p = 0.015). The H. pylori infection among various age group was found to be high at 32.4% in the age group between 31 to 40 years, and found to be low at 3.4% in the age group between 81 to 90 years (r = 3.15; p = 0.031). Among the risk factors, female gender (p = 0.003) and water for drinking and other domestic usage were found to be statistically significant (r = 0.3; p = 0.007). The findings of this study will give the authorities in health sector a good chance to put in place adequate preventive measures against H. pylori infection. Importantly, all confirmed cases of H. pylori infections should be treated to avoid the chances of transmission and steady supply of clean water to the residents.

PREVALENCE OF MULTIDRUG RESISTANT ENTEROBACTERIACEAE AMONG CHILDREN WITH AND WITHOUT SEVERE ACUTE MALNUTRITION HOSPITALISED AT THREE PUBLIC HOSPITALS IN KENYA

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Children with complicated severe acute malnutrition (SAM) have an increased risk of mortality owing to infections during admission and post hospitalization, despite current guidelines that include empiric antibiotics. Factors such as nosocomial infections due to healthcare facilities exposure, antibiotics,
antimicrobial resistance, intestinal bacterial dysbiosis and translocation could be a contributor to mortality. We sought to determine the prevalence of faecal carriage of extended–spectrum beta-lactamase–producing Enterobacteriaceae (ESBL-E) among children with and without SAM at admission to hospital, their acquisition of ESBL-E in hospital, and the frequency of ESBL-E in blood culture isolates. A prospective cohort of 1321 children admitted to three hospitals in Kenya were screened before 820 were enrolled, stratified by SAM status. Rectal swabs were collected at admission and discharge and cultured for ESBL-E. Demographic, clinical and treatment factors were recorded and analysed using logistic regression for association with ESBL-E carriage and acquisition. Blood culture isolates were retrospectively reviewed for the presence of ESBL-E at one rural district hospital with systematic surveillance of invasive infections (2010-2017). Among 820 children, ESBL-E were detected at admission in 194/412 (47%) and 168/408 (41%) of children with and without SAM respectively (P unadjusted=0.103). At discharge, 305/717 (42.5%) SAM patients compared to 251/717 (35%) non-SAM screened positive for ESBL-E (P adjusted =0.342). In a multivariate analysis, hospital site P<0.0001, prior hospitalization up to 6 months (P<0.0001) and cerebral palsy (P=0.047), are associated with ESBL-E colonisation at admission while SAM (P Adjusted=0.074), HIV or reported treatment of the current illness were not. By discharge, hospital site (OR 0.25 (95%CI 0.13-0.47, P<0.0001), length of hospital stays (OR 2.59 (95% CI 1.59-4.21) P<0.0001) per day and second line antibiotic treatment (OR 2.02(95% CI 1.01-4.08), P=0.047) were associated with ESBL-E acquisition during hospitalisation. Of 2,687 SAM and 8,441 Non-SAM children with non-contaminated admission blood cultures, 195 (7%) and 279 (3.3%) respectively were positive for any pathogen (OR 2.29 (95%CI 1.89-2.77, P<0.001); 116 (4.3%) and 138 (1.6%) for a Gram-negative pathogen (OR 2.83 (95%CI 2.14-3.74, P<0.001); and 9 (0.3%) and 8 (0.09%) for ESBL-E (OR 3.67 (95%CI 1.05-13.2, P<0.006). ESBL-E carriage at admission and acquisition in hospital are high among hospitalised children in Kenya. Prior hospitalisation, treatment with ceftriaxone and length of hospital stay, rather than severe malnutrition or HIV status, are risks for ESBL-E carriage and acquisition. Invasive bacteria expressing ESBL-E isolated from children at admission remain scarce at the rural district hospital.

PREVALENCE OF BACTERIURIA AND ANTIBIOTIC SENSITIVITY PROFILE OF BACTERIAL ISOLATES AMONG SEXUALLY ACTIVE NONPREGNANT WOMEN ATTENDING THIKA LEVEL 5 HOSPITAL

Purity Musili-M.Sc

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Bacteriuria is commonly found in women and about thirty three percent (33%) of adult women have encountered an incidence of symptomatic cystitis at least once in their life time. In case the uropathogens are unidentified and management undertaken, bacteriuria may cause more dangerous and adversed complications, including nephritis and renal
failure. Majority of studies done in Kenya have focused on pregnant women with no documented information available on the sexually active non pregnant women population despite a heightened risk of bacteriuria in this age group. The objectives of this study were to determine the occurrence of bacteriuria, to isolate bacterial pathogens associated with the bacteriuria, to determine antibiotic susceptibility profile on the isolated bacterial pathogens in sexually active non pregnant women attending Thika level 5 Hospital, Kiambu County, Kenya. The study employed a cross sectional design and random sampling technique. Three hundred and eighty four (384) mid-stream urine samples were collected from sexually active non pregnant women aged 18 to 48 years attending Thika level 5 hospital. The urine samples were analyzed using biochemical methods. Microscopy was done to observe the presence of motile bacteria and pus cells. The positive samples were cultured on Cystine Lactose Electrolyte Deficient (CLED) media. The isolated bacterial pathogens were identified by standard bacteriological methods. Antibiotic susceptibility testing was done on the antibiotics recommended for bacteriuria by the Ministry of Health. Demographic characteristics were analyzed using simple percentages among related variables and presented using pie chart and tables. The occurrence of bacteriuria was calculated using the formulae of Le and Boen et al. (1995). The bacterial isolates and antibiotic susceptibility tests were analyzed using Pearson's Chi-square test at a confidence interval of 95%. Out of 384 urine samples tested, 311 (81%) samples had significant growth (P=0.001) and 73 (19%) had no growth (P=0.056). The frequency of the study population was high within age group 18-27 years with (46.88%). The distribution of bacteriuria within age groups was highest in age group 18-27 years with (45.31%, P=0.001). This study showed decrease of bacteriuria with increasing age (P=0.001). Escherichia coli was the most isolated bacterial pathogen (41.5%). Escherichia coli and Staphylococcus saprophyticus pathogens were isolated in
all age groups. Among the ten antibiotics tested, bacterial isolates were sensitive to Cefuroxime at 93.2% ($\chi^2=29.809$, $P=0.001$) and resistant to ceftazidime at 89.7% ($\chi^2=62.791$, $P=0.001$). The most sensitive bacterial isolate was P. mirabilis and the most resistant was P. aeruginosa. This study recommended that, since antibiotic resistance among the uropathogens is evolving problem, a routine surveillance to monitor the etiologic agents of bacteriuria and the resistance pattern should be carried out timely to choose the most effective empirical treatment by the physicians. Data obtained from this study is important in appropriate management and treatment of bacteriuria. This will help in proper prescription of the appropriate antibiotic for the treatment of bacteriuria.

**ANTIBIOTIC SUSCEPTIBILITY PROFILE OF ENTERIC BACTERIAL ISOLATES FROM STOOL IN CHILDREN BELOW FIVE YEARS WITH DIARRHOEAAL DISEASE IN MURANGA COUNTY, KENYA**

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Dr. Micah Ongeri Oyaro

Diarrhoea is a major cause of morbidity and mortality in developing countries. Bacterial agents are among pathogens implicated to cause diarrhoea in children and are of major concern in public health. Antibiotic use has paradoxically led to bacterial resistance and the situation continues to worsen. The main objective of the study, therefore, was to determine enteric bacterial isolates and their susceptibility to antibiotics from diarrhoeal stool samples among children below five years in Murang’a County. A hospital-based cross-sectional study approach was applied to 163 randomly selected diarrhoeal stool samples from children below five years in Murang’a and Muriranja’s hospitals. Enteric bacterial pathogens were cultured and identified using polymerase chain reaction and biochemical methods. A questionnaire was used to collect information from the guardian. Statistical analyses were performed using STATA v.13. Fisher’s exact test was used to check for evidence of relationship ($p<0.05$). Regression model analysis was used to estimate the association between pathogenic bacterial isolates and demographic, clinical, and hygienic factors. There were nearly equal distributions in gender 86(52.8%) female vs. 77(47.2%) male, the majority (35.6%) aged within 1 day - 12 months. Clinically, 153(93.9%) had a fever, while 117(71.8%) had a nutritional problem. A total of 188 enteric bacterial isolates belonging to 11 genera were recovered from stool samples of children under investigation. Predominant bacteria from stool samples was nonpathogenic Escherichia coli 85(43.8%), while 13(7.0%) E. coli were positive for virulence genes, including 8(4.3%) positive for both LT and STp Shiga-like or Enterotoxigenic E. coli, 3(1.6%) for eae Enteropathogenic E. coli and 2(1.1%) for Enteroaggregative E. coli.
gene. Others included: Salmonella 21(10.8%), Pseudomonas 14(7.2%), Shigella 14(7.2%), Klebsiella 12(6.2%), Aeromonas 8(4.1%), Enterobacter 7(3.6%), Proteus 8(4.1%), Citrobacter 3(1.6%), Yersinia 2(1.1%) and Vibrio species 1(0.5%). Children between 1 day - 12 months (OR 0.3, 95% CI 0.1-0.8) were more likely to be infected with pathogenic bacteria than those between 49-60 months. Enteric bacterial isolates were highly diverse in female and among those aged 49-60 months. Female participants (OR 1.8, 95% CI 1.1-3.4) were nearly twice likely to be infected with pathogenic bacteria. Those who presented with watery stool (OR 0.4, 95% CI 0.2-0.9) or mucoid stool (OR 0.3, 95% CI 0.2-0.7) remained associated with pathogenic bacterial infection but less likely to be infected compared to those who presented with watery-blood stained stools. Piped water and storing water with a lid were associated with a less bacterial infection. Almost all the isolates were resistant to Ampicillin, Amoxicillin, Chloramphenicol, Ciprofloxacin, Ceftriaxone, Kanamycin and Cotrimoxazole. Bacterial identification and subsequent antibiotic susceptibility testing from stool samples should be scaled up to confirm and guide therapeutic use thereby minimizing bacterial resistance.

SCHOOL OF AGRICULTURE

EFFICIENCY OF VEGETABLE FARMERS IN EAST AFRICAN WETLANDS: CASE OF EWASO NAROK AND NAMULONGE

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Dr. Eric K. Bett

Wetlands play an important role in supporting agricultural production, therefore easing food shortage which results from climate change, rapid population growth, and low yields in the uplands. Wetlands also play critical roles in regulating climate and pollution as well as providing habitats for different species. The biggest role played by wetlands is to support livelihoods for populations dwelling around these resources, through various activities such as fishing, livestock keeping and crop production. However, these resources have been facing degradation and a rapid rate of depletion, mainly due to unsustainable agricultural activities. Given that the importance of wetlands is projected to increase, it is imperative that a balance between food production and environmental protection is attained. Striking a balance between food production and environmental sustainability requires multidimensional approaches. One of such approaches is efficiency in production which ensures that farmers obtain maximum possible output while utilizing the minimum possible wetland resources and just adequate agricultural inputs such as fertilizers and pesticides, which are detrimental to the environment when used in large quantities. As such, it is important to find out the level of efficiency among vegetable farmers in East African wetlands. Profit efficiency; a measure of productive efficiency; implies that
farmers attain efficiency in production and allocation of resources and obtain maximum possible income from their enterprises, which ease overreliance on wetlands for livelihoods and as a result reduce the rate of wetlands degradation. This study sought to analyze levels and determinants of vegetable farmers in East African Wetlands. Data were collected from 235 randomly selected farmers involved in tomato and spinach enterprises. Analysis was done using a Stochastic Profit Frontier using the one step estimation method. The results indicated a mean profit efficiency of 0.59 and 0.44 among tomato and spinach enterprises, respectively. Estimation results indicate that the profits of the two crops were significantly influenced by plot size and fertilizer. Further, the profits of tomato enterprises were influenced by the price of seedlings while among spinach enterprises, price of pesticides was found to influence profits. The main determinants of profit efficiency were level of education, distance to the market and agricultural extension, access to credit, off-farm income, group membership, gender of the household head and household size. It is recommended that the government and other stakeholders formulate land planning interventions which ensure that part of the wetlands is reserved from crop production, to enhance sustainability. Additionally, the governments should provide vegetable farmers with adequate and easy access to agricultural extension services and credit facilities to enable them to obtain and use inputs such as hybrid seeds.

ASSESSMENT OF THE PERFORMANCE OF SMALL-SCALE DAIRY FARMING IN MERU COUNTY, KENYA

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Dr. Ibrahim Macharia

Despite the apparent importance of the dairy sub-sector to Kenya's economy, the sector is plagued with low milk production. The general objective of the study was to assess dairy performance among the small-scale farmers in Meru County. The specific objectives were (i) to characterize small-scale dairy farmers; (ii) to assess the profitability of small-scale dairy enterprises; and (iii) to determine the factors influencing profitability among small-scale dairy farmers in Meru County. The research used cross-sectional design where 150 small-scale dairy farmers were selected from the subgroups using simple random sampling technique. Gross margin analysis was used to analyse profitability while multiple linear regression analysis using ordinary least square method was used to determine the factors influencing dairy profitability. The mean age of dairy farmers in Meru County was 45.7 years with 92% being men who are the household heads. 92% of the farmers had formal education and 68% had experience of more than 10 years. The average household size was 5 members. Only 29.3% of farmers had applied for a dairy enterprise development loan. Most of the farmers were members of groups and had attended dairy farming trainings. Dairy in Meru County was characterised by intensive farming technologies for instance zero grazing system. The average land size under dairy was 0.7 acres and the average herd size was 3 cows. Results also show that there is potential for increased small-scale dairy performance in Meru County. Dairy farming was profitable with farmers receiving an average gross margin of Ksh. 5,299 per cow per month. The model shows that herd size, education level and credit access have significant
influence on dairy profitability. In view of the study findings the study recommends that the policy makers should take initiative in enacting laws aimed at lowering the cost of inputs thus reducing production costs. Secondly the study recommends that the government should prioritize investing in farming as a way of promoting employment to the population. The study also recommends use of alternative improved feed such as homemade dairy ration to reduce feed cost as one way of maximizing profits from small-scale dairy farming. Finally, the study recommends that policy intervention should be aimed at establishing breeding centers for dairy cows in order to enable farmers increase herd size, formulation of laws which can help farmers get access to loans in order to invest in dairy farming and transfer of knowledge through provision of extension services to educate farmers on dairy management.

EFFECT OF ARBUSCULAR MYCORRHIZA INOCULATION AND PHOSPHORUS APPLICATION ON GROWTH, YIELD AND PHOSPHORUS UPTAKE OF SWEET POTATO IN KIAMBU COUNTY, KENYA

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Sweet potato (Ipomoea batatas (L) Lam), a dual-purpose crop is among the most important energy source for human consumption and feeding animals. Its yield is however lower than its genetic potential due to abiotic stresses such as poor soil fertility in Kenya. Phosphorus is one of the most limiting nutrient owing to low native soil P and its fixation. In an attempt to overcome these constraints without affecting the plant quality and marketability, one of the feasible options is the use of beneficial arbuscular mycorrhizal fungi (AMF). In this study the objective was to evaluate commercial AMF inoculant with or without insoluble rock phosphate or soluble triple super phosphate on two sweet potato varieties growth, yield and phosphorus uptake. The study was conducted in the field and greenhouse. The field experiment was carried out during the long and short rainy seasons of 2017 and 2017/2018 respectively in Kenyatta university research farm, while greenhouse experiment was set up in National Museums of Kenya. The field experiment was laid out in Split-split plot arrangement in Randomized Complete Block Design (RCBD) with three replicates. The factors were sweet potato varieties (Bungoma and Kemb-10), phosphorus forms (triple super phosphate, rock phosphate and control) at 90 kg/ha and with or without commercial AMF inoculant (Rhizatech) at 25 g/plant. Data on vine length, number of branches, number of primary stems, shoot and root fresh and dry weight, phosphorus uptake, AMF colonization percentage, marketable and non marketable yield, most probable number and spore species was collected. The data was subjected to Analysis of variance (ANOVA) using Genstat software 15th edition and where there were statistical differences, Tukey’s test was used to separate means at 5% probability level. Results showed that phosphorus forms and AMF inoculation enhanced growth, yields and phosphorus uptake of sweet potatoes. Results of AMF inoculation showed that AMF inoculation led to increased marketable and total shoot biomass yields of 41.33 t/ha and 70.8 t/ha respectively in week 20 during short rains which was about 18.32% and 28.68% more than the non-inoculated. Shoot and storage root phosphorus uptake were significantly influenced (P≤0.05) by phosphorus forms and TSP.
gave the highest 312.5 g/plant and 434.35 g/plant P uptake respectively during long rainy season. Results of AMF root colonization revealed that control resulted in the highest 76.6 % root colonization followed by 62.8 % PR and 33.9 % TSP at the vegetative stage in week 12 during short rains. In MPN the commercial AMF inoculant infective ability was high than the farm soil. For instance, commercial AMF inoculant at dilution 4-4 resulted in 18.75% root colonization intensity while there was no colonization in the farm soil at the same dilution level. In addition, four AMF genera; Scutellospora, Gigaspora, Acaulospora, and Glomus sp were isolated with a total of 42 and 78 spores being observed from original field soil and five months old trap cultures respectively. The study concluded that both AMF inoculation and phosphorus forms were found to boost growth, yield and phosphorus uptake of sweet potatoes. The study recommends that both PR and AMF be used as a cheap and an environmentally sound method of soil fertility management method.

ANALYSIS OF CONSUMER PREFERENCE FOR PRODUCT ATTRIBUTES: A CASE OF INDIGENOUS CHICKEN IN MAKUENI AND NAIROBI COUNTIES, KENYA

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Indigenous chickens (Gallus domesticus) are important source of livelihoods and food to majority of rural and urban households in Kenya. Consumers prefer indigenous chicken due to its nutritional and health benefits. Despite these benefits, productivity levels of Indigenous chicken are low resulting to shortages in supply. In the recent past, research has focused on increasing productivity levels of indigenous chicken resulting to improved indigenous chickens. However, acceptability and utilization of indigenous chickens is still higher compared to that of improved indigenous chickens. This can be attributed to a dearth in information on consumer preference attributes in indigenous chicken which are not available in improved indigenous and exotic chickens. This study aimed to fill this gap in knowledge by analyzing preference attributes in indigenous chicken meat and eggs which influences their choice in Makueni and Nairobi counties. This was achieved through three specific objectives that aimed to; evaluate social economic factors influencing consumption frequency of indigenous chicken, assess indigenous chicken meat and eggs attributes that influences choice and analyze the influence of indigenous chicken meat and eggs attributes on price. Multistage sampling technique was used to select 200 respondents in Nairobi and Makueni counties. Primary data was collected in a cross sectional survey design using semi structured questionnaires that were administered through interview schedules. Both descriptive and inferential statistics were used in data analysis with the aid of Microsoft Excel and STATA 11 version software. For the first objective, binary logistic regression model was employed, in the second objective principal component analysis was used while hedonic pricing model analyzed the third objective. Results of the logit model indicated that age, education, gender, price and household size
influenced consumption frequency. Principal component analysis results revealed that; Skin colour, size, tenderness, sex, freshness, skin texture and price influenced choice of indigenous chicken in both counties. Consumers in Nairobi paid a premium price of 6% for cocks while in Makueni, chickens aged 8-20 weeks attracted price premium of 10% over those aged above 28 weeks. Chickens with black and white plumage colour received price discounts of 23% and 18% respectively. In indigenous chicken eggs, consumers in Makueni paid price premium of 10% for white shell colour eggs while those in Nairobi paid price premium of 9% for brown colour over white coloured eggs. The study recommended that farmers should adopt production methods that enhance incorporation of the preference attributes. Traders should adopt appropriate marketing mix based on attributes of preference and segment the chicken market based on the social economic characteristics of the consumers. Research institutions need to incorporate attributes of interest to consumers in their breeding programmes so as to enhance consumer acceptability and utilization.

EFFECT OF VINE LENGTH ON GROWTH, YIELD AND NUTRIENT CONCENTRATION OF SWEET YELLOW PASSION FRUITS Passiflora edulis var. flavicarpa ) IN EMBU COUNTY, KENYA

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Sweet yellow passion fruit (Passiflora edulis var. flavicarpa) is widely gaining adoption in Kenya, emerging as an important high market value horticultural crop. However, its current yields are low due to poor agronomic practices among other reasons. The objectives of this study were to determine the effect of vine length on growth, yield and nutrient concentration of sweet yellow passion fruits in Embu County and evaluating orchard management practices for sweet yellow passion fruits by farmers, with a special focus on canopy management. The study involved a survey study and a field experiment and which were conducted in Embu County, Kenya. The experiment was carried out in two sites; Ugweri and Kigumo, Embu County from April 2016 to September 2017. The field experiment was established in a Randomized Complete Block Design. Four treatments of varying vine lengths were applied namely; 3 m (Conventional) 4 m, 5 m and 3 m double. The data collected were subjected to ANOVA using Statistical Analysis Software (SAS) version 9.3 and means were separated using LSD at probability level of 5 %. The survey was carried out on sweet yellow passion fruit farms in Embu East Sub- County, Kenya. The farmers were randomly sampled using a stratified sampling procedure. Personal interviews with farmers of sweet yellow passion fruit were carried out in selected households using structured and semi-structured questionnaires from June 2016 to August 2016. The survey data was analysed using SPSS version 20. Correlation between pruning intensity and dieback disease incidence was analysed using Pearson’s Correlation model. Findings from the study showed that pruning intensity among farmers varied from very low, moderate to very high. The results showed that 9.8 % of farmers pruned moderately, 58.8 % of farmers pruned with a low pruning intensity and 29.4 % of farmers pruned with a very low pruning intensity. Pruning intensity was negatively correlated (-0.265) to dieback incidence
with a P value of 0.040. The results imply that most farmers pruned the vines at low intensity with the aim of retaining more vines. However, this resulted to more incidence of the dieback disease. This study revealed that 4 m vine showed the highest photosynthetically active radiation (984.67 μmols/m2s), followed by 3 m conventional (917 μmols/m2s), 5 m (709.67 μmols/m2s) and last 3 m double (566.67 μmols/m2s) at 26 weeks after transplanting (WAT) in Kigumo. The 4 m vine recorded the highest level of N in leaf tissue both at Kigumo (3.99%) and Ugweri (5.79%) indicating a higher photosynthetic potential than 3 m conventional, 5 m and 3 m double vines. The 3 m double vine recorded the highest number of fruits per vine in Kigumo (174.67) and Ugweri (148.67), but had the lowest fruit girth of 5.04cm and 4.54cm, and length of 6.31cm and 5.94cm compared to 3 m conventional, 4 m and 5 m vines in Kigumo and Ugweri respectively at 39 WAT. This shows that 3 m double vine produced the highest quantity of fruits of smaller size compared to 3 m conventional, 5 m and 4 m vines. The findings from this study reveal that farmers in Embu County are required to practise moderate pruning to provide an appropriate canopy size which would improve productivity of sweet yellow passion fruits. Further research on 3 m double vine density should be conducted to evaluate the proper pruning regime that could optimize yield of marketable quality under the available resources.

TECHNICAL, ECONOMIC AND ALLOCATIVE EFFICIENCY AMONG MAIZE AND RICE FARMERS UNDER DIFFERENT LAND-USE SYSTEMS IN EAST AFRICAN WETLANDS

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East African farmers have been facing low crop productivity as indicated by low yields of major staples, maize and rice, leading to food insecurity. As a result, the respective governments have offered solutions such as the introduction of high yielding maize and rice varieties. Farmers have expanded their farms into productive areas such as wetlands in an attempt to increase output to counter the effects of climate change complications, population pressure, and the declining productivity in the upland fields. Agricultural production is done under different agricultural land-use management systems including; upland-rainfed, upland-irrigated, and wetland-only. Continuous pressure on wetlands compromises wetlands’ capacity to offer other critical ecosystem services. This calls for a need to enhance efficiency in production to strike a trade-off between food production and wetland sustainability. Productive efficiency will ensure increased output with reduced wetland degradation, especially from further drainage. The objectives of this study were to identify the determinants of productivity, assess technical, allocative, and economic efficiency under the different systems, and determine the factors influencing productive efficiency. Three wetlands (Ewaso Narok, Namulonge, and Kilombero) were purposively selected. A sample of 445 households was randomly selected using a semi-structured interview schedule in a household survey. Stochastic frontier analysis was used to analyze technical, allocative, and economic efficiency scores while a two-limit Tobit model analyzed determinants of productive efficiency. Results indicate that maize farmers under the upland-irrigated system had a relatively higher
technical efficiency at 52% level. Those under the wetland-only system had the highest mean allocative efficiency and economic efficiency levels of 59% and 35% respectively. Maize farmers under upland-rainfed system could proportionally save resources up to 59% by operating on wetlands best technical efficiency frontier of 93% level. Rice farmers had technical, allocative, and economic efficiency of 59%, 72%, and 46% levels respectively. Those operating at the mean technical efficiency could have inputs saving up to 37% of the resources by operating on the wetlands best frontier of 94% level. The study concludes that the upland-irrigated system is associated with the highest maize productive efficiency and that there can be a sustainable expansion of land in rice production in Kilombero wetland. The study recommends that governments and other stakeholders should ensure interventions that guarantee agricultural extension and formal education, which are necessary for improved maize and rice productive efficiency. National and county governments should encourage sustainable maize production under the upland-irrigated system especially with subsidized alternative water sources to enhance farmers’ efficiency and sustainable agricultural production in wetlands. There should be an intervention to enable farmers to use optimal fertilizer amounts in rice production to enhance sustainable expansion of rice production with minimized degradation and drainage.

SCHOOL OF EDUCATION

INFLUENCE OF PRINCIPALS’ LEADERSHIP SKILLS ON TEACHER MOTIVATION IN PUBLIC SECONDARY SCHOOLS IN ZOBA ANSEBA, ERITREA

Awtseana Askale Adgoy-M.ED

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The aspect of how leadership impacts on teachers’ motivation has attracted scholars’ interest globally. The purpose of this study was therefore, to examine the influence of principals’ leadership skills on teachers’ motivation in public secondary schools in Zoba Anseba, Eritrea. The main objectives were: to examine influence of principals’ technical skills on teachers’ motivation, to assess influence of principals’ human relation skills on teachers’ motivation, and to investigate influence of principals’ conceptual skills on teachers’ motivation. The skill theory of leadership developed by Katz (1955) was used to support this study. The study employed
descriptive survey design that embraced both qualitative and quantitative approaches. The study was carried out in Zoba Anseba, Eritrea. The target population was 339 (18 principals, 55 departmental heads and 226 teachers). The 18 schools were 6 from Grade 1-11; 7 from Grade 6-11; and 5 from Grade 9-11. Hence, the schools (Grade 9-11) were selected purposively for the main study. Consequently, the 5 principals of these 5 sampled schools were selected purposively for interview. Simple random sampling technique was used to select 20 departmental heads while proportionate allocation method and simple random sampling technique were used to select 65 teachers. This accounts for a total sample size of 90. Data were collected using questionnaire and interview schedules. Content validity was established by seeking expert judgment from professionals in the field of educational management. The test-retest method was used to establish reliability of the instruments. Quantitative data were analyzed using descriptive statistics (frequencies and Percentages) and inferential statistics (Pearson correlation and multiple linear regression) while, the qualitative data were analyzed thematically.

The study found that majority of the principals possesses the human relation skills to influence teachers’ motivation positively at the job. Indeed, the study established that majority of the principals were found incompetent to exhibit technical and conceptual skills at the job thus, exacerbated teachers’ demotivation. The study recommends that the MoE should appoint trained school principals as well as train and supervise those appointed principals through continuous follow-up as to boost teachers’ motivation at the job. Furthermore, the school principals should invest more time and efforts in their ultimate responsibility of helping teachers to facilitate students’ learning through continuous classroom supervision and solving teachers’ main challenges that closely hinder the motive of performing the daily activities at
work.

INFLUENCE OF UTILIZATION OF GEOGEBRA SOFTWARE ON SECONDARY SCHOOL STUDENTS’ PERFORMANCE IN EUCLIDEAN GEOMETRY, THARAKA NITHI COUNTY, KENYA

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Performance in mathematics in Euclidean geometry topics such as loci, 3D and transformation has been poor. This study investigated the influence of utilization of GeoGebra software on students’ performance in Euclidean geometry. The study investigated the availability of GeoGebra software in Kenya secondary schools. The challenge faced by students during the application of GeoGebra software in Euclidean geometry was studied. The study sought to find out if student’s attitude in Euclidean geometry can be stimulated by use of GeoGebra software. The location of the study was Maara sub County, Tharaka Nithi County, target population was the secondary schools (49). The accessible population was form two students (2000 students). The sample size was 5 schools (10% of the total schools). Stratified sampling was used to determine the five sample schools from the 20 schools with computers for students. Simple random sampling was used to select students as either experimental or control group. The study was carried out through a quasi-experimental pre-test post-test research design. Data were collected using MAT and students’ questionnaires and analyzed using means scores, t-test and percentages. Data indicated that after the use of GeoGebra software in teaching and learning Euclidean geometry the experimental group had a higher mean score than the control group which implies that the application of GeoGebra software helps improve students’ performance. 77% of the students indicated that they enjoyed the lessons as they used GeoGebra software in the classroom; hence the use of GeoGebra software helps to stimulate student’s interest in Euclidean geometry. 65% of the students stated that after the use of GeoGebra software they could solve more problems in geometry compared to other times when they did not apply GeoGebra software, hence the application of GeoGebra software helps stimulate the students’ knowledge. The study recommends the use of GeoGebra software to improve students’ motivation, attitude and achievement in Euclidean geometry. The study also recommends to the KICD for evaluation of GeoGebra software as a teaching and learning tool in Kenya Secondary school.

EFFECTS OF TRAUMATIC BRAIN INJURIES – RELATED COMMUNICATION DISORDERS ON THE QUALITY OF LIFE AMONG THE KENYA DEFENCE FORCE EX-WAR SOLDIERS

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The purpose of this study was to assess the effects of Traumatic Brain Injury (TBI) related communication disorders on the quality of life among the Kenya Defence Force ex-war soldiers. It was motivated by the increasing cases of TBIs over the last few years due to Kenyan military intervention in Somalia in pursuit of the Al-Shabaab terrorists. The objectives of this study were (i) to identify and describe the communication disorders prevalent among KDF ex-war soldiers with TBI, (ii) determine their effects on their social, emotional and (iii) functional well-being. (iv) It also endeavored to establish the available speech and language pathology (SLP) services in Kenya and their usefulness in the improvement and maintenance of the soldiers” quality of life. This study was based on Health Related Quality of Life (HRQOL) measures drawn from the broad Quality of Life (QoL) theory. Data was collected from the sampled Kenya Defence Force Ex-war Soldiers with TBI-related communication disorders who were either attending or had attended treatment at the military memorial hospital in Nairobi, their caregivers and medical specialists. A case study research design was employed with mixed method of data collection using observations, interviews and questionnaires as the research tools of choice. The collected data was then analyzed using a descriptive analysis method presenting quantitative data in form of frequency counts, percentages and tables and thematically analyzing qualitative data. The study found out that a majority of ex-war soldiers with TBI suffered from heterogeneous communication disorders ranging from expressive, receptive to receptive-expressive speech/language disorders. These were characterized with hesitations, articulation challenges, selective memory, slurred speech, and phonological errors. The research revealed that social life of the majority of ex-war soldiers was severely affected due to social communication break down between them and their loved ones. The study also found out that TBI conditions led to early retirements of most of young ex-war soldiers rendering them unable to engage in income generating activities affecting their functional well-being. The study also revealed gaps in the treatment procedures which included lack of multidisciplinary teams” interventions, relevant knowledge, support and informed corrective measures to habilitate ex-war soldiers and empower the caregivers. The study concluded that TBI resulted to a broad spectrum of communication disorders that affect social participation, emotional and functional well-being of the ex-war soldiers. Thus, a collaborative effort in policy development for provision of professional training to clinicians, caregiver empowerment and strengthening of societal institutions should be embraced. This can be realized through government funding, provision of subsidies and making of specific hierarchical changes to the relevant societal institutions dealing with ex-war soldiers with communication disorders. The study recommends for further research to be conducted focusing on the ex-war soldiers unwillingness to be involved in speech and language treatment and habilitation programmes.
Internet resources have the potential to improve teaching and learning. YouTube is a modern technology that is redesigning business, media, entertainment, and humanity in different ways. YouTube is the most popular website that hosts a variety of videos. These include educational videos, documentaries, video clips and live streams from media corporations. With the opportunities it provides, it is now being tapped to transform education. This thesis examines the integration of YouTube videos in teaching and learning of English language speaking skills among secondary school students in Nakuru County-Kenya. Objectives of the study include: to test the effectiveness of YouTube videos in teaching and learning of ELSS, to establish the nature and level of utilization of YouTube videos in the teaching and learning of ELSS, to determine the teachers’ perceptions in the use of YouTube videos in teaching of ELSS, and to find out the challenges that teachers face in integrating YouTube videos in the teaching of ELSS. This research addressed an innovative instructional resource in the teaching of English language and how this can bring about the conceptualization of abstract skills for EFL learners. This study adopted a mixed method. These are qualitative and quantitative research. Various studies in education have recommended the use of ICT such as video technology to enhance traditional face to face instruction. This research set to authenticate this recommendation by examining the effectiveness of videos from YouTube to teach English language speaking skills. The research was experimental in design and was carried out in six schools in Nakuru county, Nakuru North sub-county. These include a national school, two extra-county schools, one county school and two sub county schools. The sample size comprised 360 students and 12 teachers. 180 students were in the control group and 180 in the experimental group. Data was collected using standard students’ assessment tests (SSAT), Class observation schedule and questionnaires. Data was analyzed using independent t tests and analysis of variance (ANOVA) of the Statistical Package for Social Sciences (SPSS). The results showed that there was a significant difference between the experimental group that had been treated with videos from YouTube and the control group that had not been treated \( t =10.5386, p < 0.01 \). Another observation was that the experimental group exhibited better analytical skills of the test items compared to the control group. The third observation is that teachers perceive YouTube videos as a resource that can make learning meaningful and interesting. From the findings, three recommendations were made. The first supports increased utilization of videos from YouTube to teach language skills such as speaking skills, secondly to empower teachers with the necessary skills on how to integrate the same in teaching and learning and also teachers should use teaching and learning activities that encourage learners to communicate in the target language. Implications of using YouTube videos in teaching and learning as well as suggestions for further research have been provided.
One of the most important factors in realizing reading as a subject in pre-primary schools is teacher working conditions. Literature suggests that working conditions are crucial in teaching of reading and pupils’ reading ability. However, empirical studies that have examined pupils’ reading ability have not focused on the relationship between teacher working conditions and reading ability. Further, the few empirical studies that have examined the relationships have been conducted in primary and secondary schools. Whereas most pre-primary school teachers in Kenya work under unfavourable conditions, past studies have not examined the relationship between working conditions and reading ability of pre-primary school pupils in Kenya. The objectives of the study were to determine the relationship between teacher workload and pupils’ reading ability, establish the relationship between school leadership and pupils’ reading ability, find out the relationship between school infrastructure and pupils’ reading ability and determine the relationship between classroom organization and pupils’ reading ability. The study was based on Herzberg’s two factor theory. The study adopted a correlational research design. The target population for the study was 79 head teachers and 79 pre-primary 2 class teachers in public schools in Rongai Sub-County Nakuru. A stratified sample of pre-primary schools in the four zones in Rongai Sub-county was used for the study. The sample size comprised of 66 head teachers and 66 pre-primary 2 teachers. The questionnaires were filled by the head teachers and pre-primary school teachers. A pilot study was done consisting of four schools which did not participate in the actual study. Data was summarized using descriptive statistics such as frequencies and percentages, pie-charts, means and standard deviations. To test the hypotheses, Pearson’s Product-moment correlation coefficient was used. The results revealed that there was a significant relationship between teacher workload and pupils’ reading ability, school leadership and pupils’ reading ability, school infrastructure and pupils’ reading ability and classroom organisation and pupils’ reading ability. The study concluded that heavy teacher workload, poor school leadership, poor school infrastructure and poor classroom organization affects the reading ability of pre-primary school pupils. The researcher recommended that to improve reading ability, school managements should ensure pre-primary school classes are of reasonable sizes so that teachers do not have a heavy workload, have effective school leadership, improve school infrastructure and classroom organization. The study recommends areas of further.
The Activity student, Experiment and Improvisation (ASEI) through Planning Doing while seeing then Improving (PDSI) approach was introduced by SMASE project in an attempt to improve performance in mathematics and science. Subsequent lesson observation studies conducted in secondary schools, revealed weak practice of ASEI-PDSI in the classroom. Lesson study was identified as one of the strategies that would help entrench the practice of ASEI-PDSI at school level. The purpose of this study is to find out the influence of Lesson Study Project on students achievement in KCSE chemistry in Nyakach Sub County. The objectives of the study were: To determine the extent to which teachers of chemistry use lesson study to enhance students’ performance in KCSE chemistry, to establish the extent to which the availability of instructional facilities influences the readiness of teachers of chemistry to implement lesson study program, to establish the influence the Heads of Department supervisory role on the implementation of chemistry lesson study program. The theoretical framework to guide the study was social constructivism in the classroom, an education theory by Rodriques (1998). The focus tends to shift from the teacher to the students in the constructivist classroom. Descriptive survey design was adopted. The target population included all the 161 teachers of chemistry and 52 Heads of Department (Science), in the 52 public secondary schools in Nyakach Sub-county. Stratified random sampling technique with proportionate allocation was used to give a sample size of fifty (50) respondents. The main research instruments were teachers questionnaires, HODs questionnaire and lesson observation schedule. Piloting was conducted to determine the validity and reliability of research instruments. Qualitative data was analyzed using thematic and content analysis while quantitative data from questionnaires was analyzed using inferential statistics and in particular regression analysis through the SPSS computer program version 21. Data was analysed using one way ANOVA, the statistical significance of the results were then examined at α = 0.05 statistical confidence level. The findings indicated that there was a positive association between implementation of lesson study program and students performance in chemistry. The study recommends a further study to investigate factors influencing implementation of lesson study program and further there is need for an intervention to assess whether the input for the INSET project is worth the output.

IMPACT OF TRANSITION SERVICES ON JOB PLACEMENT FOR PERSONS WITH PHYSICAL DISABILITIES: A CASE STUDY OF INDUSTRIAL REHABILITATION CENTRE, NAIROBI COUNTY, KENYA.

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The purpose of this study was to analyze the impact of transition services on job placement for persons with physical disabilities: A case of Industrial Rehabilitation Centre, Nairobi County, Kenya. The objectives of the study were: to analyze the transition services offered to trainees with physical disabilities on job placement; to determine the modifications and adoptions required for them, to find out selected employers” opinions on employment of PWDs; and examine the challenges encountered by PWDs in securing employment. The Schlossberg”s theory on Human Adaption to Transition and Change
was used to underpin the study. The target population for the study was 123. Which included; 59 current and 13 former trainees with physical disabilities, 10 trainers, 1 administrator from the center, 5 job placement officers and 10 selected employers. Simple random, snowball and purposeful sampling procedures were used to get a total of 98 respondents. Piloting of the study was conducted at St. Patricks Makueni Vocational and Rehabilitation Centre Machakos, in order to ascertain both the validity and the reliability of the research instruments. Quantitative data was collected using questionnaires while interviews were scheduled to collect the qualitative data. An observation checklist was used to examine job modifications and adaptations. The quantitative data collected was analyzed using SPSS and statistics including frequency distributions, measures of central tendencies and measures of dispersion among many were calculated and presented on charts and tables for interpretations and conclusions. Qualitative data collected was analyzed thematically and presented in prose form. The findings revealed that transition services offered on job placement for trainees with physical disabilities were inadequate and did not improve their chances of employment. The study also found out that the employers had a negative opinion and attitude towards employing trainees with physical disabilities. Persons with physical disabilities were in need of modifications and adaptations at their work places. PWDs also faced numerous challenges such as discrimination and inadequate training in their quest for employment. The study concluded that the transition services on job placement offered did not positively impact the employment of those with physical disabilities. From the findings, it was recommended that training institutions should improve the transition services offered by improving their curriculum through incorporating the SNE curriculum so as to positively suit the current job market needs for PWDs. It was also recommended that there should be collaboration between the Ministry of Education and all other relevant stakeholders in the sector to ensure fully inclusion of all in the planning and implementation of transition services for persons with physical disabilities. Further, recommendations on Affirmative action, sensitization and development of policies, rules and regulations regarding the employment and provision of relevant adaptations and modifications for PWDs at their work places were made from this study.

INFLUENCE OF EMOTIONAL AND BEHAVIOURAL DISORDERS ON ACADEMIC PERFORMANCE OF LEARNERS WITH VISUAL IMPAIRMENT IN SELECTED SPECIAL PRIMARY SCHOOLS, KENYA

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Statistics in Kenya paints a grim picture of academic achievement and transition of learners with visual impairment, with only a few of them registering for post-primary education. If this is not arrested in time, it can lead to complete absence of such learners in post-primary institutions. However, in special primary schools, no attempt has been made to assess how Emotional and Behavioral Disorders (EBD) influenced academic performance of learners with VI in Kenya, an area of interest for the current study. The purpose of this study was to assess the influence of EBD on academic performance of learners with
visual impairment in selected special primary schools in Kenya. Specific study objectives were: to establish the influence of withdrawal syndrome on academic performance of learners with visual impairment; to establish the influence of depression levels on academic performance of learners with visual impairment; to determine the influence of anxiety levels on academic performance of learners with visual impairment; and lastly, to determine the influence of levels of shame on academic performance of learners with visual impairment in special primary schools. The theory of social practice was used to guide this study. A descriptive survey study design was used to carry out this study. The study targeted 4 head teachers, 17 class teachers, 4 teachers in charge of guidance and counseling and 980 learners with visual impairment in special public primary schools for learners with visual impairment in Kenya, namely: St. Francis Primary school- Kapenguria, St. Oda primary, Thika primary and Kibos primary school. Using a stratified sampling technique, a sample of 2 head teachers, 5 class teachers, 2 teachers in charge of guidance and counseling and 98 learners with visual impairment were selected for the study. Data was collected through questionnaires for class teachers and students with visual impairment, and two interview schedules for the head teachers and teachers of guidance and counseling. Piloting of the research instruments was done in Likoni Primary School for Learners with Visual impairment in order to establish their reliability. The collected data was cleaned, coded and analyzed using descriptive statistics such as frequencies and percentages with the aid of SPSS version 21.0. Quantitative data was presented using tables, bar-graphs and pie-charts. Mean and standard deviation were also used to describe the distribution of psychological dispositions of learners with visual impairment. Qualitative data were categorized into patterns, presented using texts and discussed as per the study objectives. Findings revealed that male learners with high anxiety generally displayed poor academic performance, as compared to female learners with the same condition. Both male and female learners with total blindness who had high level of depression were more affected by academic performance than those with low vision. The study concluded that academic performance of learners with VI decreased with increase in anxiety, implying that high levels of nervousness among learners with VI negatively affected their academic performance. The study recommended that the Government should ensure that special schools for learners with visual impairments have professional counselors who will assist the learners with VI in dealing with their emotional and behavioural disorders. The findings of the study may be useful to the school administrators, doctors, teachers and other paraprofessionals in special needs education in executing measures that would moderate the possible negative effects of behavioral disorders.

INFLUENCE OF IDENTIFICATION, REMEDIATION AND INSTRUCTIONAL STRATEGIES ON ACADEMIC PERFORMANCE OF LEARNERS WITH DYSCALCULIA IN SELECTED PUBLIC PRIMARY SCHOOLS IN THIKA, KIAMBU COUNTY-KENYA

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Prof Surendra Pratap Singh
The purpose of this study was to investigate the influence of identification, remediation and instructional strategies on academic performance of learners with learning disability in mathematics in class five in regular public primary schools. The objectives of the study were to identify learners with learning disabilities in mathematics, investigate instructional and remedial strategies used to teach learners with learning disabilities in mathematics and finally carried a pre- posttest to investigate how cognitive, explicit/implicit and metacognition strategies influence their academic performance. The study adopted Vygotsky’s (1962), theory of cognition because of its belief in the importance of social influences, especially instruction, on the child’s cognitive development, reflected in the zone of proximal development (Z.P.D) and scaffolding. Both qualitative and quantitative research approaches were used where descriptive survey and true experimental designs were used. The study was conducted in Thika East District, Kiambu County. The target population was 828 class five learners and 40 teachers from regular public primary schools. The study used convenience, purposive, simple random and stratified sampling techniques. The sample size comprised 8 teachers from 8 randomly sampled schools and 30 learners from one experimental school. A true experiment was carried out to the sample of 30 pupils identified with learning disabilities in mathematics for 4 weeks during remedial lessons. The study embarked on semi structured questionnaires for teachers, researcher’s observational checklist, teacher made test, document analysis as well as IEPs for teaching the experimental group. Piloting was practiced in two out of the 8 sampled schools but not in the experimental school. Content validity of the study instruments was ensured through the judgment of researcher’s Supervisors. Pearson’s product moment formula of correlation on for the test-retest method was used to check reliability of study instruments. The reliability coefficient of 0.72 for questionnaires and 0.78 for observation checklists was realized. Inferential statistical tests were used to examine the experimental objective, using t-tests and analysis of variance. Data from questionnaires and checklists were analyzed statistically using descriptive statistics. Statistical package for social sciences was used. Permission was sought from the National Commission for Research, Science and Technology. The researcher considered research ethics. The key findings of the study showed that, the regular teachers were not able to identify learners with learning disability in class. Also, though cognitive training, explicit-implicit and metacognition strategies are recommended for teaching learners with learning disability in mathematics, most teachers never used these strategies. Although most teachers agreed to have used IEP as remediation, findings from the observation checklist showed that only one school had evidence of its use. After conducting the experiment, the researcher established that most learners in the schools under study performed poorly in Mathematics. However, after the researcher employed IEP for group A and lecture method for group B, the post-test performance was significantly different. The findings revealed that use of IEP with group A led to improved performance. Major recommendations were that there is need for the ministry of education to develop identification tools for these learners in class and further develop a framework for instruction through which these learners can be instructed using the recommended instructional methods in the regular class set up.
INFLUENCE OF HEALTH IMPAIRMENTS ON ACADEMIC ACHIEVEMENT OF LEARNERS WITH TYPE1 OSTEOGENESIS IMPERFECTA IN SELECTED SPECIAL SCHOOLS IN KISUMU COUNTY, KENYA

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Dr. Cleniece G. Owino

Leavers with type1 Osteogenesis Imperfecta face health challenges which impact negatively on their academic achievement. Therefore, the purpose of this study was to investigate the influence of health impairments on academic achievement of learners with type1 Osteogenesis Imperfecta in selected special schools in Kisumu County, Kenya. The objectives of the study were to establish how health impairments affect academic achievement of learners with type1 Osteogenesis Imperfecta, investigate criteria used in selecting supportive and mobility devices for learners with type1 Osteogenesis Imperfecta, assess support services available for these learners and identify strategies used in schools to support learners with this genetic disorder. The study adopted hierarchy of needs theory by Abraham Maslow (1943). A descriptive survey design was employed. The study was carried out in two selected special schools, that is, JoyLand Primary and JoyLand Secondary for the physically disabled in Kisumu East Sub- County, Kisumu County. Purposive and simple random sampling techniques were used. Teachers who taught Standard 4-8 and Form 1-4 were purposively selected on the basis of their daily interactions with learners suffering from this disorder. Simple random sampling was used in selecting learners with type1 OI, special trained teachers and non-teaching staff. The target population was 322 participants. A sample size of 2 head teachers, 20 non-teaching staff, 21 teachers and 21 learners, making a total of 64 participants were used. The instruments used in the study were adapted questionnaires for teachers, learners and non-teaching staff, interview schedule for head teachers, and an observation guide to establish the school facilities. Pilot study was conducted at Olkarau School for the Physically disabled in Nyandarua County. To enhance the validity of research instruments, the researcher triangulated questionnaires, interview schedule and observation guide to check biases which might arise from data derived from one instrument. The researcher also reviewed research instrument after pilot study to establish their accuracy in capturing the concept under study. Validity of instruments was further established through consultation with supervisors in the area of special needs education, to check on the representativeness of items in the research instruments. To test reliability of instruments, the researcher used test-retest technique and employed Spearman rank order correlation coefficient formula. A reliability measure of 0.78 was established. Data were analyzed quantitatively and qualitatively. During data analysis, the questions were analyzed by means of SPSS computer software version 22.0.0.0 and presented in frequency distribution tables, percentages and figures. The study revealed that academic achievement of learners with type1 Osteogenesis Imperfecta was affected by their health impairments such as frequent fractures, fatigue, painful muscles, breathing problems and hearing loss. Other mental health problems included anger, frustration, stress and depression. In terms
of policy, the study recommends that sufficient and suitable assistive and mobility devices should be made available to the learners in school in order to enable them to attend their daily routine activities more effectively. The study concluded that all personnel working in both schools should be trained on how to cater for learner’s healthy impairments.

ASSESSMENT OF THE EFFECTS OF ETHNIC CONFLICT ON ACCESS AND PARTICIPATION OF CHILDREN IN PRIMARY EDUCATION IN NAKURU COUNTY, KENYA

Nyang’au Sabina Moraa-M.ED

Department: Educational Psychology

Supervisors: Prof. Daniel Sifuna

Dr. Rubai Mandela

This study assessed the effects of ethnic conflict on access and participation of pupils in primary education. The initiative was to examine the relationship between ethnic conflict on access and participation of pupils in learning activities to enable amend the underachievement challenges through curbing the effects of ethnic conflict in Nakuru County. The study was based on assessing the effects of ethnic conflict on access and participation of children in primary school education in Nakuru County. The objectives of the study were: to assess the causes of ethnic conflict and effects on access and participation of children in primary school education, to determine whether physical displacement affects access and participation of children in primary school education, to assess if property destruction affects access and participation of children in primary school education, to ascertain whether ethnic politics affect access and participation of children in primary school education and to find out the level at which ethnic inequalities affect access and participation of children in primary school education in Nakuru County. The study was carried out in public primary schools in Nakuru County. Nakuru County was appropriate for this study because the researcher was concerned with assessing the effects of ethnic conflict on access and participation of pupils in primary education. The target population of the study comprised of 3,335 respondents. This target population includes primary school pupils, head teachers, teachers, parents, chiefs, opinion leaders and religious leaders. The study employed the human needs theory by Burton (1990). He argues that conflict is deeply rooted in unmet or inadequately fulfilled basic human needs of the parties and their individual members. Both purposive and stratified random sampling were adopted to select a sample size of 138 respondents (100 standard eight pupils, 13 head teachers, 13 class teachers, 3 parents, 3 opinion leaders, 3 religious leaders and 3 chiefs). The study further used semi-structured questionnaires and interview schedules to collect data for analysis using the statistical package for social sciences (version 23). The data was analyzed both qualitatively and quantitatively. Nakuru County has the highest incidents of ethnic conflicts and the area has people
from different ethnic mixtures and hence the reason for choosing the area for this study. The study found in part that there was discernible effect for ethnic conflicts on access and participation of pupils in primary education. The study recommends that there is need to enhance capacity building programs in primary schools through organizing workshops, seminars and inviting guest speakers on related issues among learners.

DETERMINANTS OF TEACHERS’ PREPAREDNESS TOWARDS IMPLEMENTATION OF INCLUSIVE EDUCATION IN LOWER GRADE PRIMARY SCHOOLS IN AWENDO, MIGORI KENYA

Clifford Otieno Owino-M.ED

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This study focused on implementation of inclusive education in lower grade primary schools with the main objective of establishing determinants of teachers’ preparedness. In reference to policy of inclusive education, it is critical that teachers are knowledgeable and skilled on inclusive education. In view of this, the study therefore purposed to establish the determinants of teachers’ preparedness to implement inclusive education in lower primary schools in Awendo, Migori County, Kenya. The study would be useful to teachers dealing with learners living with special needs in education. The study was premised on Vygosky’s Social Development Theory as the theoretical underpinning with a concept of Zone of Proximal Development which maintains that students can learn abstract ideas through the help of informed others. Descriptive survey design was adopted for the study. The study was carried out in Awendo, Migori County, Kenya. The study targeted all lower grade primary teachers in the mainstream schools with special units. Multi-case sampling technique was used to come up with 9 (30%) of 30 targeted schools. Stratified, simple random sampling and Purposive sampling techniques were used to sample the respondents to come up with 37 subjects comprising an education officer, school heads and lower primary teachers. Questionnaires for teachers and school heads, interview schedules for teachers, heads of schools and education officers as well as Observation checklists were used to collect data. A pilot study was carried out in two schools which did not form part of study size. Validity was attained by analyzing content and instruments accepted as reliable after test re-test. The statistical package for social sciences was used to prepare and organize data for analysis. Quantitative data from questionnaires was analyzed through descriptive statistics while qualitative data from interviews and checklists was analyzed thematically by coding of the responses in the coding frame, interpreted then inferential statistics employed. Hypothesis was tested using Pearson’s correlation at a significant level of alpha 0.05. Findings revealed that there is only a small number of teachers trained in special needs education at (4%) degree and (26%) diploma as compared with the number of schools with special units and as a result most of the schools still lack a single teacher trained in special needs education. There is no policy guiding the implementation of inclusive education in the lower grade primary and therefore teachers found it difficult controlling classes full of many learners with different types of disability. In a single class in addition to other learners without special needs in education and majority of teachers are
still in denial concerning the inclusion education rolled down to regular schools. In conclusion, the ministry of education has done very little towards preparing teachers for inclusive education at the lower grade primary school. The main recommendation is that the ministry of education to ensure inclusive disability type specialization by participating schools and conduct mass training to get enough teachers for all schools with special units.

EDUCATIONAL BARRIERS TO LEARNING READING AMONG STANDARD THREE PUPILS WITH LEARNING DISABILITIES IN PUBLIC PRIMARY SCHOOLS IN NYERI COUNTY, KENYA

Wanyaga Nancy Wangechi-M.ED

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Prof. Geoffrey K. Karugu

This study investigated educational barriers to learning reading among standard three pupils with reading disabilities in public primary schools in Tetu East, Nyeri County, Kenya. The specific objectives of the study were: to find out to what extent failure for early identification and intervention of learners with learning disabilities affect learning to read, find out whether lack of phonological awareness affect learning to read, find out whether lack of instructional materials and the type of instructional method used improves learning to read. This study was based on developmental psychology theory. The research design was descriptive survey research design. The research was conducted in Tetu Sub-County, Nyeri County. The target population was 2461 persons from the entire 15 schools comprising 15 headteachers, 15 class three teachers and pupils. Purposive sampling technique was used to select 8 schools with special education teachers in class three in Aguthi educational zone. Purposive sampling was as well used to select 5 learners from class three with reading difficulties from the sampled schools based on earlier identification assessment method. The total sample comprised of 8 headteachers, 8 class three teachers and 40 pupils. Data was collected using questionnaires that were administered to the headteachers and teachers while pupils were assessed using teacher made assessment test tool. A pilot study was carried and necessary adjustments were made on the tools before data collection from the sample population. Data collected was analyzed using descriptive statistical package for social sciences [SPSS] and the results presented by use of frequency distribution tables, graphs, means, percentages and pie charts. The findings of the study revealed early identification and intervention enhances reading skills, ability through enhanced teaching and learning to read, improved teaching methods, need for more SNE trained teachers. The best teaching method was phonics followed by whole-word/look and say teaching method. Shortage of adequate, suitable teaching and learning equipment in schools were found to be a major cause of reading disability. The study concluded that early identification of learners with reading disabilities and intervention, phonological awareness, availability of appropriate instructional materials and the type of instructional method used improves learning to read. The study recommended that the government and the ministry of education come up with a policy that details how early identification through assessment of learner and intervention measures to be put in place to address various kinds of disabilities. Government should equip public
schools with adequate and suitable teaching and learning equipment and resources to cater for the
learners with reading disabilities and also consider offering in service of all teachers on special education
method to enable them focus on individualized attention.

DETERMINANTS OF READING DIFFICULTIES AMONG STANDARD FIVE PUPILS WITH LEARNING
DISABILITIES IN PUBLIC PRIMARY SCHOOLS, ELGEYO MARAKWET COUNTY, KENYA

John Kiplagat-M.ED

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Supervisors: Dr. Jessina Muthee

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The purpose of this study was to investigate the determinants of Reading Difficulties among standard
five pupils with Learning Disabilities (LD) in public primary schools in Keiyo sub county, Elgeyo Marakwet
County. The study intended to find out the extent to which reading difficulties exist among pupils with
LD in class five. It also determined the learning strategies used by pupils with reading difficulties in class
five. In addition, it determined the strategies used in teaching reading in class five. Finally, the study
aimed at determining the availability of resources used for teaching reading in class five. Descriptive
Survey Design was used in the study. The study was carried out in Keiyo Sub- County. The study targeted
a population of 2628, consisting of all class five pupils, their English teachers and head teachers in public
primary schools in Keiyo Sub- County. Simple random sampling was used to get the twenty public
primary schools to be involved in the study. Purposeful sampling was used to select five learners with
reading difficulties in each of the twenty primary schools selected. The pupils were selected from those
pupils who perennially post low marks in academic areas especially in English subject as per their class
end term mark lists and the subject teachers also played a crucial in identifying pupils with reading
problems in their respective classes. The purposeful sampling was also used to get class five English
subject teachers. On the other hand, Convenience sampling was used to get the twenty Head teachers
from the sampled schools. In summary, the sample size was 100 pupils, 20 teachers and 20 head
teachers making a total sample size of 140. The data collection instruments employed entailed these:
observation schedule for the pupils and questionnaires for the English teachers and the head teachers.
The observation schedule was used to find out the extent to which reading difficulties exist among
pupils with LD in class five by testing on three reading areas which entailed; oral word recognition, oral
reading of passage and silent reading of passages. A pilot study was conducted at Salaba primary school
which is found within the Sub-County thus bear similar geographical characteristics with the sampled
schools and therefore was used to determine the validity and reliability of the data collection
instruments. The data collected was analyzed using combined designs i.e both quantitatively and
qualitatively. The quantitative data was first coded and entered in SPSS spread sheet and then checked
for errors. All the gathered information was analyzed using descriptive statistics by using percentages,
frequency tables, bar graphs and pie–charts. The qualitative statistics was analyzed thematically basing
on the respondents point of views. The study found out that children with reading difficulties do not
have learning strategies like meta-cognition, self- directed, coping, organization, analogy skills and
rehearsal skills. Most public primary schools did not have adequate learning resources therefore had
direct influence in education of those pupils with disabilities. The study also found out the use of
phonics, whole language peer tutoring and cooperation learning were effective methods of teaching if
implemented adequately. The study therefore recommends that teachers should be trained on SNE in
order to be equipped with appropriate pedagogical skills to address diverse needs of learners in
inclusive settings, teachers should teach pupils better learning and reading skills, the government should
allocation more funds for the purchase of instructional materials.

TEACHERS’ ROLE IN ENHANCING COMMUNICATION SKILLS OF LEARNERS WITH SPEECH AND LANGUAGE
DISORDERS. A CASE OF JOY TOWN SPECIAL PRIMARY SCHOOL KIAMBU COUNTY, KENYA.
Munyi Alusiah Thaara-M.ED

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The purpose of this study was to investigate teachers’ role in enhancing communication skills of learners
with speech and language disorders. Teachers play a major role in supporting children’s educational,
social and emotional development although may be unprepared for supporting children with speech
and language disorders. The study objectives included establishing teachers’ knowledge about signs of
speech and language disorders in the communication of learners in Joy town primary school, finding out
the extent of knowledge possessed by teachers of learners with speech and language disorders and
assessing teachers’ competence in the use of teaching strategies for learners with speech and language
disorders in the school under the investigation. These objectives would be the basis for the
accomplishment of the role of teachers. The study utilized a conceptual framework based on the
underpinnings of Social Interactionist Theory of Vygostky. The study location was Joy town special
primary school and the school teaching staff purposively sampled constituted the study population. This
research used descriptive case study design mainly using qualitative approach. Data was primarily
collected using questionnaires and observation schedule for teachers and interview guide for the head
teacher. The study instruments were validated using the supervisors’ suggestions and expert judgment.
The study reliability was determined by pilot-testing on the questionnaires using Cronbach coefficient
alpha test. Qualitative data was analyzed thematically, while simple descriptive statistics was used to
analyze quantitative data. The study found that most teachers were well trained in special needs
education, but had not received training in speech and language disorders. It was revealed that they
lacked knowledge about identification of learners with speech and language disorders. The study further
showed that teachers lacked competence to use informed teaching strategies and materials to enhance
learners’ communication skills. Conclusively, although teachers are competently trained to execute
national curriculum, they are not trained in speech and language pathology and lack competence to accomplish the teaching of learners with speech and language disorders. It is recommended that adequate teacher supportive structures to be set up to promote their role in enhancing communication skills of learners with speech and language disorders. The study further recommends a further research to be conducted to examine collaboration among teachers and speech and language pathologists to promote children’s literacy and language to enlighten on the need to establish appropriate integrative school interventional approaches with a view to helping children become effective communicators, problem solvers and decision-makers and benefit from a fulfilling and excellent learning experience.

STAKEHOLDERS’ PERCEPTIONS OF CONTROL MEASURES ADDRESSING MALPRACTICES ON ATTAINMENT OF SUSTAINABLE CREDIBLE EXAMINATIONS IN SECONDARY SCHOOLS IN MAKUENI COUNTY, KENYA

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Dr. Daniel Mange

Examination is one of the major established yardsticks of measuring academic achievement and certification and hence it should reflect the true picture of the abilities of the examinees. In an effort to guard examinations against malpractices, examination bodies across the world have instituted a variety of control measures. However, despite the measures taken, there are still many cases of malpractices in examinations. The main purpose of this study was to explore stakeholders’ perceptions of control measures addressing examination malpractices and determine their role on attainment of sustainable credible examinations in Makueni County, Kenya. The objectives of the study were to; find out stakeholders’ perceptions of how examination officials carry out their roles on attainment of sustainable credible K.C.S.E examinations, establish stakeholders’ perceptions of security measures taken to protect examination content and materials on attainment of sustainable credible K.C.S.E examinations and find out stakeholders’ perceptions of how monitoring is carried out on attainment of sustainable credible K.C.S.E examinations. Using the systems theory, the study employed a descriptive survey design. The study targeted 3139 respondents including 2492 candidates of year 2017 K.C.S.E, 603 teachers and 44 principals from 44 secondary schools. The study sampled 318 respondents including 9 principals, 60 teachers and 249 students. The study used questionnaires and interview schedules to collect data. Quantitative analysis was done using descriptive statistics - frequencies and percentages. The results were presented using tables, pie charts and graphs. Qualitative data were analyzed according to themes derived from the research objectives and results presented in narration form. The study findings revealed that to a great extent, majority of the examination officials carried out their roles as expected. However, some of the officials compromised examination integrity through early exposure of examination content to candidates. The study also revealed that examination materials and content leaked or got to unauthorized persons to a less extent especially during actual examination sitting. Finally, the study found out that monitoring often took place during administration of K.C.S.E examinations. However, monitoring was to a less extent satisfactory in ensuring credible K.C.S.E
examinations. The study concludes that KNEC has greatly succeeded in addressing the issue of examination malpractice in K.C.S.E though; more effort is required to safeguard the gains already made in addressing examination malpractices and also ensure zero cases of examination malpractices. The study recommends that the government should ensure institutionalization of multi-sectoral approach in examination management. The government should also encourage the use of technology in examination administration to reduce cases of examination cheating.

**APPRAISAL OF THE PROCLIVITY OF KENYAN SECONDARY SCHOOL GIRLS TO PROCURE ABORTION IN LIGHT OF VALUE OF HUMAN LIFE**

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Cases of abortion among female students in secondary schools in Kenya are high. Although some of the abortions have been successful, other cases have had portentous implications. If this trend is not checked, Kenya could be faced with a major crisis in learning institutions as more girls will be edged out of school due to health complications or death. This study sought to investigate why secondary school girls persistently procured abortion amidst evident health risks involved, legal constraints and societal ethical expectations. This study was guided by the following study objectives: to find out why secondary school girls procure abortion; to critically analyze the place of value of human life in the abortion decision and to offer possible remedies to the challenge of abortion among secondary school girls in Kenya. This study was guided by the deontological moral theory that appeals to the innate human reason to establish clear criteria for what constitutes moral action because abortion is a moral action and a student is expected to act in accordance with and for the sake of moral duty. The study combined two philosophical methodologies namely: Conceptual Analysis and Phenomenological Analysis. This combination of methodologies was based on the assumption that underneath the perceived causes of abortion lay a fundamental cause that conceptual analysis alone could not adequately unearth. Owing to the sensitive nature of the study topic, respondents were assured of utter confidentiality and for anonymity of respondents, code names were used. Based on the respondents’ personal experiences, the study established causes of abortion among secondary school girls as: desire to complete schooling, social isolation, poverty, peer pressure and parental pressure. However, underneath these causes lay a fundamental cause: one’s personal conviction of the value of human life. Knowledge of aspects of beginning of human life, personhood of the foetus and concepts of value of human life at the foetal stage of development determined whether a pregnant student would procure an abortion or carry her pregnancy to term. The study proposed some responses to the challenge of abortion including proper and perpetual guidance and counseling, mentoring programs and reproductive health education among others. The study recommended that a similar study be carried out in primary schools and institutions of higher learning and on larger scale preferably countrywide in order to reinforce the generalized finding.
CHALLENGES TRAINEES WITH VISUAL IMPAIRMENT ENCOUNTER IN LEARNING ORIENTATION AND MOBILITY: CASE OF STUDY, MASAKA REHABILITATION CENTER FOR THE BLIND IN KIGALI, RWANDA

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This study analyzed the challenges trainees with Visual Impairment encounter in learning Orientation and Mobility at Masaka Rehabilitation Center for the Blind, Kigali, Rwanda. Masaka rehabilitation center is the only existing center in Rwanda which trains people with Visual Impairment in O and M. In fact, the loss of sight has a negative impact on Orientation and Mobility since this is the main sense organ which assist people in their movement. Specific objectives of the study sought to: Identify the challenges related to the professional qualification of trainers on the training of O&M among trainees, assess the availability of an appropriate curriculum for O&M for the trainees, determine available resources for the training of O&M among trainees and assess the skills acquired in O&M among trainees with VI at MRCB. The study was based on Social Cognitive Theory by Albert Bandura (1977). The theory was used in the study widely to provide a means of assessing and supporting progress in the development of skills/competencies on O&M. The study adopted a case study research design. The study targeted 142 respondents comprising of 5 trainers, 135 trainees and 2 administrators. Using purposive sampling, 4 trainers, 133 trainees and 1 administrator were sampled giving total of 138 respondents. Interview schedules and questionnaires were used to collect data. Data collected was analyzed quantitatively and qualitatively. Quantitative data was analyzed using descriptive statistics. Frequency distribution tables and percentages were used to express the data. Qualitative data obtained from different explanations were presented in a narrative form. The findings of the research indicated that there wasn’t a standard O&M curriculum developed or being used, there were no qualified O&M instructors and further on that there lacked enough O&M resources at MRCB. These factors were noted to impact on the level of skills acquisition in O&M. However, respondents still acknowledged that the training at MRCB provided some important O&M skills to the trainees which left them much more independent than when they joined the institution. In conclusion, the study noted that MRCB was imparting important O&M skills in the lives of the trainees. Various recommendations to improve training were established: the need to train existing trainers and employ other professional O&M trainers, a well-developed O&M curriculum to expand the content of the training, acquisition of adequate O&M resources necessarily to facilitate the training, and finally, differentiating learning in the O&M class since individual differences exist amongst the trainees which impacts on the pace of skills acquisitions.

USE OF PARTICIPATORY APPROACH IN THE TEACHING OF LISTENING SKILLS IN KISWAHILI LANGUAGE IN PRIMARY SCHOOLS IN WOTE ZONE, MAKUENI COUNTY, KENYA

Beatrice Mutio Maingi-M.ED
This research was done to investigate the use of participatory approach in the teaching and learning of listening skills in Kiswahili language among pupils in primary schools. The study explored the elements of the participatory approach, the rationale behind its advocacy to the teaching and learning of the Kiswahili language and the perceived outcomes. The objectives of the study were as follows: (i) To establish the approaches used by the teachers of Kiswahili in the teaching of the listening skills, (ii) to investigate the extent to which participatory approach is used in the teaching and learning of listening skills in Kiswahili Language, (iii) to establish the teachers’ perception in using the participatory approach in the teaching and learning of the listening skills in Kiswahili and (iv) to establish the challenges the teachers of Kiswahili face while teaching Kiswahili using participatory approach. This research used system theory as its conceptual framework. For theoretical framework, it adopted Paulo Freire’s participatory approach theory. The researcher used quasi-experimental survey design in the carrying out of this research. The study targeted 40 schools found in Wote zone, Makueni County. The target population of class six pupils in those schools was 2000 while that of teacher teaching class six was 60. Out of the target population of 60 teachers 20 were purposively sampled for the research. 220 learners in the selected class were used in carrying out this research. Random sampling technique was applied in the selection of learners in those schools. The researcher used the following research instruments; questionnaires for teachers and learners, pre-test and a post test. To analyze the data collected, both quantitative and qualitative techniques were used. For qualitative data, which was generated from questionnaires and tests, thematic analysis, coding and categorization was done. The data was then presented in tables and figures. The research revealed that the listening skills were not adequately taught to learners in primary schools in Kenya. 20% of the teachers were not adequately prepared to tackle their Kiswahili lessons. Another 20% did not take the teaching of the listening skills seriously. Emphasis was given to reading and writing skills. Poor choice of teaching and learning approaches was also noted in the teaching of the Kiswahili listening skills. The learning resources were also inadequate in those classes. This study recommends that, for proper teaching of the listening skill, participatory approach needs to be embraced and used in our primary schools.

INSTRUCTIONAL STRATEGIES IN ADAPTED PHYSICAL EDUCATION FOR LEARNERS WITH CEREBRAL PALSY IN SPECIAL UNITS OF KIRINYAGA COUNTY, KENYA

Maina John Muturi-M.ED

This study analyzed instructional strategies used by Adapted Physical Education (APE) teachers instructing learners with Cerebral Palsy (CP) in special units integrated to primary schools in Kirinyaga County. The core objective was to assess the availability of adapted PE facilities in the special units which enhance the implementation of APE. The study also sought to establish the professional qualification of teachers implementing APE in the special units. The study also aimed at analyzing the challenges affecting participation of learners with CP and their teachers in APE in the special units. The
study utilized descriptive research design, employing survey method. The target population consisted of teachers and learners of special units and the respective head teachers of primary schools with special units in Kirinyaga County. A census of all the personnel in 6 special units was carried out. They included a total of 19 respondents and all of them responded. The study utilized questionnaires/interview schedules and observation guide to collect information. Data collected was analyzed quantitatively and qualitatively. Quantitative data was analyzed in percentages and presented in tables and charts with the aid of the Statistical Package for Social Science (SPSS), whereas the qualitative data was analyzed thematically using relationships of variables. Some of the major findings of the study were that 86% of teachers agreed that adapted facilities were inadequate for use by learners with CP in APE, there were no Para-professionals to assist teachers of special units with severe cases of CP, 83% of learners agreed the environment was not friendly and finally all the head teachers administering the schools with special units are not conversant with issues in SNE. This study has highlighted important areas in the management of special units, and might assist educators on how to strategize for better implementation of the adapted PE in special units. In conclusion the study found out that APE was an important component of special education that enhances participation of learners with CP in PE and therefore needs special attention. To achieve this, adequate number of qualified teachers is needed to implement the APE curriculum and that the major challenges facing the implementation of the adapted PE curriculum have more to do with the provision of facilities suitable for the learners with Cerebral Palsy and also in provision of a more conducive learning environment. The study recommended that the government should get more involved in the provision of facilities, equipment, trained personnel and an appropriate curriculum for APE for learners with CP. The government should allocate more funds to upgrade special units through provision of physical facilities and employment of more teachers in order to make APE to be effective. Based on the study findings; it is recommended that similar research could be carried out in other parts of Kenya since types of disabilities may vary from one part of the country to another.

RELATIONSHIP BETWEEN TEACHER FACTORS AND JOB SATISFACTION AMONG PRE-SCHOOL TEACHERS IN MOMBASA COUNTY, KENYA

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Department: Early Childhood & Special Needs
Supervisors: Dr. Juliet. W. Mugo
             Prof. Richard Zigler

Pre-school teacher job satisfaction is important from the perspective of maintaining and retaining the appropriate employees within the early childhood sector for quality childcare. In Kenya, pre-schools are owned and run by public, private and local communities. The teachers work on different terms according to the employers or management. The purpose of this study was to establish the relationship between teacher factors and job satisfaction among pre-school teachers in Nyali constituency, Mombasa County. Specifically, the study established that pre-school teacher’s job satisfaction varies according to their attitude, teaching experience, gender, and teacher training. The study was guided by
Maslow’s (1943) Hierarchy of Needs Motivation Theory using the correlation research design. Multistage sampling technique was employed to 135 respondents which included 90 pre-school teachers and 45 head teachers. A questionnaire for teachers and interview schedule for head teachers’ were used for data collection. A pilot study was conducted in 6 pre-schools to determine the validity strictly following the study objectives. Content and face validity of the questionnaires were ensured. The split half methods were used to ensure reliability and a coefficient (alpha) of 0.7 or higher were considered reliable. Qualitative data were analyzed based on the thematic areas and the trends as well as patterns related to the contributory factors of teachers’ job satisfaction in pre-school discussed in narrative form. Quantitative data were coded and analyzed descriptively using means and percentages. The results were presented in tables, graphs and charts. The findings established that teacher factors such as attitude, teaching experience, gender and training greatly influenced their level of job satisfaction. The study also found out that administrative factors like relations with other colleagues and salaries paid played a greater role in pre-school teacher’s job satisfaction. The head teachers recommended increment of salaries and in-service training to ensure pre-school teacher job satisfaction and schools endowed with resources to encourage teacher retention and minimize teacher turn over.

PARENTAL FACTORS INFLUENCING PRE-SCHOOL CHILDREN’S ACADEMIC PERFORMANCE IN DAGORETTI CONSTITUENCY, NAIROBI COUNTY, KENYA

Mwangi Jacqueline Njambi-M.ED

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Dr. Catherine G. Murungi

The purpose of the study was to investigate the extent to which parental factors influence the pre-school children’s academic performance in Dagoretti constituency. The study focused on the following objectives: the extent to which parental socio-economic status, parent-child socio-interaction and the child’s family size influence pre-school children’s academic performance. Dagoretti Constituency, Nairobi County, Kenya was the locale in which the study was conducted. Since children are reared within a families by their, rearing practices including how basic needs are met determine how well they adjust and cope with learning experiences at school. In this regard, the researcher selected the Maslow’s Motivational Theory to guide the descriptive study, using the survey design. A pilot study was conducted in two pre-schools using 12 children from each school together with their parents. A population of 50 pre-schools attached to primary schools both private and private were targeted for the study in which 15 (30%) of the schools, 12 learners per school alongside their parents were sampled. Questionnaires for parents and observation checklists for children were used to collect data. Content validity of the research tools was ascertained by strictly adhering to the study objectives while reliability was established by use of the split half technique at 0.7 co-efficient. Data analysis involved both qualitative and quantitative methods. Specifically, qualitative data were analysed thematically and quantitative data descriptively using means, frequencies and percentages. For inferential data, T test was used to determine whether there were differences between the parental factors and children’s academic performance. It was evident that there is a relationship between the parental factors studied and pre-school children’s academic performance and the three study hypotheses were therefore rejected. It is
hoped that the information from this study will be used to bridge the gaps towards optimizing pre-school children’s academic performance. Parents to better understand deficits in their children’s academic performance may also use the study findings. This applies especially in relation to their home environments and therefore assists parents as well as families to embrace robust approaches in rearing their children. This will make parents to identify more closely with their children’s social needs thus give them the necessary support to enhance their academic performance. Additionally, they will possibly come up with innovations in dealing with their children’s socio-emotional behaviour and learning performance.

SCHOOL OF ENVIRONMENTAL

EFFECTS OF SAND HARVESTING ON WATER QUALITY IN RIVER THWAKE MACHAKOS COUNTY, KENYA

Tabitha Nzula Mwanzia-M.ENV

Department: Environmental Science

Supervisors: Dr. Gladys Gathuru
Dr. Esther Kitur

Sand harvesting is a common economic activity globally and has environmental effects on the riparian land as well as the quality of the river water the activity is carried out. The associated environmental and water quality challenges pose environmental and health risks to the community and the aquatic life. This study was conducted between May and September, 2016 and was aimed at assessing the physico-chemical quality of water in River Thwake and the socio-economic impacts of sand harvesting to community. The general objective of the study was to establish the physico-chemical effects of sand harvesting on the water quality of River Thwake. Its specific objectives were; i) establish the methods used for sand harvesting in the area ii) to determine the effects of sand harvesting on water quality of River Thwake iii) to determine the socio-economic impacts of sand harvesting to the community iv) to find out sand harvesting regulation policies implemented in the area. 8 samples were collected and the physico-chemical parameters measure were; temperature, Hydrogen ion Potential, turbidity, color, electrical conductivity, Lead, Copper, Zinc, Iron, Biological Oxygen Demand and Chemical Oxygen Demand. The study employed purposive sampling to identify water sampling points A (1°28'17.6"S and 37°24'30.6"E) and B (1°27'44.6"S and 37°24'36.1"E) where point A was up-stream and a non-sand harvesting site and point B was a sand harvesting point. Convenience sampling was employed to identify 400 questionnaire respondents who were; 10 key respondents who were environmental officers, 68 harvesters, 46 transporters and 276 community members. Independent sample t test and chi-square tests were used in the study to compare means and establish relationships between point A and B. The study showed that in-stream sand harvesting was most common 80% as compared to off-channel sand harvesting (19%). A chi-square test (p = 0.228) was done and depicted that despite the fact that sand harvesting methods resulted to varied environmental problems, sand harvesting methods do not predict
with certainty the type of environmental problem likely to be expected. The study found out that there were significant difference in the means of point A and B water samples as regards to; color (p=0.001), turbidity (p=0.001), Iron (p=0.001) Chemical Oxygen Demand (p=0.001) and Zinc (p=0.02) which was associated with sand harvesting activities at point A. However, Copper (p=0.54), conductivity (p=0.17), temperature (p=0.93), Hydrogen ion Potential (p=0.09), Lead (p=0.85), Biological Oxygen Demand (p=0.63) mean scores were not significantly different despite sand harvesting. The study also revealed that sand harvesting had a positive effect on the socio-economic status of the local community by depicting a significant increase in their weekly earnings (p =0.005). Despite the existence of sand regulatory policies, it was established that 20% of the respondents were aware of the National Sand Harvesting Regulation and 40% of the respondents knew about the Machakos County Sand Harvesting Bill. The study recommends environmental education to raise awareness among the local community on the policies regulating sand harvesting and encourage goodwill and support in the implementation of those policies. It also recommends regular record keeping of water quality status in River Thwake by relevant authorities to ensure that water is safe for usage.

INDUSTRIAL DISCHARGE IN NAIROBI: AN ANALYSIS OF REGULATORY ENVIRONMENT, QUALITY OF DISCHARGE AND MEDIA COVERAGE

Otsieno Namwaya Mathews-M.ENV

Department: Environmental Science

Supervisors: Prof. Michael K. Koech
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Management of wastes – industrial or otherwise – is a primary step in safeguarding human health. The media, with its agenda-setting role, is important in as far as highlighting the health hazards of poor management of waste is concerned. This study, therefore, focuses on the media and the management of industrial discharge in Nairobi. The objectives of the study were: to determine the volumes of effluent waste emissions by industries; evaluation of industrial effluent discharge and determining frequency of mass-media coverage of these issues. The study particularly looked at how the mass media covered the issue of industrial discharge and its management or failure thereof in Nairobi, whose population at the time of study was 3.7 million people. Nairobi also
has the highest number of industries, which in effect means that Nairobi also has the highest amounts of effluent discharge than any other Kenyan town. From the study both qualitative and quantitative data was obtained through observation, newspaper content analysis, interviews with key informants, the administration of questionnaires and laboratory tests. Data processing was by Statistical package for Social Sciences to generate frequency tables, graphs and charts. Raw industry data was also subjected to anova. The results showed that different metals were present from generated industrial waste. From the findings, the amount of metal levels (mg/1) in the discharge include Iron, Cadmium, Copper, Mercury, Arsenic and Lead. In total, industries in Nairobi discharge on average 201,600 cubic meters of effluents per month. Majority of respondents, which was at 75%, felt the media has not paid attention to the issue of industrial discharge at all and further found that relevant authorities have not enforced laws as required. The study recommended strict enforcement of environmental laws and strengthening of regulatory institutions to ensure that the type of waste effluent generated is adequately analyzed to facilitate treatment before discharge. Additionally, environmental journalism to undertake proper researched cases that capture environmental protection including effluent discharge and industrial emissions.

IMPACT OF FUELWOOD CONSUMPTION BY THREE TEA FACTORIES ON ENVIRONMENT AND ON-FARM TREE PRODUCTION IN KANGEMA SUB-COUNTY, MURANG’A COUNTY, KENYA

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The tropical forest loss is increasing by 2,101 km2 per year. The factors causing the increasing tropical forest loss include agro-industrial development and exploitation of fuelwood by many
countries. The role of human involvement in the deforestation situation in Africa cannot be understated. Studies carried out in Kenya show that most of the Tea factories rely on fuelwood for their energy requirements. This forces them to heavily contribute to the felling down of trees in the quest of meeting energy demands. The study sought to determine the impact of fuelwood demand by three tea factories on On-farm tree production and the environment in Kangema Sub-county. The objectives that guided the study were to assess the fuelwood consumption rate by the three tea factories, to determine the effects of fuelwood consumption by the three tea factories on the environment and on-farm tree production, examine the efforts by the three tea factories to meet their fuelwood demand and to determine farmers’ awareness level on the need to for on-farm tree production. The study employed a descriptive research design. The study target population was the Tea farmers in Kangema Sub-county, and the sample size was determined by simple random sampling method. The study had a sample size of two hundred and ninety farmers and six key informants. Data were collected using interview schedules, observation sheets and interview guides for key informants who included the factory section heads, area Environment Officer, the Agricultural Extension Officer and the area administrative Chief. Data were analyzed by use of descriptive and inferential statistics for the quantitative data while the qualitative data was analyzed by way of understanding the meaning of the answers brought forth by the respondents and relating it to the previous studies undertaken in the field of fuelwood demand and its impact on the tree cover requirements. The research findings indicated that the consumption rate of on-farm trees was significantly high. A correlation between the type of trees planted by the farmers and the preference to support a continuous supply of fuelwood to tea factories yielded an $r = -0.459$ and a $p$-value of 0.000 at a significant level of 0.05. The increased consumption of on-farm trees had serious effects on environment. A correlation test between exploitation of on-farm tree production and and the approximate portion of land with trees returned an $r = 0.016$ and a $p$-value of 0.792 at a significance level of 0.05. Tea factories had instituted a number of strategies and efforts to ensure continuous supply of fuelwood for their factory. This was proven by the correlation test between factories efforts to provide farmers with quality, fast growing seedlings which returned an $r = 0.08$ and a $p$-value of 0.901. Awareness of the need for on-farm tree production and to the environment was significantly high. The farmers’ levels of awareness on the need for on-farm tree production and how they fared in attaining the 10% tree cover policy on their farms was studied by correlating the two. The result showed an $r = -0.176$ at a $p$-value of 0.003. The study recommended that tea factories should be regulated and forced by way of the statute to diversify their energy sources. The tea factories should equally be forced by the county governments to grow trees as a replacement measure in the harvested areas. This would positively impact on the tree replacement rates by the tea factories. Sensitization by the statutory environmental organs on the need to practice on-farm tree production to attain the requisite ten percent tree cover should be done.
TILLAGE, CROP RESIDUE AND INORGANIC NITROGEN EFFECTS ON CROP YIELDS, SOIL CARBON AND NITROGEN IN KIRIMARI WARD IN EMBU COUNTY, KENYA

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Integration of crop residues, inorganic N and appropriate tillage system is an important strategy for improving soil fertility, enhancing crop yields and reducing food insecurity. Such integration under zero tillage systems could enhance soil structural development and nutrient management hence mitigating against soil impoverishment through nitrogen and carbon losses. Crop residues combined with inorganic N in zero tillage results to a controlled immobilization-mineralization process which could avert nitrogen leaching while concurrently improving carbon stock within the macroaggregates relative to conventional tillage systems. However, despite zero tillage being promoted as a promising nutrient management strategy, there is little documentation on the effects of applying stover residues and inorganic N on maize yields, soil mineral N, carbon and aggregate fractions in Embu. The objectives of the study were to; (i) assess the effects of applying different rates of residue and inorganic N on maize productivity in conventional relative to zero tillage systems, (ii) examine the effects of applying different levels of residue, inorganic N and tillage on soil mineral N and (iii) assess the effects of residues, inorganic N and tillage on organic and active carbon fractions and soil aggregation. An on-station trial was set in a randomized complete block design replicated three times. The test crop was maize. Six treatments were laid in 6 × 4.5 m plots comprising of combinations of different rates of maize stover residues (0, 3 and 5 tons ha⁻¹) and N in form of urea (0, 80, 120 kg ha⁻¹) in conventional and zero tillage systems. The key variables assessed were; grain and stover yields, nitrate-N and ammonium-N concentration sampled at four depths (0-10, 10-30, 30-60 and 60-90 cm) during sowing, 8th leaf, 10th leaf and dent stage, soil carbon and aggregate fractionation at four depths at the end of the season. Analysis of variance was done using GenStat 14th edition, means separated using least significant difference (p≤0.05) and orthogonal contrasts between treatments run using R environment. Application of inorganic N as the only nutrient input resulted to higher (p≤0.01) grain yield than the control. Application of inorganic N as the only nutrient input increased (p≤0.02) phosphorus accumulation in maize grain in conventional system compared to the control. At 0-5 cm depth, application of similar (3 tons and 80 kg N ha⁻¹) input rates increased macroaggregates yield in zero tillage system by 28.1% over that of conventional tillage system. Averaged over the different depths, incorporating 3 tons ha⁻¹ residues caused 18.2 and 11.2% higher active and organic carbon, respectively, compared to surface residue application. Applying 5 tons of residues and 80 kg N ha⁻¹ under zero tillage system has an increased potential of enhancing maize grain yield to similar levels as conventional systems. Besides, increasing the application period of 5 t ha⁻¹ of residues with appropriate N rates could improve soil nutrient replenishment potential through macroaggregate build-up in the study area.
Biodiversity is an important component of agricultural landscape but has been under threat of depletion recently. This is because of the escalating poverty and pursuance by farmers to shield their households from hunger. Farmers often remove trees from croplands to create more space for crop production through agricultural intensification instead of managing them together with the annual food crops. The consequence of their action has been the decline in soil fertility, tree diversity loss, and food insecurity at the household level. Ex-ternal agents have been working closely with farmer groups on tree planting and agrofor-estry programs to reverse the situation by building farmers’ capacity to improve farm productivity and encourage them to adopt trees from livelihood diversification strategy perspective. However, the impacts of their efforts in enhancing on-farm tree diversity is yet to be evaluated. This study, therefore, sought to address this knowledge gap in Siaya County through the following specific objectives: (1) to determine diversity of tree species on croplands (2) to assess whether farmers’ perceptions on trees are associated with the location where trees were planted on croplands; (3) to assess the influence of external agents and farmer groups on-farm tree diversity; and (4) to determine main socio-economic and farm characteristics influencing tree diversity on croplands. A questionnaire was ad-ministered to 336 randomly selected respondents and complemented with 10 key informant interviews to gather survey data. The data was analyzed using SPSS and BiodiversityR software for descriptive statistics, tree diversity measurements, correlation and regression analyses. The findings showed that a total of 73 tree species with an average richness of 4 species and abundance of 57 trees per acre of croplands were counted. Grevillea robusta (28%), Eucalyptus spp (25%), and Markhamia lutea (18%) were the most abundant species contributing 71% of all individual trees counted on croplands. Majority (74 %) of tree species counted had 100 individuals and were mostly indigenous. External farm bound-ary was the most dominant tree planting location accounting for 58% of all individual trees counted on croplands. The study also found that perceptions on the effect of trees on croplands significantly (p=0.000) influenced species richness in the study area; though it had no significant association (χ²=0.361) with location where trees were planted or retained on croplands at p <0.05. Both membership to a group and external agents were not significantly influencing species richness and abundance per acre of cropland with exception of external agent (p=0.00) that was found to significantly influence tree abundance per acre of croplands at p<0.05. Farm size, age, main occupation for the households, purpose of tree planting, access to seedlings, land use decision maker and group type had significant influence on species richness on-farm tree diversity at p<0.05. However, there was need to build capacity of farmers to recognize tree diversity as an important component of croplands and how to sustainably use them to generate wealth devoid of biodiversity loss.
Food insecurity is a global problem exacerbated by poor agricultural productivity due to poor soil health, soil infertility, and improper agricultural management practices. Conservation agriculture (CA) practices have been widely promoted and adopted in many regions, but little is known concerning their effects on soil health. This study focused on assessing the effect of long term use of mineral fertilizers, organic inputs and lime on soil microbes and their activities under different tillage and cropping systems. The specific objectives of the study were; (i) to determine the effects of long term use of mineral fertilizers, organic inputs and lime on soil microbial biomass, composition, abundance and enzymatic activities under different tillage and cropping systems; (ii) to determine how soil microbes influence soil aggregation under different tillage and cropping systems; (iii) to determine how tillage and cropping systems influence denitrification and net nitrogen mineralization in the soil. The study involved twelve treatments set up in randomized complete block design. Illumina Miseq sequencing was used to identify the microbial species present whose abundances were assessed using both Simpson’s and Shannon Wiener diversity indices. Aggregate stability was assessed using wet sieving technique; while denitrification potentials was determined using acetylene incubation technique; and net nitrogen mineralization assessed using In-situ resin core incubation methods. Data was analysed using R Project. Analysis of variance (ANOVA) was done and means separated using Tukey’s HSD test. Practicing reduced tillage significantly increased microbial populations, with Glomerales increasing by 50.3% relative to conventional tillage. Inorganic phosphorus application, respectively, significantly reduced arbuscular mycorrhizal fungi operational taxonomic units (OTUs), with Glomerales reducing by 29.8%. Addition of inorganic P fertiliser also significantly (p<0.001) reduced Alkaline phosphatase (ALP) potential activities by -38%, but significantly (p<0.001) increased aggregate Mean Weight Diameter by (16%) and microbial species richness by 34%; with relative abundances of cyanobacteria and rhizobia increasing by 64% and 68%, respectively. Maize-soybean intercropping significantly increased Glomerales (45.5%), with slight increases (not significant) in Microbial Biomass Carbon (MBC) (29%), Microbial Biomass Nitrogen (MBN) (32%), Acid Phosphatase activity (ACP) (12%), ALP (2%) and rhizobia (5%); but reduced cyanobacterial relative abundance (11%). However, aggregate stability significantly (P<0.001) increased under maize-soybean intercropping relative to rotation. Residue retention significantly (P<0.001) reduced ALP activity (-20%), but significantly (p<0.001) increased denitrification potentials (67%; 0-5 cm), MWD (8%; 5-15 cm), MBP (46%), net nitrogen mineralization (+83%), rhizobial relative abundance (80%), cyanobacterial...
relative abundance (60%) and Glomerales (41.9%). Liming slightly increased (though not significant) ACP (31.8%), ALP (28.9%), MBC (18.9%), MBN (7.8%) and MBP (12.4%). Denitrification potentials significantly (p<0.001) increased (61.0%) under reduced tillage than conventional tillage systems. In conclusion, practicing reduced tillage, residue retention and intercropping can increase overall soil microbial biomass, species abundance, extracellular phosphatase enzyme activities and aggregate stability. Application of inorganic phosphorus fertilisers, though needed for increased crop yields and nutrient enrichment, potentially reduces abundance arbuscular mycorrhizal fungi populations and phosphatase enzymes activities. Practicing reduced tillage without residue retention is an unstable agronomic system that potentially reduces soil microbial species richness and diversity.

SCHOOL OF HOSPITALITY AND TOURISM

EMPLOYEES GENDER INFLUENCE ON JOB PERFORMANCE IN SELECTED REGISTERED HOTELS IN KANO STATE, NIGERIA

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Department: Hospitality and Tourism

Supervisors: Dr. Alice Ondigi
Dr. Monica Wandolo

Gender is an analytical concept that is used to assess various forms of social relationship and inequality between the male and female populations in any given society, including the hospitality environment. Women tend to be under-represented in top positions in the corporate world. That has prompted many corporations to review their policies and practices regarding gender inclusiveness. If firms are to remain productive and competitive in an increasingly demanding global hospitality market sector, they must recruit, retain, develop, and promote their most talented employees, irrespective of their gender. The purpose of this study was to explore the influence of employee gender involvement on job performance in an attempt to find out if gender discrimination exists in the registered hotels in Kano state Nigeria. The specific objectives were; to examine the effect of gender involvement in training on job performance, to establish the effect of gender involvement in management on job performance and to determine the influence of gender involvement in remuneration on job performance in registered hotels of Kano state, Nigeria. The study adopted a descriptive research survey design to collect primary data using both quantitative and qualitative. The study targeted a population of eighty hotel managers and 1143 operations staff working in registered hotels in Kano State. Purposive sampling technique was employed to select eight registered hotels and managers. 296 were apportioned to each hotel proportionally to get the sample size of employees for each hotel. Simple random sampling technique using the lottery method from was used to select 296 staffs who participated in the study. The study used structured questionnaires to collect primary data from the hotel staffs and interview schedule to solicit qualitative data from hotel managers. Descriptive statistical analysis such as means, frequencies
and standard deviation, were applied to analyse data in line with the study objectives. Multiple linear regression analysis was used to assess the relationship between independent and dependent variables (staff job performance) in the registered hotels. The study established that 71.6% of the independent variables influenced the dependent variable. It also emerged that men participated more as compared to women. The study revealed that fewer women were in managerial position an issue that was attributed to specific gender factors. Finally, the study found that men were paid more than women on the same work they perform. Based on these findings the study recommends the development of gender-friendly policies of employment that will address gender influence for better job performance. These findings will benefit the stakeholders of the hospitality sectors to address gender-related challenges to improve job performance. More importantly, have more gender-based inclusivity in employment.

EVALUATION OF KNOWLEDGE AND ATTITUDES ON DOPING BY FOOTBALL ATHLETES, COACHES AND SPONSORS IN MALAWI

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Knowledge and attitude on the use of performance enhancing substances among athletes are important aspects in the fight against doping in sports. This study determined knowledge and attitudes of football athletes, coaches and sponsors on doping in Malawi. It established reported prevalence of the use of performance enhancing substances among football athletes, assessed knowledge of football athletes, coaches and sponsors and examined their attitudes respectively. It respectively determined whether there was an association between selected demographic factors of football athletes, coaches and sponsors and their knowledge and attitudes on the use of performance enhancing substances in football in Malawi. The study targeted 450 football athletes, 45 coaches, 15 team sponsors and 8 competition sponsors in Malawi. Football clubs for athletes and coaches were randomly sampled in the cities of Blantyre and Lilongwe. 240 athletes and 24 coaches attached to the sampled football clubs participated in the study. Sponsors (15) of football were purposively sampled from the cities of Blantyre and Lilongwe. Using
the cross section survey design, the selected athletes, coaches and sponsors responded to self-reported structured questionnaires. The obtained data was analysed using Pearson Chi Square, One Way Analysis of Variance (ANOVA) and Post Hoc Tukeys’ HSD in the Statistical Package for Social Scientists (SPSS 20). The study found that participants had high (73.4%) medium (20.8%) and low (5.8%) levels of knowledge on the use of performance enhancing substances. Athletes, coaches and sponsors had negative attitude towards doping. Association existed between knowledge and age of athletes; athletes $p < 0.001$, coaches $p = 0.006$ and sponsors ($p = 0.012$); experience of athletes $p < 0.001$) and sponsors ($p = 0.012$) on doping. Association further existed between the attitude and age of athletes; athletes $p = 0.001$; education of athletes ($p = 0.001$) and sponsors ($p = 0.025$) on doping and experience of the athletes ($p < 0.001$) and sponsors $p < 0.001$) towards doping. There were significant differences in knowledge on doping drugs between athletes (20.76 $\pm$ 3.35) and coaches (18.54 $\pm$ 7.56) and between athletes (20.76 $\pm$ 3.35) and sponsors (21.40 $\pm$ 6.95) $p = 0.01$. There were significant differences in attitude between coaches (14.58 $\pm$ 1.13) and sponsors (12.13 $\pm$ 3.50), $p = 0.003$. The significant differences in knowledge existed between athletes and coaches (2.22; $p = 0.011$) and coaches and sponsors (2.86; $p = 0.042$). Further significant differences in attitudes on doping existed between football coaches and sponsors (3.47; $p = 0.003$). It is recommended that Malawi Government should formulate deliberate policy that will be used to fight against doping in football in Malawi. Athletes, coaches and sponsors need to be engaged in awareness programmes on doping for them to acquire more knowledge. Malawi Anti Doping Organisation needs to design a website where athletes can obtain information on doping. Further studies are required on doping in junior football with emphasis on gender and its socioeconomic impact in Malawi.
THE ROLE OF LOCAL COMMUNITIES IN ENHANCING SUSTAINABLE COMMUNITY-BASED HERITAGE TOURISM, IN MOUNT KENYA REGION, KENYA.

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In the recent past, sustainable tourism is a developing alternative type of tourism; this has led sustainable tourism to gain recognition by tourism developers and stakeholders. Nonetheless, tourism encounters various challenges such as people displacement, commercialization of culture, organic dilapidation, and economic dependency through social economic development. However, sustainable tourism has gained recognition through providing alternative tourism development that is economically friendly, socially acceptable, and environmentally conducive. Sustainable tourism has led to better policing of eco-friendly practices. In Kenya, unsustainable practices such as mass tourism and stakeholders disagreements has for a long period challenged the economic, environmental and cultural development. However, Kenya has started to embraced sustainable goals in tourism development by realizing unsustainable practices negatively impact environmental and social economic development. Therefore, there is need to obtain a sustainable balance in development of social cultural practices in tourism development. These practices include stakeholders’ participation, collaboration, and local community heritage interpretation on community sustainable tourism. Sustainable community heritage tourism involves people and place that is shared for decades hence the reason to sustainably protect the values for tourists experiences and the coming generations. Sustainable community challenges can be solved by understanding research objectives and gaps that focus on aspects that influence community based heritage tourism. Such gaps and objectives in this study include identifying the role of local communities in enhancing sustainable community based heritage tourism in Mt. Kenya region. The main objectives include identifying community interpretation of heritage, examining the role of stakeholders’ participation, identifying stakeholders’ collaborations and the impacts on sustainable community based heritage tourism. The study area covered Mt. Kenya region counties targeting the local communities and the park management. The targeted Mount Kenya region counties include Kirinyaga, Nyeri, Meru, Tharaka Nithi, and Embu. The research applied descriptive survey research design to allow comparison of findings of different respondents in different counties. Research questions and interview were used to collect the data which resulted to 85% questionnaire and 100% interview response rate of the total targeted 384 sample size. Demographics such as gender, age, marital status, and level of education were evident as key determining factors that influence local community roles in enhancing sustainability of community based heritage tourism in Mt. Kenya region. Male gender dominate in participating in sustainability of community based heritage tourism while age and marital status influence people availability based on commitments to family chores, roles and educational engagement of the young people. Similarly, level of education is a significant factor that determines knowledge of promoting sustainable practices in the region. The respondents indicated to have knowledge on heritage, value Mt.
Kenya as a natural heritage site and can interpret heritage based on the availability of community forums and CBO in the region. The respondents indicated to be moderately involve in participating in CBT but highly indicated the desire to be included in Mt. Kenya heritage decision making and the need to have more stakeholders. The respondents indicated availability of local and international stakeholders’ collaborations that promote sustainable tourism. Collaboration are importance in the region as a key factor in promoting sustainable inclusion of various stakeholders to promote sustainable community based heritage tourism in Mt. Kenya region. In recommendation, communities should be appropriately engaged without undermining their roles to enhance local people interpretation, create awareness, make informed decisions, and sustainability promote heritage. Moreover, policy makers should develop stakeholders’ partnerships and collaborations policies for engagement.

ROLE OF CONVENTIONS IN INFLUENCING TOURISM PERFORMANCE IN NAIROBI CITY COUNTY, KENYA

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Research has shown that conventions are a high value-added industry. This can be argued that the outcome of money spent on convention facilities, convention tours, visitor stay and spending and promotion can be quantified and it is possible to see in terms of positive effects of conventions. There has been a continuous growth of convention industry, which has great potential both directly, and indirectly in delivering huge benefits in various areas including, convention center, accommodation, transportation, communications, entertainment, trading, tourism and many more. Therefore, through development of the tourism industry, there is gain of huge economic, political and cultural benefits. However, further research needs to be done to understand the tourism potential of convention delegates. Lack of effective marketing and promotion and inadequate convention facilities makes Kenya lose potential tourists to other competing destinations. Quantity of function space on income management and performance evaluation, have comparatively been neglected despite the growing interest in the expansion of convention centers. The research area identified the gaps in Nairobi City County since it is a capital city and an area that influences conventions largely. The purpose of the study was to establish the role of conventions in influencing tourism performance in Nairobi, Kenya and bridge the gaps. The key objectives of the study were to examine the role of conventions tours, visitor stay and spending, marketing and consumer preferences and their impact on tourism performance in Nairobi, Kenya. The study targeted employees and guests of selected hotels and venues associated with conventions in Nairobi. A total sample size of 384 employees and guests was used as the source of primary data. Descriptive survey design was used for the purpose of this study. Guests were given questionnaires to fill while the practitioners were interviewed one on one to give their opinion of the study on conventions regarding its variables. Reliability and validity of the instruments was determined through pre-testing. Data of research objectives was described and expressed by use of descriptive statistical analysis such as mean scores, percentages, frequency distribution and standard deviations.
The relationship between convention tours, marketing of convention facilities, length of visitors’ stays and visitor spending in convention facilities was determined by use of linear regression analysis. Results showed that convention tour activities, marketing of convention facilities, visitor stay and spending and consumer preference had a positive and statistically significant relationship with tourism performance in Nairobi. Based on the study findings, the study concluded that the independent variables influence tourism performance. Conventional tourism has contributed annual revenue of Ksh 723M. However, managers of convention facilities have not been able to market intensively in the global market. This study recommends promotion of convention tour activities to attract tourists while implementing policies to extensively market convention facilities. This study also recommends provision of a favourable economic and political environment and diversification of tourism products in order to promote visitor stay and spending.

CONTRIBUTION OF ADVENTURE PRODUCT TO SUSTAINABLE TOURISM DEVELOPMENT IN ELGEYO MARAKWET COUNTY, KENYA

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Tourism being a sector of the economy is used by most of the countries in the advocacy of economic development. Most of the adventure tourists/visitors travel to rural areas to experience natural wonders of the world which are prominently features such as great waterfalls, volcanic phenomena, and geological phenomena like caves or spectacular views. This study investigated the contribution of adventure product to sustainable tourism development in Elgeyo Marakwet County. Specific objectives included: to establish strategies adopted in adventure tourism product diversification to sustainable tourism development, to determine the extent of stakeholders’ participation in sustainable tourism development, to investigate constraints to stakeholders’ participation in sustainable tourism development to determine the influence of community attitudes and perception towards sustainable tourism development. The study employed descriptive research design. Elgeyo Marakwet County, which is located in North Rift region and borders Uasin Gishu and Baringo County, was chosen as the study area. The target population of the study was made up of 2 County government officials, 1 national government representative, 1 Kerio Valley Development Authority (KVDA) official, 1,250 Athletes (High Altitude camp), 3 hotel managers, 4,876 tourists, 3 private investors and 24,450 community members of the following areas: Tambach, Anin, Kapchemutwa, Kaptarakwa and Soy South. After calculation of the sample and distributing proportionately, the sample size for Community Members were 316, tourists 63 and athletes 16. Census approach was used for County Government Officials (CEC and CO), National
Government official (Tourism Regulatory Officer), KVDA (tourism officer), hotel managers and private investors since they were few in number. Therefore, the total sample size was 405 respondents. Stratified random sampling strategy was used to choose the respondents from the Community Members, tourists and athletes. Questionnaires and interview guides were used to collect the data. The collected data was analyzed using SPSS. The data was analyzed by using descriptive and inferential statistics. The specific descriptive statistics included mean, standard deviation and percentages, while the specific inferential statistics included correlation and regression analyses. Results indicated that adventure product and stakeholders’ community attitudes and perceptions were positively associated with sustainable tourism development. Additionally, the study findings indicated that constraints on adventure products were negatively associated with sustainable tourism development. The study concluded that different weather changes (cold, humidity and sunny), high altitude training centers, unique culture heritage and affordable tourists’ fee were some of the other features that attracted tourists to their destination. The study recommended that Policies on adventure tourism should be formulated and implemented to increase the diversification of tourism and that the roles of stakeholders should be facilitated through adequate funding and training to increase their creativity and corporation for effective tourism diversification.

INTERNAL CONTROL MEASURES AND COST REDUCTION IN HOUSEKEEPING DEPARTMENTS OF 3-5 STAR HOTELS IN NAIROBI CITY COUNTY KENYA.

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Dr. Bichage M. Gesage

Internal control system is one of the fundamental issues from a global perspective. These makes many hotels in the world to employ proper internal control measures and effective cost reduction processes that would enable them remain competitive in the market. The growth of the global economy and many small and medium sized enterprises that are coming up in this century has led to the challenges in the management of resources and hence the need for the internal control systems. These dynamics coupled with the rapid change in enterprise, systems, processes and corporate scales have made many organizations to be subjected to a comprehensive audit of the financial statements. Internal control measures are generated to ensure that the assets and resources of the organization are safe guarded. They also assist in detecting against possible frauds that might occur in the organization. Various cost reduction
mechanism have been adopted by many hotels in the various departments. However, many hotels have had difficulties in controlling costs which in the long run has always escalated the cost of expenses. Additionally, limited studies have been done on cost reduction measures in the housekeeping department of hotels. The study therefore sought to find out the internal control mechanisms adopted and their influence on costs in the housekeeping department on the various hotels that formed part of the study. The specific objectives for the study were to establish the types of internal control measures instituted in hotels that formed part of the study, to determine whether an internal monitoring and review system that can detect internal control weakness existed in the hotels that formed part of the study and lastly to determine whether the hotels in Nairobi often conduct risk assessment processes to avert any problems of internal control. The study was conducted in Nairobi County whereby the hotels that formed part of the study were selected through a census from the population. The study adopted descriptive survey design with both quantitative and qualitative research approaches for data collection and analysis. Quantitative data was analyzed using both descriptive and inferential analysis. The target population for this study were 1380 middle and senior level staff in all the forty-eight (48) classified hotels comprising of 3-5-star hotels in Nairobi County. This population yielded a sample size of 300 respondents. Questionnaires and interview schedules were used to collect data. Validity and reliability of the research instruments was tested by conducting a pre-test of the study before embarking on the actual study. The quantitative data was regressed linearly to ascertain the relationship among the variables. Qualitative data was triangulated and analyzed based on the findings. The results revealed that there was a relationship between control environment and cost reduction was positive and statistically significant ($r=0.595$, $p<0.05$). The relationship between control activities and cost reduction was positive and significant ($r=0.699$, $p<0.05$), the relationship between monitoring system and cost reduction was positive and significant. ($r=0.690$, $p<0.05$). There was a positive and significant correlation
between Risk assessment and cost reduction (r = 0.679, p<0.05). The regression of the variables generated the R square value of 0.853 (R2 = 0.853) which indicated that the predictor variables explained 85.3% of the outcome variable, a significant relationship among the variables. The findings concluded that there is a correlation between internal control measures and cost control yielding a strong positive relationship between the above-mentioned variables. The study further recommends that hotels in Nairobi County should endeavor to build capacity in getting good internal control measures to ensure that their cost reduction is not compromised.

ASSESSING INFORMATION COMMUNICATION TECHNOLOGY USE ON PERFORMANCE OF FAST FOOD RESTAURANTS IN NAIROBI COUNTY, KENYA.

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Supervisors: Dr. Alice Ondigi

Mr. Sisinio Muthengi

The purpose of this study was to assess Information Communication Technology use and performance of fast food restaurants (FFRs) in Nairobi County, Kenya. Given today's competitive market conditions, customers in hospitality industry have become more selective with their product and service choices. It is therefore difficult to meet their increasing demands, which make providing and maintaining customer satisfaction one of the biggest challenges for managers in this industry. Some firms have employed various strategies to survive in the industry like adoption of Information and Communication Technology (ICT). The study therefore aimed at assessing ICT use and performance of fast food restaurants in Nairobi County, Kenya. The specific objectives of the study were to; explore the intensity of ICT component usage in FFRs, determine the influence of customer frequency of visit on ICT use and their level of satisfaction, establish the relationship between ICT usage and operational efficiency in FFRs and evaluate the effect of ICT usage on customer satisfaction in FFRs in Nairobi County, Kenya. Across sectional research design was used for this study and convenience sampling technique was used in selecting the samples for this study. Questionnaires were used to collect primary data. 163 questionnaires were administered to the employees and 260 questionnaires to customers. Both descriptive and inferential statistics were used to analyze the information collected. The findings revealed that ICT components are available in the fast food restaurants though they are limited with the overall rating of (μ=2.9) which is moderate as per the scale used. This study found out that the intensity of ICT use in fast food operations was in the range of (μ=1.9 to=2.1) which is low. Correlation between intensity of ICT use, operational efficiency and customer satisfaction was carried out and the relationship between ICT use and operational efficiency had a p value of 0.000 and r value of 0.662 indicated a strong positive relation between the two variables, and therefore the null hypothesis that
there was no significant relationship between the intensity of ICT use and operational efficiency in fast food restaurants was rejected. The relationship between ICT use and customer satisfaction had a p value of 0.000 and r value of 0.307 which indicated a moderate positive relationship between the variables, and therefore null hypothesis that there was no significant relationship between the intensity of ICT use and customer satisfaction in fast-food restaurants was rejected. From the findings the conclusions drawn were; ICT adoption influences FFR performance by reduction of customer complaints, over 50% of the FFRs had no point of sale terminals, ICT was mainly applied in marketing and menu management as opposed to table reservations, inventory management and reporting systems. ICT use in FFRs had an impact on customer frequency of visit. The recommendations made from the findings were; Management of FFRs should increase point of sale terminus because 50 % of FFRs had none, use of electronic pay system should be increased in order to enhance efficiency in guest billing cycle which reduces customer complaints, statistics and report system should be adopted and implemented in FFRs because they are least used with a rating of 51.7 and the hotel and restaurant policy makers should consider ICT components as key element when they are assessing hospitality sectors for classification and rating.

OUTSOURCING OF FOOD PRODUCTION SERVICES, CHALLENGES AND ITS BENEFITS TO PRIVATE HOSPITALS IN NAIROBI CITY COUNTY, KENYA.

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Organisations all over the world are turning to outsourcing of non-core activities in order to improve the efficiency of their operations. Some of the non-core activities in hospitals include cleaning services, customer care, transport, catering services among others. The purpose of this study was to explore reasons associated with outsourcing of food production services, the suitability or unsuitability of outsourced foods, challenges as well as the benefits to private hospitals in Nairobi County. The specific objectives were: To identify the reasons private hospitals in Nairobi County outsource food production services ,To determine the types of foods suitable or unsuitable for outsourcing, To identify challenges associated with outsourcing food production services, To establish the benefits of outsourcing of food production services. The H01 was there is no relationship between challenges and benefits associated with food production outsourcing in private hospitals in Nairobi County. The study employed a descriptive survey design targeting specific managers, food production and service staff in selected private hospitals in Nairobi. The sample for the study was 125 individuals that comprised 14 hospital management staff, 26 chefs and 85 catering staff from three purposively selected hospitals. Data were
collected using self-administered structured questionnaires. The research instruments were piloted in Hospital M and the pilot study data was subjected to Cronbach Alpha which gave a correlation score of 0.72 which was found to be valid and reliable. Quantitative data were collected, coded and keyed in computer data analysis software to facilitate data analysis. Descriptive and inferential statistics were computed to describe variables and determine their significance. Chi-Square test was used for hypothesis testing. The study findings were presented using frequency tables, figures and graphs and bivariate statistics. The results indicated that private hospitals outsourced so as to reduce cost and increase efficiency (50%), provide competitive advantage to the organization (28.5%), to introduce workforce flexibility (14.4%) and to reduce problems of managing industrial relations (7.1%). The challenges were increased dependency (42.9%), scheduling and time management issues (21.4%), loss of control over the service process (14.3%), loss of core competencies in-house (14.3%), and loss of flexibility and control (7.1%). The Chi-square test indicated a 95% confidence level, the Null (H01) hypotheses yielded Pearson’s P-value = 0.031, which is significant. Hence, the Null hypothesis (H01) that there is no relationship between challenges and benefits associated with food production outsourcing in private hospitals in Nairobi County was rejected. The study recommends that considering the major reasons for outsourcing, proper cost benefit analysis must be done to ascertain if the outsourcing business actually reflects the hospital outsourcing objectives. However such action should be taken in view of the benefits that are expected. As such, the cost of outsourcing should be compared with benefits. Customer satisfaction should be investigated through the patients complaints and complements. Despite the challenges, hospitals wishing to outsource should ensure the vendors can deliver the food on time and quality should be an important factor.

SOURCES OF STRESS AND COPING STRATEGIES OF ACTIVE RUGBY UNION REFEREES IN KENYA

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Rugby referees have for a long time volunteered to officiate matches in Kenya yet refereeing as an activity is stressful. It is an activity whereby the work environment is often unfriendly, performance is publicly scrutinized, and decisions elicit long debates. The purpose of this study was to investigate the sources of stress that affect active rugby union referees in Kenya and the subsequent coping strategies they adopt to persist in the activity. The study assessed the impact of age, gender and experience the active referees had on their respective sources of stress and coping strategies. Cross-sectional descriptive research design was adopted to assess the sources of stress and coping strategies of referees of different age, gender and experience. The respondents were active rugby union referees in Kenya whereby a target of 80 referees
active during the 2016 / 2017 Kenya Rugby Union season were involved in the study. Self-administered questionnaires were used to collect data. Data was summarised using percentages, mean values and standard deviations. The null hypotheses were tested using One-Way Anova, independent t-test and the Pearson’s Coefficient of Correlation at 0.05 significance level. The results revealed that majority of the referees were aged 27-36 years (43.75%), male referees (85.75%) were more than female referees (16.25%) while referees with less than 5 years of experience were the majority (40%). Findings revealed that the referees encountered stress from different sources and coped actively with the stress. Intrapersonal and performance sources were responsible for causing the greatest amount of stress to the referees while organisational sources contributed the least. Fear of failure and accuracy with calls were the two most severe stressors that affected the referees while verbal abuse was the least severe. The referees used problem focused, emotion focused and avoidance coping mechanisms to fight stress. Problem focused was the most preferred mechanism while emotion focused was the least preferred. According to this study, there was no significant mean difference in sources of stress across different age categories (p=0.344) and sources of stress of male and female referees (p=0.344) but there was a significant mean difference in sources of stress across refereeing experience (p=0.009). This implies that neither age nor gender influenced sources of stress. However, referees’ experience influenced sources of stress. Therefore, the most experienced referees were the most stressed. On the other hand, findings showed that there was no significant mean difference in the rating of coping strategies by different age groups (p=0.348), there was no significant mean difference in the rating of stress coping strategies across sex groups (p=0.124) and there was no significant mean difference in the rating of stress coping strategies across different categories of refereeing experience (p=0.243). This implies that age, gender and experience did not influence choice of coping strategies. However, this study showed that there was a positive relationship between sources of stress and coping strategies (p=0.008). This implies that the more stress the referees came across, the more coping skills they developed. This study recommends that active rugby referees in Kenya should be subjected to continuous learning focused on stress and coping techniques in order to improve their coping skills and make them more effective. The study also recommends that the Kenya Rugby Union should ensure that recruitment and career pathway for referees focus on talent identification since age, gender and experience do not lead to better coping skills which are essential in preventing burnout and early termination by referees.

THE EFFECTIVENESS OF EXHIBITION EVENTS IN PROMOTING THE TOURISM INDUSTRY IN NAIROBI CITY COUNTY, KENYA

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The study sought to determine the effectiveness of exhibition events in promoting the tourism industry in Nairobi City County, Kenya. Kenya’s leisure tourism has suffered suppressed performance due to insecurity challenges and negative travel advisories resulting in decline on tourism revenues and visitor numbers. Thus the need to focus on harnessing the full potential of tourism especially by targeting exhibition events segment to aid in the county’s tourism promotion. The objectives of the study included to: determine the effectiveness of exhibition events in promoting the tourism industry in Nairobi City County; investigate the motivational factors that influence exhibition event participation and how they influence tourism industry promotion in Nairobi City County; examine the main attributes that influence exhibition events participation and their role in tourism industry promotion to Nairobi City County and to determine the influence of exhibition event participation experience on the participants’ overall satisfaction to Nairobi City County. The study used a cross-sectional descriptive design. The study population comprised of all exhibition events participants in Nairobi City County with the use of a sample size of 384. The study was carried out in Nairobi City County, specifically at KICC, the Sarit Expo Centre, and Radisson Blu Hotel. Data collection was by the use of questionnaires and interview schedules. The collected data were processed and analyzed using means, frequencies, averages, percentages, standard deviations, content analysis and chi-square. The Results from the study were presented in graphs, tables, and charts. Study findings indicated that exhibition events are held monthly, quarterly, biannually and annually and they attract participants from all over the world. Majority of the respondent agreed that exhibition events are an effective tool for promoting the tourism industry. The exhibition events can be used to create additional tourism demand, increase visitor numbers, and stimulate travel for lots of people. They can also create country’s tourism brand awareness and as means to advertise a country’s tourism offering. From the findings, the respondents indicated generating sales, gaining competitive advantage, identifying potential customers, education benefits networking, and gathering information for future purchases as the main motivations for attending exhibition events. Destination safety and security, market coverage of the exhibition, venue accessibility and location, destination image and attractions were cited as the main attributes influencing exhibition participation. The study concluded that exhibition events have the potential of being used in promoting the tourism industry in Nairobi City County. To be successful in attracting events tourism, there is a need for the destination to develop and maintain up to standard infrastructure and facilities and also ensure the safety and security of its customers. To remain competitive the study recommends that: tourism marketers should harmonize the communication mix and embrace wholesomely the use of new technologies especially the use of social media together with exhibition events marketing to promote the tourism industry; the government in collaboration with the private sector need to work on event venues available in the destination and ensure they conform to international standards to enable the industry to meet the expected demand.
Baringo is a cultures-diverse county that hosts communities including the Pokot, Ilchamus, Tugen and other Kenyan communities. This makes the county a true definition of social and cultural diversity. Although Baringo is known for cultural diversity, existence of item based tourism rather than market based poses a danger to cultural tourism development. Whilst stiff competition is encountered on conventional tourists’ destination, there is need of increasing supply of cultural attractions in Baringo. The study investigated the influence of cultural practices on tourism development in Baringo County, Kenya. Exploratory research design utilizing mixed method that is qualitative and quantitative methods was used. The target unit of analysis was the 7 Destination managers, 3 county government officials, 399 Community members and 395 tourists. The sample size used was 804 respondents. Data was collected by administration of questionnaires and interview guide. Data was analyzed using content analysis, descriptive statistics and inferential statistics which are the Pearson correlation and regression. The findings both for tourists and community members indicated that there was a positive and significant relationship between cultural practices (cultural festivals, custom & artefacts and traditional rituals) and tourism development in Baringo County. Cultural festival and tourism development were positively and significant related \((r=0.228, p=0.00)\). Result also indicated that customs & artefacts and tourism development were positively and significant related \((r=0.223, p=0.00)\). Similarly, it was established that traditional rituals and tourism development were positively and significantly related \((r=0.129, p=0.001)\). However, cattle rustling had a negative effect on tourism development in Baringo County \((r=-0.024, p=0.497)\). The regression analysis indicated that cultural festivals had the largest influence on tourism development, followed by custom & artefacts, traditional rituals and finally cattle rustling with negative influence on tourism development. The other factors that attracted tourists to Baringo County included Lake Bogoria National Reserve, Lake Baringo, rugged terrains and beautiful valleys. Tourism development is influenced by cultural practices which if well developed, it could lead to fast tourism development in Baringo County. From the findings and conclusion made, the following recommendations were made; new tourism products should be developed from culture, culture has a huge untapped potential for tourism. The traditional rituals whose permission is granted should be developed for tourism attraction e.g. rain making process and traditional cleansing ceremonies. Cultural festivals should be prioritized in the tourism sector, so that it can boost tourism as well as conserving the culture. Customs and artefacts should be profiled and documented for easy access by the tourists. Cattle rustling should be fully eradicated to avoid tourism migration.

DETERMINANTS OF JOB INVOLVEMENT OF FRONTLINE EMPLOYEES IN CLASSIFIED HOTELS IN KWARA STATE, NIGERIA

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Dr. Rahab Mugambi
The hotel industry’s growth has been felt globally. Due to its immense growth, it has therefore attracted both skilled and semi-skilled personnel to work in the labor intensive industry. Being an industry that requires fast and efficient services, there is a need for the hotel industry to establish the factors that may affect its frontline employees’ job involvement. This is due to the fact that, hotels rely heavily on workforce as an important component for service delivery. Thus, the overall objective of the study was to examine the determinants of frontline employees’ job involvement in classified hotels in Kwara state Nigeria. Specifically, the study sought to establish the relationship between work design characteristics, employee empowerment, perceived organizational support and job involvement of frontline employees in classified hotels of Kwara state. The study used a descriptive cross-sectional survey design approach and targeted all classified hotels in the state. The study used stratified and convenience sampling techniques in order to get the required number of respondents. The former was used to put hotels into different categories (strata) whereas the latter was used to select the required number of the study participants from the hotels included in the sampling frame. Quantitative and qualitative data were collected using self-completed semi-structured questionnaires using both closed-ended and open-ended questions. Questionnaires were issued to 384 participants that were selected from the forty-three classified hotels in Kwara state. Descriptive and inferential statistics were used to analyze quantitative data. The former comprised of means and respective standard deviations. The latter encompassed Pearson Correlation coefficient (r) that was used to examine relationships between the study variables. Multiple regression analysis was used to establish the relative importance of the study independent variables (work design characteristics, employee empowerment, and perceived organizational support) on the dependent variable (job involvement). Content analysis technique was used to analyze qualitative data in order to offer more meaning on the quantitative data. Correlation results revealed direct moderate correlations between work design characteristics (r = .361, p < .001), employee empowerment (r = .393, p < .001), and perceived organizational support (r = .312, p < .001) and job involvement. Thus, all null hypotheses indicating no relationships between work design characteristics, employee empowerment and perceived organizational support and job involvement were not supported. Multiple linear regression analysis indicated that all the independent variables were significant and together would explain 63.4% of the total variance in job involvement. Nonetheless, employee empowerment was found to be the most significant predictor of job involvement when compared to perceived organizational support and work design characteristics. As a result, managers should take this into account and develop appropriate actions. To this end, they should predominantly develop strategies and put procedures in place to ensure that frontline employees are given the necessary training, allocate duties on the basis of the strength of the staff. Additionally, correct procedures and infrastructure must be identified to build and sustain an enabling work environment in the
establishments. Frontline employee need to be assured that they are important to the organization and most importantly, their welfare is well looked into.

SCHOOL OF PUBLIC HEALTH & APPLIED HUMAN SCIENCES

BREAST CANCER PREVENTION AND TREATMENT PRACTICES AMONG WOMEN OF REPRODUCTIVE AGE IN BAHI DISTRICT, TANZANIA

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Dr. Onditi Kodhiambo M.

This study was set to assess the breast cancer prevention and treatment practices among women of reproductive age (15-49yrs) in Bahi Division in Tanzania. It has been observed by research that lack of information of the breast cancer sickness has been a big problem in rural communities in Tanzania. This is attributed to the influence of socio-cultural factors like beliefs and practices such sickness is caused by witchcraft and evil spirits. Despite of the fact that the government of Tanzania has tried to come up with strategies to mitigate the prevalence of breast cancer among women of reproductive age more has to be done by people themselves by changing the beliefs that the disease is a curse. The study is guided by the objective to investigate breast cancer prevention and treatment practices among women of reproductive age in Bahi Division, Tanzania. The study employed cross-sectional survey design utilizing random sampling method to sample study participants. Both quantitative and qualitative approaches were considered in the study. The target population for the study was all the 9600 people which includes reproductive age (15-49) women and community health workers and community extension workers in four community units in Bahi Division. The researcher sampled 370 respondents through Fisher’s model. The data was collected by the use of administered questionnaires as the research instruments. The instrument was validated to check their consistency and reliability by consulting research experts and guidance from the supervisors. A total of 361 questionnaires met the threshold and the data obtained was analyzed using descriptive analysis and results presented in charts, tables, graphs and other relevant statistical presentations. The findings revealed that 51% of the respondents were aware of the disease and that there was a significant level of awareness about both breast cancer programs and breast examinations targeting women of reproductive ages in the area. The study also found
that 49.7% of socio-cultural factors had a significant effect on the prevention and treatment of breast cancer disease in the area. The study established that 52.7% of respondents affirmed that there were considerable measures put in place to address breast cancer issues in the area.

HEALTH WORKERS KNOWLEDGE, ATTITUDE AND PRACTICES ON NUTRITION INFORMATION IN MOTHER CHILD HEALTH HANDBOOK IN TURKANA WEST SUB-COUNTY KENYA

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The Mother Child Health (MCH) handbook has been used worldwide to improve maternal and child health through ensuring a continuum of care. Studies have shown that the handbook is an effective tool in ensuring mother and child receive optimal health care. Kenya introduced the handbook in 2010 to improve health service integration, knowledge of mothers and address key nutritional indicators affecting maternal and child health. The study aimed to assess health workers’ (HWs’) knowledge, attitudes and practices on nutrition information in the MCH handbook in promoting maternal and child nutrition. A cross-sectional analytical study design and exhaustive sampling of HWs stationed at the MCH in 22 health facilities in Turkana West Sub-County was adopted. Data was collected through a questionnaire administered to the HWs; a data review checklist used on randomly sampled 219 caregivers’ handbooks to assess HWs recording of nutrition information and focused group discussion (FGD) guide administered to caregivers to collect data on nutrition information in the handbook they received from HWs. The data collected was analyzed using the SPSS version 22 software. Statistical significance was set at p< 0.05. Descriptive statistics were used to summarize data. Chi-square test was used to test the relationship between categorical variables. The findings revealed that most (64.7%) of the HWs were young adults aged between 25-34 years and males were the majority (51.5%). A large number (38.2%) of them were nurses. The HWs reported receiving only on the job training on the MCH handbook. Results revealed the mean nutrition knowledge score as 78.40 (SD 20.13) with only 35.30 % of respondents having high knowledge. Most of the HWs were found to have basic knowledge on infant feeding, micronutrient supplementation, deworming and growth monitoring but lacked comprehensive knowledge on details of these nutrition information and services. The mean attitude score was 77.75 (SD=22.20) with a majority (39.7%) displaying the desired positive attitudes. Negative attitudes were however depicted in a few aspects such as expressing breastmilk, feeding during illness and relevance of growth
monitoring. The mean practice score was 78.97 (SD=15.56) with only 39.7% of the respondents having optimal practices. HWs displayed optimal practices regarding infant feeding and iron and folic acid supplementation (IFAS). However, moderate to poor practices were depicted in documentation of nutrition services, vitamin A supplementation (VAS) and growth monitoring. The study established strong significant relationship between the HWs nutrition knowledge and practices ($\chi^2= 36.712; \text{df}= 4; \text{P}<.001$) as well as between nutrition attitudes and practices ($\chi^2= 20.888; \text{df}= 4; \text{P}<.001$). Significant relationship was also established between socio-economic characteristics (age, education, profession, nutrition background and training) and nutrition practices. Despite their positive attitudes, HWs failed to display optimal practices due to insufficient knowledge. Inadequate nutrition training, high workload and documentation were reported by health workers as challenges in offering nutrition information/services in the handbook. This study recommends that the ministry of health should provide nutrition training and support supervision for health workers and ensure adequate information sharing to caregivers to improve use of nutrition information and services in the MCH handbook.

ACCESSIBILITY OF ANAL CLEANSING MATERIALS FOR PUBLIC PRIMARY SCHOOL PUPILS IN KAJIADO COUNTY, KENYA

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Anal cleansing is the hygienic practice of cleaning oneself after defecation. National school health policy states that schools should provide appropriate materials (toilet paper and water) for pupils’ anal cleansing. Inaccessibility of anal cleansing materials subjects pupils to use of inappropriate methods resulting in fecal hand contamination. Poor hand hygiene is a risk factor for transmission of fecal oral infections which affects pupils’ health and educational outcome. This study focused on accessibility of anal cleansing materials for public primary school pupils in Kajiado County. Specifically, it looked at the level of accessibility of anal cleansing materials, pupils’ predisposing factors influencing access, institutional factors influencing access and proposed sustainability measures for access to anal cleansing materials. It was a descriptive cross-sectional study which targeted public primary schools selected from the larger Kajiado North Sub County. Cluster sampling technique was used to sample schools from the five educational zones while simple random sampling was used to sample 384 pupils from the selected schools proportionately. Both quantitative and qualitative data were captured using observation checklists, structured interviews and key informant interview schedules. Quantitative data was analyzed using the Statistical Package for Social Sciences version 21 and the qualitative data analyzed thematically. Chi-square was used to test hypothesis at $p<0.05$ significance level. Result shows that only 22.9% of the pupils had access to anal cleansing materials. Pupils’ predisposing characteristics of class
(p-value = 0.036) and level of material awareness (p-value <0.001) had influence on accessibility. For Institutional factors, material sensitization had association with accessibility (p-value = 0.001). Head teachers and health teachers proposed the following sustainability measures; sensitization on importance of anal cleansing materials through IEC materials (75.0%), provision of materials through cost sharing(66.7%), management of the materials by class teachers(77.7%) and prefects(69.4%) and continued support by government ministries of health and education(80.6%). In conclusion anal cleansing materials access was low; pupils’ predisposing characteristics and institutional factors influenced access. From the findings, it is recommended that anal cleansing material access be enhanced, pupils be sensitized on appropriate anal cleansing materials and sustainability measures be devised to ensure continued access.

HEALTHCARE WASTE MANAGEMENT PRACTICES AMONG HANDLERS IN SELECTED HEALTH FACILITIES IN NAKURU EAST SUB COUNTY, NAKURU COUNTY, KENYA

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Dr. Ramadhan Leonard Mawenzi

Health care waste (HCW) is unwanted materials produced in the course of health care activities including from hospitals, laboratories and research centers. It is necessary that all health care wastes from any source be properly managed according to the available guidelines to avert health crises. If health care waste is poorly managed it exposes health care workers, sanitary workers and the community to infections, toxic effects and injuries. The purpose of this descriptive cross-sectional study was to establish the health care waste management practices among handlers in selected health facilities in Nakuru East Sub County with the goal of offering advisory public health opinion. Specifically, the study sought to determine the types of health care wastes generated in the selected health facilities in Nakuru East Sub County and to assess the level of compliance to national guidelines for safety in the selected health facilities in Nakuru East Sub County. The study population consisted of (105) sampled healthcare workers and sanitary workers from the selected health facilities. Purposive sampling method was used to select the study area and simple random sampling method was also used to select respondents. Collection of data was done by use of observation checklist, questionnaires and interview schedule. Statistical Package for Social Sciences (SPSS) version 20 was used to analyze data. Chi-square was used to test for association between variables at p<0.05 significance level. Results were presented using tables and pie charts. From the study, three types of wastes were generated including; general waste (79%), infectious waste (10%) and sharps (11%). On segregation of waste; it was observed that waste from health facilities was not segregated into general waste, infectious waste, sharps, chemical waste, pharmaceutical waste and pathological waste. It was also observed that all (100%) health facilities (HCFs) had waste storage containers. Methods of transportation of health care waste were done using wheelbarrows (51%), County government garbage collection vehicles (32%), handcarts (10%) and trolleys (6%). It was further observed that about (67%) of health facilities had non-functional
incinerators; only two (33%) of health facilities had functional incinerators. On compliance to national guidelines for safety it was also found that majority of the respondents (68%) did comply with the guidelines for safety on health care waste management practices, while (32%) of the respondents did not comply with the guidelines. There was a significant relationship between health care waste generated and health facility (p=0.001), hazardous health care waste generated and segregation of hazardous health care waste (p=0.001), health care waste segregation and health facility (p=0.001), hazardous health care waste generated and method of transportation of hazardous health care waste (p=0.002). The study concludes: (i) the main types of waste generated were; general waste such as waste papers and hazardous waste that is sharps and infectious waste, (ii) health waste management practices found included; segregation, storage, transportation, pit disposal and incineration, and (iii) most (68%) of the health facilities complied with the guidelines. This study recommends: (i) the County Government should create awareness on the various types of wastes among handlers, (ii) the health facility and County Government should ensure that proper health care waste management practices are followed, and (iii) hospital management and County Government should ensure that all guidelines are compiled on HCWM, and (iv) studies on the reasons for poor handling of health care waste in Nakuru East Sub County health facilities are advocated.

CLINICAL PHENOTYPES ASSOCIATED WITH PRETERM BIRTHS AT JARAMOGI OGINGA ODINGA TEACHING AND REFERRAL HOSPITAL IN KISUMU COUNTY, KENYA.

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Supervisors: Prof. Margaret Keraka

Preterm birth is a global health problem. It is the leading cause of child and neonatal mortality globally including Kenya. Preterm birth is the birth occurring before 37 completed weeks of gestation. In Kenya, preterm birth is the leading cause of neonatal mortality as it contributes to 35% of deaths among the neonates while Kisumu County is among the county’s leading with child under-five mortality rate at 133 deaths per 1000 live births. The main objective of this study was to identify the clinical phenotypes associated with preterm birth in JOOTRH in Kisumu County. It was a cross sectional study based on women who had a preterm birth alive or stillbirth at JOORTH in Kisumu County. Purposive sampling technique was used to select 178 respondents who met the inclusion criteria. Interviewer administered questionnaire was used to collect both qualitative and quantitative data. Data was analyzed by computer software SPSS version 23; descriptive statistics was used together with inferential statistics (Chi-square and Fisher’s Exact test) to help in the identification of the statistical significance of any association between the variables. A p value of < 0.05 was used. Bivariate analysis was utilized to measure the strength of associations. Data presented by use of frequency tables and narrative description. Ethical clearance was sought from Kenyatta University Ethics and Review Committee, permit sought from NACOSTI, consent and assent from the respondents. Results showed that maternal age (p=0.011) to be statistical significant with preterm births. Clinical phenotypes based on maternal,
fetal and placental conditions; preeclampsia/eclampsia (p=0.016), extrauterine infections which includes malaria, UTI and HIV (p=0.030), severe maternal conditions that includes DM, anaemia, cardiac disease, hypertension prior to pregnancy and TB (p=0.001), multiple gestations (p=0.013), fetal anomaly (0.048), IUGR (p=0.049), antepartum stillbirth (p=0.046) and APH/early bleeding that include placenta previa and placenta abruption (p=0.025) were all significantly associated with preterm births. On bivariate analysis between clinical phenotypes and preterm births, all except multiple gestation (p=0.416) and APH (p=0.660) remained statistically significant. All clinical phenotypes (maternal, fetal and placental conditions) were significantly associated with preterm births. All clinical phenotypes except multiple gestations and APH/early bleeding remained statistically significant after bivariate analysis. The study recommends the use of Barro’s classifications system of clinical phenotypes to phenotype all preterm births in JOOTRH. Early identification of maternal, fetal and placental conditions identified in this study to be associated with preterm births by adopting Barros’ phenotyping of preterm births as a strategy to help prevent the occurrence of PTBs and eventually reduce neonatal deaths and under-five mortality.

Dr. Antony Wanyoro

INPATIENT’S PREFERENCES FOR INVOLVEMENT IN THERAPEUTIC MANAGEMENT AT NAKURU LEVEL 5 HOSPITAL, NAKURU COUNTY, KENYA.

Ben Kibet Sawe-M.PH

Department: Community Health

Supervisors: Dr. Fransisca Ongecha

Dr. Joel Koima

Patient involvement is a process by which people are enabled to become actively and genuinely participate in creating a condition for communication, informing and educating patients, joint decision making, promoting self-management, relationship building, and being responsive to patients’ perspective. Evidence indicate that involving patients leads to reduced cost; increased patient satisfaction; better quality health care outcomes; reduction in errors and re-hospitalization; empowerment of individuals and the public hence increasing their sense of ownership of health services; and increased confidence and acceptability of the public in health services. The main objective of this study was to explore inpatient’s preferences for involvement in their therapeutic management at Nakuru Level 5 Hospital, Nakuru County, Kenya. Across-sectional descriptive study design was used. Data was collected by administration of a structured questionnaire to: determine the patient’s preference and perception on involvement; compare patients’ preferences and perception on involvement; find out patients level of awareness of their rights to participate; and determine the factors influencing patient involvement in their therapeutic management. Stratified sampling followed by Systematic random sampling was used to obtain the sample. The study targeted 196 respondents however the response rate was 194 (99%). Data obtained was analyzed using SPSS version 23 to provide
descriptive and inferential statistics. Exact p-value of less than 0.05 was considered to be statistically significant. The result showed that 80.9% of the respondents perceived passive involvement whereas on preferences 76.3% preferred collaborative care. Majority (57.2%) of the respondents were not aware of the presence of patient’s charter in the hospital. Fifty-six-point seven percent (56.7%) of the respondents had low level, 2.6% moderate level while 40.7% had high level of patients’ rights awareness. Univariate analysis showed that gender, perceived nature (chronic/acute) of the disease, perceived seriousness (Serious/Minor) of the disease suffered were found to be significantly associated with the patient preferences. Multivariate analysis (logistic regression) showed that males were more likely (odds ratio = 2.7) to prefer collaborative care, while those patients with acute nature of the disease/condition were also more likely (odds ratio = 2.7) to prefer collaborative care compared to those with chronic disease/condition. In conclusion, patients currently are not being involved in their care; however their desire is to be involved. Moreover, patients are not aware of the availability of patients’ rights charter. Gender and nature (acute/chronic) of disease are associated with patient preferences on involvement. Based on the findings, this study recommends that: health care workers be sensitized on the importance of involving patients in their care; patients be given the opportunity to participate in their own care as this ensures quality outcome; some of the identified factors be used as a major initiation of patient centered care (PCC) for patients by providing sufficient information to the patients, support and encourage them to participate in their own care. Findings of the study will be very useful to health care providers, hospital managements, policy makers and academicians in improving the quality of healthcare.

HIV/AIDS INTEGRATION POLICY IMPLEMENTATION FACTORS AND ITS INFLUENCE ON QUALITY OF HEALTHCARE SERVICES IN SELECTED COUNTIES OF KENYA.

Adoyo, Maureen Atieno-M.PH

Department: Health Management and informatics

Supervisors: Delivery of HIV/AIDs healthcare services in Low and Middle-Income Countries (LMIC) remained a challenge, long after World Health Organization called for a comprehensive integrated approach to service delivery in 2007. High Income Countries recognized integration as the most logical way to organize service delivery while LMICs still experienced delayed access to healthcare services and sub-optimal adherence a decade after the beginning of implementation of integration policy. In LMIC there was little information on what an integrated service would look like, and whether it contributed to improved quality in service delivery. This study sought to analyze integration policy implementation factors and how it influenced quality of HIV/AIDs healthcare services in Kenya. Concurrent correlational and explanatory mixed method adopted as study design was necessitated by need to conduct in-depth analysis of integration policy retrospectively and rapidly applying quantitative and qualitative approach to data collection. Study variables included; policy context, health systems, points of care factors, integrated services, and quality of care. Both probability and non-probability sample techniques were used and a total of 527 adults and 212 children participated directly or indirectly after consenting and assenting process. Data collection techniques applied simultaneously included; desk reviews, interviews, and focus group discussions to improve validity and internal consistency of study findings. SPSS Ver. 21
software used to measure correlation coefficient, test relationships between variables and hypothesis. Qualitative data was analyzed using N-vivo software. Implementation status of integration policy varied across facilities and had significant influence on quality of HIV/AIDS services (95% C.I; 0.22; p-value 0.00). Need based approach to programming and collaboration led to efficiency and effectiveness in HIV treatment. Health system factors had significant influence on quality of care, (95% C.I; 0.48; p-value 0.010) with gaps in the management of medical products and leadership role in accountability. Point of care factors had no significant influence on quality of care. Convenience on check-up booking and use of medical services were not significant (0.038; p-value 0.77 and 0.04; p-value 0.55 respectively at 95% C.I. Seventy six percent of the facilities had functional organization structure facilitating participatory approach in decision making and structured clinic days while 50% of the facilities had no routine maintenance schedule for medical equipment. The study recommends reinvention of strategies in paediatric ART programming, incorporation of sustainable hexapartite collaboration in the design of intervention programmes and cross learning for functional organizational structures, practices and culture.

ELECTROCARDIOGRAPHIC FEATURES OF LEFT VENTRICULAR HYPERTROPHY AMONG ELITE KENYAN NATIONAL SEVENS RUGBY PLAYERS

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Dr. Gordon Ogweno

Regular participation in intensive physical exercise is associated with central and peripheral cardiovascular adaptations. Electrocardiographic (ECG) changes in athletes are common and usually reflect structural and electrical remodeling of the heart as an adaptation to regular physical training. In rare cases, abnormalities of an athlete’s ECG maybe an expression of an underlying heart disease putting the athlete at risk of sudden cardiac death. While pre training screening is in practice, there is no literature available of it undertaken on elite athletes in Sub-Saharan Africa. The aim of the study was to, assess the ECG features of left ventricular hypertrophy (LVH) among Kenya National Rugby Sevens Players aged 18-35 years. The methodology included use of standard 12-lead ECGs which were obtained from 25 male rugby players and LVH was determined using the Sokolow-Lyon Index. Blood pressure and body mass index (BMI) were measured and calculated respectively for all participants. The findings were, mean age among the players was 23+3.22 (m+SD) years and were dominantly of Bantu race origin. Three players exhibited LVH >3.5 mV on ECG with a mean 2.70+0.88 mV, twenty two were overweight BMI >24.9 Kg/m2 (26.4+1.36). The chi-square test revealed no relationship between BMI and ECG features of LVH p>0.05. Among the players, 10 had isolated systolic hypertension (>140/<90 mm Hg), 1 showed diastolic hypertension. In conclusion all athletes and physically active persons should be screened for LVH and hypertension. If the condition is diagnosed, appropriate treatment should be started to reduce the risk of morbidity and mortality associated with cardiovascular disease. There is need for large athlete population studies in rugby as well as across other sports.
Human immune deficiency virus and its associated opportunistic infections have been shown to affect the nutritional status of clients by damaging the immune system, interfering with nutrient ingestion, absorption and utilization. A combination of malnutrition, Human immune deficiency virus (HIV) and Acquired immune Deficiency Syndrome (AIDS) leads to a vicious cycle of immune malfunction, malnutrition and infectious diseases. Despite more funds being accessible for people living with HIV (PLHIV) treatment, and many of such programs having positive outcomes, HIV remains a greater basis of morbidity and mortality. The aim of this study was to determine the nutrition status, dietary intake and morbidity patterns among adult patients living with HIV and AIDS attending Narok County Referral Hospital. The study adopted cross-sectional analytical study design. Purposive sampling was used to select Narok county referral hospital, the PLHIV attending the comprehensive care clinic at the hospital and key informants. Simple random sampling was applied to select the 121 respondents from the PLHIV visiting the clinic. A structured questionnaire and anthropometric form were used to collect the data. Besides, 24-hour dietary recalls and a 7-day food frequency questionnaire were used to collect dietary data and were analyzed both descriptively and inferentially. Data was analyzed by the aid of SPSS, where descriptive statistics i.e. standard deviation, means, and percentages were used in summarizing the data. Inferential statistics of correlation, Regression and analysis of variance analysis were used to determine the relationship between nutritional status and dietary intake of the PLHIV at a $P < 0.05$. The study established that most of the respondents were not consuming the required level of nutrients. A major challenge was that they had to purchase most of the foods and yet 51% had a very low-income level of less than ksh 5000 per month. Among the respondents 60% reported having been sick in the previous two weeks. Most respondents showed a normal trend in their nutritional status as shown by the BMI between 18.5 – 24.9, MUAC > 23 cm and WHR of less than 0.8 and 0.9 for female and male respectively. The results revealed that there was no statistically significant relationship between demographic and socio-economic characteristics, dietary intake, morbidity status and nutritional status among PLHIV attending Narok County referral hospital. The regression model therefore could not be used as an appropriate predictor of the effect of demographic and socio-economic characteristics, dietary intake and morbidity variables on nutritional status of PLHIV in Narok County. Vitamin A consumption as per the results of the research shows that it’s consumed above RDA and considering that it’s toxic at above normal levels, the recommendation is that vitamin A prescribed routinely for therapy may need to be reduced or stopped all together by the Ministry of Health through revision of nutrition guidelines. The study concludes that the three measures of nutritional status used in this study (BMI, MUAC and WHIR) may not be enough or adequate alone as predictors of nutritional status among
adult PLHIV. The results are expected to be beneficial to health facilities at the County and National levels, health partners, beneficiaries, health care workers and researchers.

HEALTH-RELATED FACTORS AMONG PRENATALLY HUMAN IMMUNODEFICIENCY VIRUS INFECTED ADOLESCENTS IN NAIROBI COUNTY, KENYA

Edwina Anyango Ouma-M.PH

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Supervisors: Dr. George Orinda

Dr. Kinuthia Gichuhi

Globally, the paediatric HIV epidemic is experiencing a shift into a new phase where children on antiretroviral therapy are now growing into adolescents and adults while facing challenges of living with the HIV. Prenatally HIV infected adolescents account for about 70% of the total number of all HIV infected adolescents. This study sought to identify the health related factors among the prenatally HIV infected adolescents, specifically to determine their socio-demographics, identify their level of knowledge on HIV, examine their sexual behaviours and practices as well as determining their perception and challenges as they access care and support in Nairobi County at Mbagathi and Lea Toto facilities. The study employed a descriptive study design to gather quantitative and qualitative data from the sample population of 14-19-year-olds in these health facilities. Ethical approval was obtained from Kenyatta University Ethics Review Committee and National Commission for Science and Innovation, (NACOSTI). Informed consent/assent was obtained from the study participants while confidentiality was maintained at all levels of the study process. Data was obtained from 368 study participants, results were collated and analysed using SPSS version 20. More than half, 53.8% were males and 46.2% females. Majority (64.9%) were aged 14-16 years, most of the respondents, 61.1% were in either secondary or vocational training. Knowledge level on HIV transmission and re-infection was relatively high at 70%. About a third, 34% were found to engage in unsafe sexual behaviours with the youngest sexual debut being at 12 years old. Majority were still greatly bothered by being HIV positive, 33.4% and were also greatly bothered about disclosing their status, 54.1%. Most of the respondents were aged 7-12 years (75%) when they had their status disclosed to them. The circumstances surrounding disclosure was either during interaction (40.6%), at HIV counselling session (33.5%), or during illness (25.9%). Discordance in families among parents and siblings was highlighted during FGD. The relatively fair level of knowledge on HIV, does not meet the UNGASS requirement of 95%. The vulnerability of re-infection and onward transmission of HIV is increased by the inadequate levels of knowledge and the unsafe sexual behaviours and practices. The adolescents are greatly bothered by Stigma from self and others. Discordance among family members, disclosure and adherence to care are some of the challenges faced by the adolescents. The findings of this study show the need to address the health related factors among the adolescents with respect to their knowledge on HIV, sexual behaviours and practices, their perception on care as well as the challenges they face as they access care in Nairobi County.
MATERNAL BODY COMPOSITION AND INFANT BIRTH WEIGHT IN URBAN INFORMAL SETTLEMENTS IN NAIROBI CITY COUNTY, KENYA

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Nutrition depletion before and during pregnancy compromises foetal programming, and is among the causes of adverse birth outcomes, including low birth weight. Mothers with lower body water and fat free mass are more likely to have children with lower birth weights. Direct maternal body composition assessments during pregnancy are better predictors of birth outcomes than traditional nutritional assessment methods. However, there is paucity of evidence on maternal body composition and the relationship between maternal body composition and birth weight in urban informal settlements in Kenya. The purpose of this study was to assess maternal body composition using the deuterium dilution technique, and establish the relationship between various maternal body components (total body water, fat mass and fat free mass) and birth weight among pregnant mothers in Korogocho and Viwandani informal settlements in Nairobi City. This study was nested in the Maternal Infant and Young Child Nutrition study implemented by the African Population and Health Research Center in Korogocho and Viwandani, in which a cohort of 1000 women were recruited during pregnancy and followed until one year after delivery. For this study, sub sample of 129 participants before their third trimester were recruited to participate in the body composition assessment, using the deuterium dilution technique, and the birth weight of their children was established after delivery. Information on maternal, socio-economic, demographic and health characteristics was also collected. Data collected was analysed using STATA statistical package. Descriptive analysis were used to present participants’ body composition characteristics while linear regression analysis was used to determine the relationship between maternal body composition and birth weight at 95% confidence interval
There was a significant relationship between maternal age and gestation stage, with total body water (TBW), fat free mass (FFM) and fat mass (FM) (linear regression, p=0.05). TBW was significantly higher among older mothers, that is 20 to 24 (33.23L, p=0.044), 25 to 30 (34.28L, p=0.009) and 30 years and above (34.31L, p=0.001), compared to those who were less than 20 years (31.11L), and higher among mothers in the second trimester (33.77L, p=0.01) compared to those in the first trimester (31.06L). FFM was significantly higher among participants aged 20 to 24 years (45.56kg, p=0.031), 25 to 29 years (46.97kg, p=0.007), and 30 years and above (47.0kg, p=0.008) compared to those less than 20 years (42.66kg) and higher among participants in the second trimester (46.26kg, p=0.07) compared to those in the first trimester (42.59kg). FM increased significantly for participants aged 20 to 24 (17.47kg, p=0.001), 25 to 29 (16.75kg, p=0.002) and 30 to 35 (21.3kg, p=0.000) years compared to those in the younger than 20 years (13.81kg). The mean birth weight was 3.3kg + 0.42kg. Infant’s birth weight was positively related to maternal total body water and fat free mass (linear regression, p=0.005, p=0.003 respectively) but not fat mass. These findings suggest that non – fat components of the body, including total body water and fat free mass, positively influence the birth weight of children. In conclusion, it is crucial for governments and other relevant stakeholders to design interventions that improve optimal maternal feeding practices that would subsequently enhance gains in fat free mass and total body water and hence overall birth weight of infants especially among teenage mothers.

UPTAKE OF FOCUSED ANTENATAL CARE SERVICES AMONG WOMEN OF REPRODUCTIVE AGE IN NAKURU COUNTY, KENYA

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Dr. Eunice Chomi

The desire to correct the poor implementation of traditional antenatal care (ANC) in developing countries resulted in the adoption of antenatal care model termed as Focused Antenatal Care (FANC). The goal of FANC is to ensure a good outcome for both the baby and mother and prevent complication during pregnancy, labor, delivery and postpartum period. It is characterized by four main focused visits. Studies have shown that Kenya has long suffered from high maternal morbidity and mortality one of the strategies to reduce the high Maternal Mortality Rate (MMR) is effective implementation of FANC. The aim of this study was to identify uptake of FANC services among women of reproductive age with emphasis on their perceptions, cues to action and self-efficacy levels. The health belief model was adopted in the study to guide the researcher in understanding the respondents’ behavior in seeking FANC services. The broad objective was to identify uptake of focused antenatal care services among women of reproductive age in Nakuru County. A cross sectional study was carried out. Data collection involved use of a pre-tested questionnaire for quantitative data and Focused Group Discussion (FGD) guide for qualitative data. The sample size was 337 participants who had delivered within two years. Data analyses was done using SPSS version 21 while chi square test was used to compare association between variables and content analysis for qualitative data. The study found that the demographic factors significantly associated with the uptake of FANC include age (p =0.0002), marital status (p =0.007), education (p =0.004), occupation (p =0.035) and the number of children alive (p <0.001). It was also established that achieving or not achieving FANC is significantly associated (p<0.05) with high, moderate or low levels of perceived susceptibility (p =0.015), perceived severity (p =0.03), perceived barriers (p <0.001), cues to action (p= 0.003) resulting from external influence, cues to action resulting from desire to have good pregnancy outcomes and levels of self-efficacy (p< 0.001). The study recommends that the Ministry of Health and other health sector should take cognizance of demographic characteristics associated with uptake of FANC. There is need for the Ministry of Health and other development partners to further strengthen the cues to action of women associated with the uptake of FANC services in Nakuru County. There is need to strengthen sensitization, information sharing and follow-up on FANC in a move to improve the uptake of FANC in Nakuru County.

ADOPTION OF COMMUNITY HYGIENE STRATEGIES FOR SAFE WATER AND SANITATION AMONG MOTHERS OF UNDERFIVES IN KITUI COUNTY, KENYA

Lydia Mbeti Muti-M.PH

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Supervisors: Dr.Alice Ondigi
Dr. Sammy Letema

Inadequate access to safe drinking water, sanitation and hygiene constitutes a serious global threat to health accounting for approximately 4 billion cases of illness annually. Children under five years in the
developing world are most affected, where nearly 1.6 million deaths are recorded annually due to diarrhea alone. This accounts for 15% of all deaths among under fives. Poor sanitation and hygiene practices are among the main factors associated with sanitary diseases. The purpose of this study was to analyze the adoption of community hygiene strategies to safe water and sanitation among mothers of under five year olds in Migwani Division, Kitui County, Kenya. Objectives guiding the study were: to determine adoption of community hygiene facilities for safe water and sanitation among mothers of under five year olds, to examine the prevalence of common sanitary diseases among children under five years old and to assess the influence of community hygiene practices on safe water and sanitation among mothers of under five year olds within Migwani Division, Kitui County. The study adopted a descriptive survey research design. A sample of 94 mothers of children under 5 years old, 3 public health officers and 57 community health workers was used for the study. The total number of respondents was 154 and the response rate obtained was 89%. Data was collected using interview schedules, questionnaires and observation checklists. Quantitative data was coded to develop code sheet quantitative data. Qualitative data was thematically categorized and analyzed using Statistical Package for Social Science Version 20. Statistical analysis involved determination of percentages, means, standard deviation and logistic regression. The results of the study show that only 50.6% of the mothers had access to treated piped water with the rest using pond water, stream water or harvested rain water. More than 40% of the mothers used untreated water sourced from open wells, which increased water borne diseases among children. Toilets were observed in 89.9% of the homesteads with 10.1% practicing open defecation. Common sanitation and water borne diseases reported were worms, amoeba, diarrhea, and dysentery. Mothers who used both open well water and stream water were more likely to have children suffer from diarrhea compared to those who used piped water (9.37 for stream water, 9.42 open wells and 5.42 for piped water - p<0.05). Amoeba prevalence was 82.6% among children whose mothers were using untreated water. Majority of mothers (76.4%) lived more than 10km from water sources therefore forced to use unsafe water. Hand washing at critical times was at 94.4% meaning hygiene awareness was high, evidenced by 61.8% of homesteads with hand washing facilities outside toilets. High level of adoption of safe water and sanitation practices were: Availability and use of toilets, hand washing facilities, hand washing and treating drinking water. Medium level was access to safe water and participation in health programmes. Low adoption was evidenced by prevalence of sanitary diseases and long distances to water sources. Therefore, Community hygiene strategies and practices have great influence on levels of adoption of safe water and sanitation practices among mothers of children under five years old. Recommendations of the study are: community involvement in assessing their health, training of community health workers on concepts of health care and development, change in human behavior in community response towards disease outbreaks and emergencies and poverty alleviation in order to improve adoption of community hygiene strategies for safe water and sanitation.

RISK FACTORS ASSOCIATED WITH SYPHILIS INFECTION AMONG MEN WHO HAVE SEX WITH MEN IN NAIROBI CITY COUNTY, KENYA

Mwangi Hellen Nyambura-M.PH

Department: Population, Reproductive Health and Community Resource
Supervisors: Prof Margaret Keraka

Dr. Rekha Rani Sharma

Syphilis is an infectious disease caused by the bacterium Treponema palladium. Globally, about 12 million people, majority of whom come from sub-saharan Africa and Asia have suffered from syphilis infections. This study therefore determined the prevalence and the risk factors for occurrence of syphilis among men who sex with men in SWOP/MSM clinic in Nairobi City County. The study adopted a crosssectional study design which encompassed use of qualitative and quantitative data collection techniques. Structured questionnaires were used to collect quantitative data from respondents while Key Informant Interview schedules were used to collect qualitative data from healthcare workers in SWOP/MSM clinics. The study targeted a sample size of 257 MSMs attending clinical appointments in the facility. Systematic random sampling was used to select respondents using a predetermined interval of 2. The researcher obtained ethical clearance from the Kenyatta University Ethical Review Committee. Before interview each selected respondents, the study sought informed consent from respondents. Blood samples of 3mls were collected from respondents after each interview for VDRL screening. Positive VDRL specimens were subjected to a specific treponema test (Fluorescent treponema antibody absorption FTA-ABS) test for confirmatory diagnosis and treatment was given immediately by the clinical officer in the clinic. Data was then cleaned and entered into a Microsoft excel database for processing. This was later exported to SPSS version 22.0 for analysis. Descriptive data were presented using frequency tables, graphs and pie-charts. Inferential statistics were done using Chi-square to establish the relationship between variables. Qualitative data from KII was triangulated with quantitative data as direct quotes or narrations from respondents. The study found out that the prevalence of syphilis among MSMs in Nairobi stood at 18.9%. From Chi-Square analysis, the study revealed significant relationship between knowledge factors, risk factors and attitude towards syphilis infection. Transmission mode (p=0.001), frequency of syphilis testing (p=0.001), knowledge on syphilis reinfection (p=0.011), sexual orientation (p=0.005), number of sexual partners (p=0.001), isolation among MSMs (p=0.034), inconsistent use of condoms (p=0.001) and being afraid of syphilis infection (p=0.001) played a significant role in syphilis infection among respondents. These results will be presented to NASCOP and other NGOS and recommendations advised accordingly. These research findings would assist key healthcare stakeholders to design strategic policies and initiatives to address the challenges faced by MSMs in acquiring healthcare services. This would in turn reduce the rising prevalence of syphilis infections among MSMs in Kenya.

DEMAND FOR HEALTH INSURANCE AMONG THE ELDERLY IN NAIROBI CITY COUNTY, KENYA

Nelly Saiti Barasa-M.PH

Department: Health Management and Informatics

Supervisors: Dr. Yitambe Andrea

Dr. Korir Julius
The aging population is likely to increase the demand for health care services and social support in Kenya. In 2005, the 58th world health assembly called for health systems to move towards Universal Health Coverage (UHC). The Kenyan government revised the 2009 National Policy on older persons and ageing which recognizes older persons as an important segment of National Population whose rights must be recognized, respected, protected and promoted. With growing numbers of older persons and the existing limited resources, these efforts may not be felt by those who rely on their individual savings for use to access care. This study therefore sought to investigate the demand for health insurance among the elderly in Nairobi City County, Kenya. The variables tested were socio-demographic characteristics, health system characteristics, actual barriers, knowledge and practices and the demand for health insurance. The study adopted a descriptive cross-sectional survey research design. A multi-stage sampling approach was used. Nairobi North Administrative Unit was purposively sampled as the study area in Nairobi City County. Proportionate sampling approach was used to allow for equal allocation of sample representatives in the area. Data collection tools employed were household questionnaires for quantitative data while Focus Group Discussion and Key Informant Interviews for qualitative data. Quantitative data was analysed by STATA to assess association and relationship between variables by applying both chi-square and binary logistic regression technique. Qualitative data was analysed using thematic content analysis with QSR Nvivo. The findings showed that the proportion of the elderly without health insurance cover was at 67%. Majority (36%) of those with health insurance were covered under the National health insurance scheme. For socio-demographic characteristics, income ($\chi^2 = 42.004$, $p = 0.001$) and education ($\chi^2 = 48.572$, $p = 0.001$) were associated with demand for health insurance while for health system factors, being comfortable paying premium to health insurance firm ($\chi^2 = 73.302$, $p = 0.0001$), health insurance affordability ($\chi^2 = 95.262$, $p = 0.001$), health care workers offering information on health insurance ($\chi^2 = 46.512$, $p = 0.001$) and health care providers asking for health insurance card from clients ($\chi^2 = 37.804$, $p = 0.001$) were associated with demand for health insurance. Age ($\chi^2 = 4.675$, $p = 0.031$) as a barrier was associated to demand for health insurance. The study found that the coefficient of education level represented by any post-secondary education (1.37497, $p = 0.008 < 0.05$) and of having ever heard of health insurance (2.857381, $p = 0.012 > 0.05$) was positive and statistically significant at 5% level. The coefficient of health insurance being affordable (1.515318), comfortable paying premium (1.171559) was positive and statistically significant at 1% level respectively. The null hypothesis for this study was rejected as socio-demographic characteristics, health system factors, actual barriers, knowledge and practices significantly influenced demand for health insurance. The study recommends National Health Insurance Fund (NHIF) to increase enrolment so that the elderly with limited access to financial resources and education are able to benefit especially from the recent government development on health insurance subsidy program for the elderly. Insurance companies should scale up introduction of health insurance in remote areas so that more elderly people are able to access and enroll.

**EVALUATION OF THE IMPLEMENTATION OF WATER, SANITATION AND HYGIENE POLICY COMPONENT IN OL KALOU PRIMARY SCHOOLS NYANDARUA COUNTY, KENYA**

Josphine Wanja Muiru-M.PH

Department/: Community Health
Supervisors: Dr. Joseph K. Muriithi  
Dr. George Kimathi

Water, sanitation, and hygiene is a combination of technical and human development components that are essential to produce a healthy school environment and support appropriate health and hygienic behavior. Adequate and appropriate provision of water and sanitation facilities in schools is linked to the achievement of sustainable development goal. There is a deliberate effort to improve water hygiene and sanitation programme in schools, but information on the progress is limited. The main objective was to evaluate the implementation status of water hygiene and sanitation component in primary school based on the Kenya School Health Policy in Ol kalou Sub County, Nyandarua County. Specific objectives were to establish awareness level of head teachers and pupils on WASH, to find out the attitudes of head teachers and pupils towards WASH, to evaluate the availability of water and sanitation facilities in schools, to describe hygiene and sanitation practices among pupils and evaluate availability, status, and adequacy of sanitation facilities in schools. It was a descriptive cross-sectional study. Simple random method was used to select school that participated in the focus group discussion and key informant interview. Schools that participated in the focus group discussions were 10. Key informants who were the chairpersons of school management committees were selected purposively and they were 10. A total of 111 head teachers were interviewed using interviewer schedule and observation checklist were filled for 111 schools. Data collected was both qualitative and quantitative. Association between variables was assessed using chi-square test majority of head teachers at 77% were not aware of the existence of the school health policy. Awareness on diseases that are transmitted by lack of or inadequate WASH facilities was high as all the head teachers could mention at least one disease with cholera being the most known at 86.4%. Awareness of pupils on WASH was high as Majority of the pupils knew at least three critical times when hand washing is important, and they had a positive attitude towards WASH. All the schools had toilets available within the school compound. There was no school where teachers were sharing toilets with the pupils. Schools that had constructed toilets in the past five years stood at 65%, but the policy target was 70%. Majority 81% of the schools had adequate toilets for girls. Boys’ urinals were inadequate in the majority of the schools at 75%. Water storage facilities were available only in 57% of the school compared to the target of 78% in the policy. Hand washing practice among pupils was very low at 33%, and 92% of the schools had dirty toilets during the study period. No relationship was established between the opinion of head teachers on the importance of WASH in school and budget allocation (p>0.05), but there was a relationship between type of school ownership and availability of water storage tanks and adequacy of boys’ urinals (p<0.05). The study concluded that awareness level of teachers and pupils on WASH was high. Pupils and teachers had positive attitude towards WASH. Boys’ and girls’ toilets are adequate in majority of the schools. Majority adequate urinals for boys and lack hand washing facilities. Sanitary facilities are not well maintained. The sub-county had not met the targets for construction of new toilets and provision of water storage facilities. The study recommends that school health policy be disseminated and copies of the same availed in schools. Adequate urinals for boys and hand washing facilities should be provided. Routine maintenance of the WASH facilities should be done more regularly with adequate supervision by the head teachers.
MALE PARTNER INVOLVEMENT IN UTILIZATION OF PRECONCEPTION CARE IN NAIROBI CITY COUNTY, KENYA

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This study sought to establish male partner involvement in preconception care utilization among men in Embakasi East Sub-county, Nairobi City County, Kenya. The study specifically sought to determine the proportion of men involved in preconception care, their knowledge levels, attitude, existence of spousal communication and challenges affecting male partner involvement in preconception care utilization. Most men are the breadwinners of their families and sole decision makers; this makes them have a strong influence on women’s health and their access to care. However, it is evident that most men are not involved in preconception care as matters of childbearing are left to women. The study employed descriptive cross-sectional community based study design. The study used both quantitative and qualitative data collection methods. The study targeted a sample size of 422 respondents, who were systematic sampled for study. Quantitative data was collected using semi-structured questionnaires while qualitative data was collected using focused group discussion guides with study respondents and key informant interview schedules with female partners. Quantitative data was analyzed using Statistical Package for Social Sciences version 22.0. The results were presented in frequency tables, charts, percentages and graphs. Qualitative data was triangulated with quantitative data as direct quotes or narrations from focused group discussion and key informant interview respondents. Inferential statistics were done using Chi Square tests to determine the association between study variables at 95% confidence interval (p<0.05). The results revealed that only 35% of respondents were involved in utilization of preconception care services. 65% of respondents had low knowledge levels which was significantly associated (p=0.031) with utilization of preconception care. 64% of respondents had negative attitude towards male involvement in preconception care utilization. Spousal communication aspects such as respect for one another’s opinion (p=0.018), commitment to relationship (p=0.001) and talking about preconception care (p=0.013) were associated with male partner involvement in preconception care utilization. The study further revealed that challenges which impeded male involvement in preconception care utilization included lack of access to health facility (p=0.003), time to accompany partners to seek medical care (p=0.002) and institutional practices (p=0.001). The study therefore, revealed low rates of male partner involvement in utilization of preconception care, which was attributed to low knowledge levels and negative attitude towards its utilization. Furthermore, there were low rates (35%) of utilization of male partner involvement in preconception care utilization in Embakasi East sub-county. The study recommends creation of awareness and sensitization programs to the general public through health messages to improve male partner involvement in preconception care utilization.
The burden of diabetes is reflected not only in the increasing numbers of people with diabetes, but also in the growing numbers of premature deaths due to diabetes. One measure of burden of disease is disability-adjusted life years (DALYs), which combines estimates of years of life lost due to premature death (YLL) and years lived with disability (YLD) to count the total years of healthy life lost from disease and injury. In Kenya, Non-Communicable Diseases (NCDs) accounts for more than 50% of total hospital admissions and over 55% of hospital deaths. The major NCDs are cardiovascular conditions, cancers, diabetes, and chronic obstructive pulmonary diseases. In Kenya there were 1,976,337 NCDs cases in 2012. Nairobi and Kiambu led all other counties in NCDs with 155,899 and 126,754 cases respectively.

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The Kenyan health sector is predominantly financed by private sector sources (including out-of-pocket Expenses (OoPE) borne by patients, family members and relatives). However, there are only sparse data available from developing countries on the expenditure on diabetes care. Knowing the medical cost of diabetes is critical to understanding the long-term economic consequences of diabetes prevention. The broad objective of the study was to quantify the burden of Diabetes Mellitus among patients attending Thika level 5 Hospital, Kiambu County, Kenya. The study employed prospective prognostic study design and was carried out in Thika level 5 Hospital, Kiambu County. The study population comprised of diabetic patients attending outpatient diabetic clinic. The respondents were recruited into the study till saturation of 594 respondents. Data was collected for YLL, YLD, Direct costs and Indirect costs. EQ-5D-5L tool was used to measure HRQoL. Data analysis was done using SPSS, Microsoft Excel Worksheet and DISMOD II. The results showed that diabetic patient incurs a mean of KSHs 28,433 within six months (translating to approximately KSHs 56,866 per annum). According to the results from this study, 43% was attributed to direct costs while 57% for indirect costs spent by a diabetes patient. A total of 805/1000 DALYs was lost as a result of premature mortality and disability associated with diabetes. Most of the diabetes patients in the study had a reduced Health Related Quality of Life (HRQoL) as per the EQ-5D-5L tool with a mean VAS of 0.55. Knowledge on burden of diabetes especially medical cost of diabetes is critical to understanding the long-term economic consequences of diabetes prevention. Thus, assuming prevention costs can be kept sufficiently low, effective diabetes prevention efforts would likely lead to a reduction in long-term medical costs. The results of this study informs policy makers in Kiambu County and Ministry of Health on need to work towards comprehensive and sustainable solutions in regard to diabetes. Based on the study findings, it is recommended that the National government and Kiambu County government of Kiambu to give priority to diabetes disease by providing free insulin and oral glycemic drugs to diabetes patients. It also recommends that the National government and Kiambu County government to prioritize diabetes care by ensuring all patients subscribe to NHIF and to cover
management costs of diabetes, both for outpatient and in-patient services through NHIF, thereby reducing the economic burden of a diabetic patient and also improve HRQoL and reduce DALYs.

QUALITY OF LIFE OF INFORMAL CAREGIVERS OF PATIENTS WITH CHRONIC AND TERMINAL ILLNESS IN MURANG’A COUNTY, KENYA

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Patients in the chronic and terminal phases of a disease usually have complex healthcare needs. In Kenya, one of the great benefits of family members and other members in society is the willingness to provide care to relatives and friends who are suffering from a chronic or terminal disease. These care tasks are significant, but there is a strong consensus that caregivers experience negative effects to their emotional and psychological health. This study evaluated the relationships between providing care to a chronically or terminally ill patient and the caregiver’s emotional, psychological, social and physical well-being and quality of life. It also aimed at determining the information and knowledge needs that caregivers have. The study was a descriptive cross-sectional study involving structured questionnaires administered to patient-caregiver dyads. Data were collected, coded and analyzed using statistical tools. Descriptive and inferential statistics were used to draw conclusions and compare different sets of data. Women comprised 80.3% of all caregivers; with 65.0% of all caregivers being married and 21.7% being single. A quarter (25.6%) of the participants had completed secondary school while parents comprised 34.7% of caregivers to sick patients. Mean age of the caregivers was 43.7 (n = 360) and the mean duration of giving care in months was 64.6 (n = 360). More than a third of the caregivers (35.6%) spent 1 to 4 hours of their day taking care of the patients. The patients were majorly women (55.6%) in the age group 40-49 (25.3%) who were diagnosed with psychiatric/neurological diseases (23.0%) and heart/vascular diseases (20.0%).
Caregivers were not optimistic about the future. Slightly less than half (44.7%) of the participants had below average emotional well-being while 6.7% had very low emotional well-being. In terms of life satisfaction and social well-being, 9.4% were struggling and 21.1% were suffering. Caregivers with poor physical well-being were 23.6% while 39.4% of the caregivers were unhappy about caregiving. There was no evidence to suggest association between the patient’s gender ($\chi^2 = 0.595, df = 1, p = 0.441$), patient’s age-group ($\chi^2 = 4.921, df = 4, p = 0.296$) and the severity of the patient’s disease ($\chi^2 = 0.730, df = 2, p = 0.694$) and the caregiver quality of life. There was an association between the caregiver’s age group ($\chi^2 = 9.669, df = 4, p = 0.046$) and education level ($\chi^2 = 8.498, df = 2, p = 0.014$) to the caregiver quality of life. There was no association between the patient disease and the caregiver’s levels of happiness ($\chi^2 = 9.039, df = 12, p = 0.700$). Linear regression analysis revealed a relationship between the caregiver’s education level ($F(1,358) = 12.082, p = 0.001, R^2 = 0.033$), caregiver’s age ($F(1,358) = 12.290, p = 0.001, R^2 = 0.033$), and caregiver quality of life. When analyzed, the duration of giving care did not lower the number of hours spent daily in caregiving tasks. Multiple regression analysis showed that the caregiver age, caregiver level of education, duration of giving care and severity of patients’ disease statistically significantly predicted a caregiver’s quality of life ($F(4,355) = 4.22, p = 0.02, R^2 = 0.045$). Emotional and psychological well-being were affected with 51.4% of the caregivers reporting very low and below average well-being. The social and emotional well-being was also affected with responses between 0 and 4 being the most common for present and future assessments of well-being. In addition, 30.5% were suffering and 39.4% were unhappy about caregiving. Caregivers expressed the need for more information about their patients’ illnesses and also how to care for their patients better. This study recommended that health care providers should brief the caregiver on the patient’s illness to improve on optimism about caregiving. Trained health care workers should also visit homes to give care which would reduce the informal caregiver’s burden, improve energy and raise
confidence levels. Caregiver support groups should also be established while new techniques of patient care ought to be taught to reduce the time spent during caregiving. Counselling services for caregiver stress should be provided by health institutions. A caregiver booklet with information on caregiving should be given to all caregivers. Home visits from community health workers or community nurses should be carried out to enable caregivers to learn by observation. A larger and more regional study is needed to identify if there are differences in quality of life between informal caregivers in urban counties and in rural counties in Kenya. Other measurement tools can also be used to assess the caregiver’s quality of life, such as Quality Adjusted Life Years or Disability Adjusted Life Years. The work of the caregivers can also be viewed in the context of development frameworks such as the Sustainable Development Goals and Universal Health Coverage. Lastly, future research can be done to gauge if digital delivery of knowledge and information to caregivers through mobile and web technology can lead to an improvement in patient health outcomes and caregiver quality of life.

DISPOSAL METHODS OF HOUSEHOLD PHARMACEUTICALS IN GATUNDU, KIAMBU COUNTY, KENYA

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There are serious environmental and physical consequences of improper pharmaceutical waste management. Pharmaceuticals are an emerging class of environmental contaminants. Both prescription and over-the-counter medicine use has increased and their presence in the environment has raised concern in the environmental and public health issues. The main objective of this study was to establish the disposal methods of household pharmaceuticals among residents of Gatundu Sub-County. This study employed descriptive cross-sectional study design in which both qualitative and quantitative data was collected. The research instruments employed to collect data were self-administered questionnaires for the household heads. 12 Community Health Units were proportionately selected out of the 24 units. The number of households sampled per community health unit was proportionate to the number of the
households in the particular unit. Systematic random sampling technique was then used to obtain the desired sample size of 384 households. Household heads or any other dependable adult present in the household at the time of questioning and had been residents of Gatundu Sub-County for six months and were willing to participate were illegible for participation. Those excluded in the study are those who met the inclusion criteria but were absent during the sampling or unwilling to participate. The entry point to the residents was the Gatundu Public Health Officer and the Community Health Volunteers who head the community health units. Data was analyzed using SPSS version 21 and presented using tables, and bar graphs. Majority of the respondents were found to have household pharmaceuticals at home (87%). Most of these threw the unused household pharmaceuticals in the toilet (27.9%) followed closely by 26.1% who threw it in the trash. These were found to be the main disposal methods of household pharmaceuticals among the residents. Majority of the residents (72%) had low level of knowledge on disposal methods of household pharmaceuticals. Chi square, $X^2$ was used to test for the association between the variables. Age, gender, religion, marital status, level of education, employment status, source of household pharmaceuticals and type of household pharmaceuticals often used were found to have significant influence on the disposal methods of household pharmaceuticals. The level of income and the frequency of use of household pharmaceuticals had no significant influence on disposal methods of household pharmaceuticals. The findings of this study exposed the situation on the ground as far as disposal methods of household pharmaceuticals is concerned hence a wake-up call to the Public Health Officer and other Sub-County authorities on patient education on proper ways of disposal of household pharmaceuticals. It also calls for enlightenment of residents on the effects of poor disposal of household pharmaceuticals in the study area.

ADOPTION OF COMMUNITY HYGIENE STRATEGIES FOR SAFE WATER AND SANITATION AMONG MOTHERS OF UNDERFIVES IN KITUI COUNTY, KENYA

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Inadequate access to safe drinking water, sanitation and hygiene constitutes a serious global threat to health accounting for approximately 4 billion cases of illness annually. Children under five years in the developing world are most affected, where nearly 1.6 million deaths are recorded annually due to diarrhea alone. This accounts for 15% of all deaths among under fives. Poor sanitation and hygiene practices are among the main factors associated with sanitary diseases. The purpose of this study was to analyze the adoption of community hygiene strategies to safe water and sanitation among mothers of under five year olds in Migwani Division, Kitui County, Kenya. Objectives guiding the study were: to determine adoption of community hygiene facilities for safe water and sanitation among mothers of under five year olds, to examine the prevalence of common sanitary diseases among children under five years old and to assess the influence of community hygiene practices on safe water and sanitation among mothers of under five year olds within Migwani Division, Kitui County. The study adopted a
descriptive survey research design. A sample of 94 mothers of children under 5 years old, 3 public health officers and 57 community health workers was used for the study. The total number of respondents was 154 and the response rate obtained was 89%. Data was collected using interview schedules, questionnaires and observation checklists. Quantitative data was coded to develop code sheet quantitative data. Qualitative data was thematically categorized and analyzed using Statistical Package for Social Science Version 20. Statistical analysis involved determination of percentages, means, standard deviation and logistic regression. The results of the study show that only 50.6% of the mothers had access to treated piped water with the rest using pond water, stream water or harvested rain water. More than 40% of the mothers used untreated water sourced from open wells, which increased water borne diseases among children. Toilets were observed in 89.9% of the homesteads with 10.1% practicing open defecation. Common sanitation and water borne diseases reported were worms, amoeba, diarrhea, and dysentery. Mothers who used both open well water and stream water were more likely to have children suffer from diarrhea compared to those who used piped water (9.37 for stream water, 9.42 open wells and 5.42 for piped water - p<0.05). Amoeba prevalence was 82.6% among children whose mothers were using untreated water. Majority of mothers (76.4%) lived more than 10km from water sources therefore forced to use unsafe water. Hand washing at critical times was at 94.4% meaning hygiene awareness was high, evidenced by 61.8% of homesteads with hand washing facilities outside toilets. High level of adoption of safe water and sanitation practices were: Availability and use of toilets, hand washing facilities, hand washing and treating drinking water. Medium level was access to safe water and participation in health programmes. Low adoption was evidenced by prevalence of sanitary diseases and long distances to water sources. Therefore, Community hygiene strategies and practices have great influence on levels of adoption of safe water and sanitation practices among mothers of children under five years old. Recommendations of the study are: community involvement in assessing their health, training of community health workers on concepts of health care and development, change in human behavior in community response towards disease outbreaks and emergencies and poverty alleviation in order to improve adoption of community hygiene strategies for safe water and sanitation.

UTILIZATION OF IMMUNIZATION SERVICES AMONG CHILDREN AGED UNDER FIVE IN KIRINYAGA COUNTY, KENYA

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Immunization is a key approach that can be successfully employed to reduce deaths and illnesses among children. Immunization presently averts an estimated 3 million deaths annually for children aged under five. Kenya Expanded Program on immunization has a stipulated immunization schedule guideline that
should be adhered to for effective utilization of immunization services for improved health outcome. The study was prompted by the alarming statistics on morbidities related to vaccine preventable diseases in a County where there has been a lot of intervention on immunization services. The main objective of the study was to investigate utilization of immunization services among children aged under five in Kirinyaga County, Kenya. The specific objectives were to assess the level of utilization of immunization services, establish the social-demographic factors associated with immunization services, determine health service factors influencing immunizing services and assess family factors associated with utilization of immunization services. A descriptive cross-sectional study was conducted in the community among 388 participants in the five sub-counties of Kirinyaga County. This was done through systematic random sampling of every 9th household. The respondents were interviewed through structured questionnaires. Children immunization record card was assessed for data entry. Data was analyzed by Social Statistical Package for Social Scientists (SPSS). Descriptive findings were presented in tables and bar graphs while inferential statistics used chi-square test to measure association between independent and dependent variables. P-Values equal to or less than 0.05 were considered statistically significant. The results showed that utilization of immunization services was not in compliance with the National Child Immunization Schedule that ensures maximum protection from vaccine preventable diseases. Measles 2 vaccine the last antigen in the schedule administered at 18 months had 58%. A confidence interval of 95% was adopted thus setting significant thresholds at 0.05 implying any threshold less than 0.05 was significant in affecting utilization of childhood immunization. The results indicated that socio-demographic factors such as age, gender, educational level, income levels had p-values (p<0.005) and were all significant factors that affected timely utilization of childhood immunization. Religion was found to have no effect on utilization and had p values (p>0.005) The health service factors such as waiting time, stock out of vaccine, rescheduling of vaccine and return dates had p values (p<0.05) and were all significant factors that affect utilization of immunization services negatively. Distance was found to have no effect on utilization (p>0.05) The study established that family factors had a strong statistical significant relation with utilization of immunization services such as myths and misconception, side effects, parity, sick children and lack of information and had p values (p<0.05). Birth order (p>0.005) was found to have no effect on utilization of immunization services. The Conclusion was that the levels of performance antigens was below the recommended target by WHO of 85%. It was recommended that health education program be carried out to improve utilization of immunization services and door to door campaign to trace and immunize defaulters.

PREVALENCE AND RISK FACTORS FOR SANITATION RELATED DISEASES IN LANG’ATA WOMEN AND NAIVASHA MAXIMUM PRISONS, KENYA

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Globally, 15 % of people live without any form of sanitation and 2.4 billion lack basic
sanitation. Despite proactive efforts by prisons authority to promote and implement
prisons health reforms, standards of sanitation in correctional facilities in most countries
are still low, and in some cases appalling. Prisons worldwide are known for having high
rates of communicable diseases which affect both prisoners and staff which exceed those
in the general population. To achieve good sanitation well-designed approaches are
required which need to be addressed in prison settings that are likely to inform behaviour
and structural changes. The main objective of this study was to determine prevalence and
risk factors for sanitation related diseases in selected Maximum correctional facilities in
Kenya being Lang’ata women and Naivasha Main prisons. The study adopted descriptive
research design involving 382 systematically sampled participants. Interviewer
administered questionnaires, key informant interviews, secondary data and checklist was
used. The results showed that overall prevalence was 63.5% with diarrhea, skin and
respiratory diseases at 40.4%, 34.6% and 24.2% respectively. Poor sanitation practices
were reported in the majority (65.7%) with major challenge being inaccessibility to
sanitation facilities, unhygienic and dirty toilets. Majority were highly knowledgeable at
70.8%. Sanitation related infections among inmates was found to be significantly
influenced by low level of education (p= 0.001); short stay of less than one year ( p=
0.045); category of the inmates ( OR 2.547 ( CI 1.185-5.475) p= 0.014); in-cell toilets ( OR
1.871 ( CI 1.012 - 3.457) p= 0.043); Infrequent solid waste collection ( OR 3.250 ( CI
1.154 - 9.153) p= 0.029); inmates not washing hands before meals, after visiting toilets
and ( OR 2.113 ( CI 1.362-3.278) p= 0.001, OR 1.632 ( CI 1.031-2.583) p= 0.036,
respectively); Infrequent bathing ( OR 1.760 ( CI 1.136-2.726) p= 0.01. Protective factor
was found to be hand washing with soap and water (OR 0.608 (CI 0.380-0.971) p= 0.037).
It is concluded that prevalence of sanitation related diseases was 63.5% higher than in
general population and more predominant in female inmates (74.6% & 61.1%
respectively), majority did not have good sanitation practices (65.73%), majority were highly knowledgeable on sanitation (70.8%). and significant predictors were low level of education, short stay, remand status, type of institution, in cell toilets-lack of flushing water and overcrowding, failure to observe handwashing critical times, lack of use of soap & water, poor personal hygiene and insufficient provision of sanitary facilities. The study recommends holistic and coordinated response from both Government, NGO’s and prison department to address sanitation in prisons. It also recommended that measures to control high burden of Sanitation Related morbidities, based on gender priority needs together with expansion of sanitation institutional infrastructure and provision of the institutional supportive mechanisms so as to ensure standard sanitation is recommended.

Need to establish independent written medical institutional policies and framework and implementation of the same for maintaining sanitation. A collaborative approach should be enhanced for Kenya prisons authority to work in hand with other stakeholders, interprisons sanitation best practices sharing forums and benchmarking the best prisons either within or without Kenya for better results is also recommended.

MAL
E PARTNER INVOLVEMENT IN CONTRACEPTIVE UPTAKE AMONGST URBAN SOMALI REFUGEES IN, NAIROBI COUNTY, KENYA

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Male partner involvement in contraceptive uptake is an important aspect of public health worldwide in the control of the upsurge of populations. Decisions about contraceptive use and childbearing may be confounded by unequal power relations, especially in more patriarchal societies as in the Somali community which emphasizes on male dominance in the culture. Male partner involvement in contraceptive uptake has been shown to greatly influence uptake and continuation rates. According to International Organization for migration (IOM) report of 2010, it indicated that current average use of modern contraceptives amongst urban Somali refugees was 20%, significantly lower than the KDHS report of 2009 at 46% for Kenyan women. The report also stated that the total fertility rate among the
Somali population is between 5.7 and 6.7, irrespective of their geographical location. The reproductive health of urban Somali refugees in Nairobi is an important issue for Kenya. Projections indicate that a large number of refugees migrating into towns will become permanent urban residents. The aim of the study was to identify male partner involvement in contraceptive uptake amongst Somali refugees in East Leigh, Nairobi County Kenya. This was a descriptive cross-sectional study utilizing quantitative and qualitative approaches targeting urban Somali refugee male partners living with a woman of the reproductive age in section 11 in East Leigh. Simple random sampling technique was used to get the 255 study participants, who were interviewed using semi-structured questionnaires. In addition, 2 Focused Group Discussions (FGDs) comprising 10 participants each was conducted using the FGD guide. Key informants from the health facility; 1 clinical officer and 4 FP nurses were interviewed using the Key Informant Interview (KII) questionnaire guide. The data from semi-structured questionnaires was analyzed using SPSS version 17.0 software. Descriptive statistics were generated and cross tabulation (Chi-Square test and Fischer’s exact test) was done for relationships of variables. Logistic regression was done to assess the effect of various explanatory variables on male partner involvement in contraceptive uptake. The recordings of the FGDs and KIIs were transcribed and main concepts identified. The qualitative data was triangulated with the quantitative data to enhance validity and reliability of the study. The results showed proportion of male partners involved in contraceptive uptake at 79.2%. The following factors influenced male partner involvement: Age when first started living with a woman (OR=3.46, p=0.048), Level of education(OR=3.44, p=0.003), Age(OR=2.76, p=0.044), Knowledge on available contraceptive methods (p=<0.001). The respondents who were aware of some methods that could be used to delay pregnancy had significantly more proportion of male involvement at 81.0%(OR=12.78, P=<0.001), 85.2% of the men reported that men should not be actively involved in issues of contraceptives at ( OR=3.44, P=<0.001). In conclusion, information sharing on importance and benefits of male partner involvement in contraceptive uptake should be strengthened in the health facilities and the urban Somali refugee community using community strategy to improve male partner involvement. Religious leaders need to be engaged and IEC done to dispel myths and misconceptions.

NURSES PERCEPTION OF HEALTHCARE SERVICES QUALITY IN SELECTED MISSION HOSPITALS IN KIAMBU COUNTY, KENYA

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In the last one decade, Kenya has adopted quality improvement initiatives in health facilities aimed at improvement of quality of care. However, quality gains are not yet optimal in both public and private sector. The private sector, which includes mission hospitals, face myriad of accusations and challenges ranging from perceptions of poor
regulation, unqualified health professionals, to gaps in monitoring quality of care. Therefore, the broad objective of this study is to assess nurses’ perception on the quality of healthcare services in mission hospitals in Kiambu County, Kenya. A descriptive cross-sectional study design employing mixed methods of data collection was used. Two of the highest volume mission hospitals in Kiambu County were selected from which simple random sampling technique was used to select 188 nurses who participated in the study while purposive sampling design was used to select fifteen key informants. Self-administered questionnaire using a 5-point liker scale questions was used to collect quantitative data from study respondents and a key informant guide was used to collect qualitative data from key informants. Descriptive statistics and simple linear regression analysis were used to analyze quantitative data using SPSS Version 20 while qualitative data was analyzed thematically using Nvivo. The nurse’s perception of quality of services was 3.62, which ranked as good quality. In regard to physical environment, the perception score was 3.43. Regression model showed that visual appearance of the hospital buildings (p=0.000) facility cleanliness and hygiene (p=0.006) modernization and proper maintenance of medical equipment (p=0.00), and having clear signs to direct patients and visitors (p=0.00), were associated with nurse’s perception of quality of services. In regard to service process, the perception score was 3.52. Regression model results showed that providing adequate time for patient-provider interaction (p=0.00), building good staff-seniors relationship (p=0.001), upholding patients’ rights (p=0.00), conducting satisfaction surveys to understand and address staff needs (p=0.013) and constituting effective quality improvement teams (p=0.00) was associated with nurses’ perceptions on the services’ quality level. In regards to management structures, the perception score was 3.33. Regression model results showed that allocation of adequate resources to improve quality of services (p=0.00), and implementing efficient inpatient
discharge procedures (p=0.001), were associated with nurses’ perceived quality of services. In regards to treatment services, perception score was 3.77. Regression model results showed that availability of qualified staff (p=0.00), adherence to standard operating procedures (p=0.007), providing medical tests within the facility (p=0.00) and providing good ambulatory care services (p=0.00) was associated with nurses’ perception of healthcare service quality. In conclusion, there is no significant difference between service quality perceptions among the studied mission hospitals. Nurses in mission hospitals have a fair perception of service quality with a substantial room for improvement. To address quality gaps in service delivery, the study recommends mission hospital management, comprising of hospital managers, head of departments, and the nursing regulatory bodies, to adopt use of effective quality improvement teams complemented by provision of adequate resource, promote adherence to standard operating procedures and ensure inclusive staff involvement in continuous quality improvement efforts in the facilities.

USE OF INSECTICIDE TREATED NET IN THE PREVENTION OF MALARIA AMONG JIGGERY AND TEA WORKERS IN KISII COUNTY KENYA

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Prof Alloys S.S. Orago

Insecticide- treated nets (ITNs) if used correctly are the most powerful malaria control intervention tools which have been recommended by most governments in the world. Yet up to date, use is still very low in some places with only three percent of African sleeping under an ITN and about 20 percent sleeping under any kind of net. Worse still, malaria continues to be the leading cause of mortality and morbidity among the Jaggery and tea workers in both sugar cane and tea industry. The main aim of this study was to assess the use of ITNs among the Jaggery and tea workers in the prevention of malaria in the South Mugirango Sub County, Kisii County. The specific objectives include; to establish the demographic and socioeconomic characteristics, to determine knowledge on the use of ITNs, to examine the perception of the ITNs use, to establish the level of ITNs use and to identify the factors that influence the ITNs use.
among the Jaggery and tea workers. The study adopted descriptive cross sectional design whereby both cluster, proportionate, purposive and snowball sampling approaches were used to get the sample size of 209 respondents from the Jaggery and tea workers to be interviewed. Data was collected using questionnaires, key informant interview and focused group discussions. Qualitative and quantitative data were transcribed; coded and categorized to come up with the emerging themes. Data was analyzed using SPSS version 20.0. Chi-Square was used to determine the relationship between variables. The results show low levels of ITNs use due to lack of knowledge and low level of income as (52.2%) of respondents did not know the difference between ITNs and non-treated nets. It was found that 56% of respondents were males with 44% being females. Most of the Jaggery and tea workers were aged between 29-39 years and 40-50 years with 41% and 26% respondents respectively. Education was significantly related (p<0.001) with ITNs use whereby 82.4% of non-users were found to have no education at all. Gender and occupation were significantly related with (p<0.001) and (p<0.003) and the use of ITNs respectively. Economic factors were also associated with ITNs use. The cost, accessibility and house structure were related with (p<0.010) and (p<0.001) and the use of ITNs respectively. The study found that weather was significantly related (p<0.001) with the use of ITNs among the Jaggery and tea workers. The study concludes that demographic and socio-economic characteristics were statistically associated (p<0.001) with the use of ITNs. Furthermore, knowledge, perception, level of use and factors such as accessibility and affordability were statistically related and influence ITNs utilization among the Jaggery and tea workers. This study recommends implementation of programs and policy formulation to empower the Jaggery and tea workers in education and economically through income generating activities to strengthen their resource base. Study results are useful in addressing ITNs utilization among the Jaggery and tea workers in the prevention of malaria in Kisii County, Kenya. It will also help the Kisii County government to redirect more resources to malaria prevention. Therefore, this study recommends the future research in the informal sector as well as low income earners as they were found to be the most malaria vulnerable group.

PERINATAL OUTCOMES OF FREE MATERNITY SERVICES IN MAMA LUCY KIBAKI HOSPITAL, NAIROBI COUNTY, KENYA

Kainde Musyoka-M.PH

Department: Population & Reproductive Health

Supervisors: Prof. Margaret Keraka

Dr. Olivia Wesula Lwande

The introduction of free maternity services in all public healthcare facilities in Kenya was the government’s initiative to decrease maternal morbidity and mortality and promote sustainable health for both the mother and infant. It has been a major step in the achievement of vision 2030 that aims at ensuring women from resource poor settings have access to maternal care. Objectives of the study included a comparison of the perinatal outcomes before and after implementation of the free maternity services, determine both health facility and staff factors
contributing to perinatal outcomes and also determine the maternal characteristics of women seeking free delivery services at MLKH. There is evidence of stagnation in addressing perinatal health in Kenya. The study adopted a cross-sectional descriptive survey design involving all women seeking free delivery services at Mama Lucy Kibaki hospital. Data was collected using both open-ended and closed-ended questions. Questionnaires were researcher administered where face-to-face standardized interviews with the respondents was conducted. Pretesting was done to ensure that the research tools tested what they intended to (validity) and that they consistently measure the variables in the study (reliability). Data was analyzed using SPSS software version 20. Chi-square test was used to test for the association between independent and dependent variables. The average monthly patient delivering at Mama Lucy Kibaki hospital at the time of the study was 630. From this population a study sample of 228 participants was obtained calculated using Fishers formulae 2003 and sample adjusted using Cochrans formulae (1977). 23 nurses (10%) of the study population were also interviewed to represent the key informants. Simple random sampling was used to get the study participants and convenient sampling used for the key informants. Data obtained from the study participants was analyzed, and the summary was written for the necessary explanation. The study findings showed that there was an increase in the number of women seeking FMS, and resultant increase in the number of good perinatal outcomes as well as a decrease in the number of poor perinatal outcomes. Further, the study showed that despite the FMS 60.2% of the mothers sought ANC services in the second semester with the majority not meeting the WHO recommended ANC visits. The study also showed that 88.5% of the women did not suffer any disease in pregnancy. 65.4% of the diseases suffered was anaemia with 80% of those who suffered being primigravidae. A correlation between the number of ANC visits and the perinatal outcomes was significant (x²=8.125, df=3, P=0.003). The trimester of ANC booking was also significant (x²=3.615, df=2, P=0.001). Despite the increased work load, the number of nurse’s supplies and equipment remained constant. The supplies and equipment’s inadequacy was reported by 100% of the key informants, while 87%. of the study respondents perceived that the supplies and equipment’s were inadequate. The study concluded that FMS has contributed to improved perinatal outcome and it recommended that pregnant women be sensitized on the importance of seeking ANC services immediately they are diagnosed pregnant, and further that the county government of Nairobi should boost the hospitals with supplies, equipment and human resource specifically nurses, so as to cope with the increased workload.

PREVALENCE OF DIETARY SUPPLEMENTS USE AND DIETARY PRACTICES AMONG TEACHERS IN PUBLIC SECONDARY SCHOOLS IN KIKUYU, KIAMBU COUNTY, KENYA

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The dietary supplements market is growing at an alarming rate despite dietary source being acknowledged as the primary and priority source of nutrients. Kenya’s dietary supplements market has experienced a steady growth since 2009 owing to increasingly busy lifestyles, growing health consciousness and disposable income among the general population. Little has been documented about use of dietary supplements in Kenya despite their increase in popularity. The purpose of this study was to determine the prevalence of dietary supplements use and dietary practices among teachers in public secondary schools in Kikuyu, Kiambu County. Teachers were chosen to represent the general population because it’s a homogeneous group, with average Kenyan income, evenly distributed across the country and hence opinion shapers in the community. The study adopted cross-sectional analytical study design with qualitative and quantitative methods in data collection, analysis and presentation. Researcher administered questionnaire and key informant interview guides were used to elicit information from the participants. Simple random sampling was used to select a sample of 178 teachers from 17 public secondary schools located in Kikuyu Sub-County while purposive sampling was used to select a sample of the key informants. Data was analyzed using SPSS version 22. Data from the 24 hour dietary recall was analyzed using Nutri-survey to obtain specific nutrients consumed. A P-value of <0.05 was considered statistically significant. The mean age of the teachers was 38.53 ± 9.75 years with most being between the ages of 41-50 years. Majority of the participants were females (60.7%), married (65.7%) had an undergraduate university degree (67.4%), and earned an average household income of >Ksh 50,000 (53.9%). Out of the possible 14 food groups, the mean DDS was 7.42 ± 1.40. The mean intakes for vitamin A, B6, iron and zinc (2300±4432, 1.43 ± 0.69; 28.39 ± 24.7; 14.40 ± 5.30 respectively) were found adequate as opposed to those of vitamin C, D and E as well as calcium (55.30 ± 27.09; 6.906 ± 4.59; 10.12 ± 5.697 and 703.04 ± 420.87 respectively) that fell below the RNIs. Consumption patterns showed high intake of starchy staples with rice and ugali having the highest intakes. There was moderate intake of proteins with high consumption of animal source foods while consumption of fruits and vegetables was low and moderate respectively. The prevalence of dietary supplements use was 28.7% with the most commonly consumed supplements being omega 3 and 6 (60.8%), calcium (56.9%) and multivitamins (19.6%). The main reasons for supplements use were medical reasons (59.6%), prevent deficiencies (29.8%) and to promote good health (25.5%). Key informants were used to give an insight on DS use. The main sources of information on dietary supplements use were health workers (68.6%) and internet (62.7%). Dietary supplements use was significantly associated with age (P<0.001), gender (P<0.000), marital status (P<0.006) and household income (P<0.049), with those above 40 years of age being 3.25 times more likely to use DS (AOR:3.2;C.I;1811-8.956; P value=0.023). Chi square test
further showed that DDS was significantly associated with DS use (P<0.045). Furthermore, there was significant relationship (p<0.05) between nutrient intake (vitamin A, C, iron and calcium) and dietary supplements use. Due to the increased number of people (28.7% prevalence) using dietary supplements among the general population, there is need for a solid foundation of regulatory framework to forestall consumer exploitation and promote their safety as well as prevent abuse of the products by consumers.

NUTRITION KNOWLEDGE, DIETARY PRACTICES AND NUTRITION STATUS OF PREGNANT ADOLESCENTS IN MANDERA COUNTY, KENYA

Mohamed Khalif Abdirahman-M.PH

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Dr. Joseph Kobia

Adolescent’s pregnancy is on the increase. This consequently has led to high morbidity, mortality among the born child. Appropriate mother’s nutrition status during pregnancy is essential for both the mother and the fetus. Dietary intake among pregnant adolescents is a key factor that influences their nutrition status and the birth outcome. Nutrition knowledge of the mothers has been shown to affect the dietary practices of the children. However, nutrition knowledge among pregnant adolescents is normally ignored. More research has focused on pregnant mothers in general with a little focus on those who are adolescents. In addition, there is inadequate information on nutrition status and dietary intake among pregnant adolescents. Thus, the study aimed to assess nutrition knowledge, dietary practices and nutrition status of pregnant adolescents. A cross sectional analytical design was used, to carry out the study in Mandera East Sub-County, Mandera County which is one of the ASAL areas in Kenya. A sample size of 258 pregnant adolescents visiting the various Health Facilities in Mandera East Sub-County was selected using a systematic sampling technique from hospital records. A researcher administered questionnaire was used for collecting data. Additional data was collected using focus group discussions guides and key informants interviews. Nutri-survey software was used to analyze dietary data for amount of nutrients consumed. Data was collected, entered and analyzed using SPSS. Pearson’s correlation coefficient was used assess the relationships between non-categorical variables while chi-square was used for categorical variables. Logistical regression analysis was used to assess prediction among variables. A probability value <0.05 was taken as significant. Qualitative data was analyzed to indicate the emerging themes. Results show that the proportion of the pregnant adolescents (22.1%) were unmarried and with up to primary level education (68.4%). They were mainly casual workers or pastoralists earning an average monthly income of 6,934± 625 KES. The mean nutrition knowledge score was 46.4 ± 6.8 was low with majority (47.5%) having moderate nutrition knowledge. The mean number of meals was 2.95 ± 0.6. The mean energy intake was 1850.5 ±33. Intake of energy and other micronutrients were below the recommended daily allowance apart from fat. The mean individual dietary diversity score was 5.64 ± 2.32 food groups. Cereals and oils/fats, flesh meat and milk and milk
products were the common foods consumed by most mothers. The nutrition status was poor 31.1% were underweight. About 36.1% of the mothers had been sick in the previous two weeks. The main illness were malaria and cough experienced by (33) 37.5% and (25) 28.4% of respondents, respectively. The nutrition knowledge score was shown to have a significant positive relationship with nutrition status ($r=0.069; P<0.001$) and morbidity status ($\chi^2 =121 \ df=6, P= <0.001$). There was a significant relationship ($r=0.069; P<0.033$) between the dietary diversity score and the nutrition status as well as with morbidity status ($r = 0.526; p= 0.005$). This study concludes that the nutrition knowledge of these mothers was low and led to poor nutrition status. The poor nutrition status was associated with inadequate dietary intake and frequent illness. The poor dietary practices were as a result of by low education level as well as low nutrition knowledge level which was in combination with lack of adequate income to procure food. The low education level and low income led to poor health seeking behavior and as such led to a higher morbidity status among the pregnant adolescents. This study recommends a policy on utilisation of the training package among health workers so as to help the mothers improve their care practices.

SATISFACTION LEVELS WITH MATERNITY SERVICES AMONG POSTNATAL WOMEN ATTENDING PUBLIC HOSPITALS IN NAIROBI CITY COUNTY, KENYA

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Dr Kenneth Rucha

Globally, the rate of maternal mortality is unacceptably on the rise. A considerable number of women are dying from pregnancy or child birth related complications across the world. Many initiatives have been intensified on policy intervention to curb the high cases of maternal mortality. Delivery in unhygienic conditions without the assistance of a skilled birth attendant may lead to adverse health outcomes. Maternal mortality rates in Kenya remain high at 362 per 100,000 live births. Only 62% of women deliver under the care of a skilled provider indicating a deficiency in the quality of care. The government of Kenya introduced the policy of Free Maternity Services to all women attending public health facilities by June 2013 to increase access to skilled care delivery and help reduce the rate of maternal mortality and morbidity in the country. The study sought to establish the satisfaction levels with free maternity services among postnatal women attending public hospitals in Nairobi City County. The study mainly focused on the individual client characteristics, the health provider related factors, the health system factors and the obstetric experiences associated with maternal satisfaction. The study adopted a descriptive cross-sectional facility-based study design which encompassed use of both quantitative and qualitative data collection methods. Quantitative data was collected
using pretested questionnaires administered to post-natal women by trained research assistants. Qualitative data was collected through Focused Group Discussion sessions with patients and Key Informant Interviews with care providers. A sample size of 417 postnatal mothers was proportionally selected from each hospital through systematic random sampling and interviewed. Kenyatta National Hospital, Pumwani maternity, Mbagathi and Mama Lucy Kibaki hospitals were purposively selected. Necessary approvals were sought from relevant authorities and informed consent obtained from research participants prior to data collection. Descriptive data was analyzed using Statistical Package for Social Sciences version 20.0 in conjunction with Microsoft Excel program. Frequency distribution tables, graphs and pie-charts were used for data presentation. Qualitative data was presented as direct quotes or narrations from respondents and triangulated with quantitative results. Inferential statistics were calculated using Chi-Square tests \((p<0.05)\) done at 95% confidence interval to establish the association between study variables. The study found out that the overall satisfaction level of respondents was 62.4%. Chi-square analysis revealed significant statistical association between age \((p=0.001)\), educational level \((p=0.001)\), occupation \((p=0.002)\), parity \((p=0.001)\), income \((p=0.001)\), provision of patient privacy \((p=0.001)\), involvement of patients in decision making \((p=0.007)\), listening to patient issues attentively \((p=0.003)\), availability of staff \((p=0.014)\), facility cleanliness \((p=0.002)\), availability of drugs \((p=0.006)\), sharing of beds \((p=0.034)\), antenatal care advice \((p=0.001)\), labour time \((p=0.001)\) and pain management \((p=0.001)\) with maternal satisfaction level. The study results indicated a sub-optimal maternal satisfaction level with maternity services among post-natal women attending public hospitals in Nairobi City County. These findings would assist key healthcare stakeholders to design strategic policies and initiatives to ensure sustenance of Free Maternity Services in the country. This would enable Human Resources for Health to provide services in an appealing treatment environment matched with adequate equipment, drugs and supplies. This would further ensure that the Free Maternity policy leads to improved quality of maternal service provision in all public hospitals thus increased satisfaction with care among women of reproductive age.

**SCHOOL OF HUMANITIES**

**DIGITAL DIPLOMACY: THE INTEGRATION OF INFORMATION COMMUNICATION TECHNOLOGIES IN KENYA’S MINISTRY OF FOREIGN AFFAIRS, 1963-2014**

Irene Nyambura Waithaka-M.A.

Department: International Relations and Diplomacy

Supervisors: Dr. Joseph Wasonga

Dr. Felicita Kinyanjui
This study delves into the implementation of digital diplomacy in Kenya’s Ministry of Foreign Affairs and International Trade. Digital diplomacy is a relatively new concept that is widely rolled out and researched in the developed countries. Developing countries are however still in the process of integrating ICTs in the conduct of public service. This study explored the integration process in Kenya’s Ministry of Foreign affairs and International Trade but with a bias to the sphere of diplomacy. This study’s core objective was to survey the use of ICTs in Kenya’s foreign policy and diplomatic trends. The researcher utilized Actor Network Theory as well as the three stages of e governance integration as articulated by the Centre for Democracy and Technology. In reference to the methodology, the researcher employed purposive sampling in the selection of departments and respondents that would provide pertinent information. Primary data was sourced from interviews as well as official Government of Kenya and Ministry of Foreign Affairs documents such as the strategic plan and foreign policy. Secondary data was sourced from journals, text books, theses, newspapers and online materials. The study demonstrated that the foreign policy in Kenya is often shaped by the Presidency and appointed Ministers in Foreign Affairs. Jomo Kenyatta’s Presidency was noted for having laid the foundation of Kenya’s foreign policy and employed a delegated approach in its management. President Moi exhibited presidential and peace diplomacy in the management of foreign policy. The Kibaki Presidency on the other hand espoused economic diplomacy while Uhuru Kenyatta’s presidency has edged towards presidential diplomacy given the many foreign trips taken. Kenya was noted to have taken a slow but gradual process in setting up the ICT infrastructure in the
country and more precisely at the MFA&IT. The results indicated that integration of technology in the ministry is informed by the desire to enhance administrative duties as well as offer better services to clients and international partners. Further, the study established that some of the common uses of ICT at the Ministry included online dissemination of information, online sharing of documents and memos as well as direct communication. The study established that indeed ICT is gradually being harnessed in the foreign policy and diplomatic processes. Thus enhanced information gathering, knowledge management, policy planning and coordination as well as implementation. In addition, the study demonstrated that diplomatic processes precisely bilateral and multilateral relations have changed in light of ICT integration. Some of the changes noted include heightened virtual representation, new ways of sharing documentations in international conferences, compressions in costs involved as well as enhanced ways of negotiations.

TRANSFORMATION IN THE ADMINISTRATION POLICE SERVICE IN KENYA, 1958 - 2010

Gladys Kirigo Wambugu - M.A.

Department: History

Supervisors: The police service in any society plays a crucial role in ensuring internal peace and security is achieved. There has been growing concern by the public on the role of the police officers which necessitated reforms in the police service in Kenya. This study sought to investigate the genesis of the administration police in Kenya, recruitment, and functions from 1958 to 2010. Data for this study was collected in Nyeri County. Guided by the rational choice and the neopatrimonial paradigms, the study sought to examine the premise that the police generally, and the administration police in particular, has been patronized and (mis)used by subsequent governments for their own goals. The study employed both primary and secondary data. Primary data was obtained through oral interviews and archival resources from the Kenya National and Nyeri County Archives. Data was obtained from former and current administration and regular police officers, former officers in the provincial administration, elders, educationists and members of the public with relevant knowledge on the transformation in the administration police. Secondary data was accessed from text books, journals and other materials from the Post Modern Library, of Kenyatta University, Jomo Kenyatta Memorial Library at the University of Nairobi and the Kenya National Library Services in Nyeri. Data analysis was done through corroboration
of different sets of data. Ethical issues pertaining to research were observed during the entire process of this study. The study established that Administration Police has undergone various transformations, from a regiment entity to a service to enhance efficiency and cooperation with Kenya Police. Similarly, the command structure also changed with the promulgation with both the AP and Kenya Police Service operating under one command. Steps have been made towards improved training and education through the establishment of Administration Police Training College – Embakasi. It has witnessed female officers joining the service some taking high ranks. Further studies should be done on gender dynamics in the Administration Police Service.

TRANSFORMATION IN THE PRACTICE OF WIDOW GUARDIANSHIP AMONG THE LUO OF KABUNDE, HOMABAY COUNTY, KENYA; 1920-2014

Sabato John Joel-M.A.

Department: History

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Dr. David Okelo

This study examined the transformation of the culture of widow guardianship among the Luo of Homa Bay County from 1920 to 2014. The study was guided by four objectives namely: to interrogate the importance of widow guardianship in Luo society, examine the extent to which colonialism and missionary activities affected the practice, analyze how the culture has been practiced in the post-colonial period among the Luo and investigate the extent to which it has been transformed in the context of HIV/AIDS. The study was based on the assumption that widow guardianship had psychosocial and economic importance in the Luo society however forces of colonialism and Christianity transformed the manner in which the practice was carried out in the colonial period and that the practice has continued to transform due to HIV/AIDS prevalence. The research was grounded on the social evolution theory which holds that culture generally evolves. The argument was therefore that since the culture gradually changes, the same is true to widow guardianship. The study involved use of various tools such as questionnaires and interviews to collect data. The research then employed qualitative method to analyze the collected data. The study established that widow guardianship had both psychosocial and economic importance in pre-colonial Luo society. However, due to the changing trends which have revolutionized the way people relate in the society, the practice has transformed beyond its cultural obligation. The research therefore recommended among other things that the government and other stakeholders need to step up rigorous sensitization to highlight the dangers that this long held cultural practice poses on the society.
Additionally, the state should develop measures of poverty eradication especially among the rural dwellers; the government should formulate and implement policies that fight inequality and more importantly, education should be made more affordable especially secondary and higher education. This would reduce the vulnerability of women which at times pushes them guardianship.

EVOLUTION AND GROWTH OF COFFEE COOPERATIVE SOCIETIES IN KIPKELION, KERICHO COUNTY, KENYA: 1923 – 2012

Soy Irene Chelangat-M.A.

Department: History

Supervisors: Dr. Susan Mwangi Owino
Dr. Peter Wafula Wekesa

The coffee cooperative sector by tradition has been organized into cooperatives in order to enhance its effectiveness and facilitate regulation. Cooperatives account for an estimated 65 percent of the coffee sector in Kenya. However in the last two decades beginning 1990, in the era of liberalization the ability of the coffee cooperative societies to deliver economic value to its members has raised a lot of concerns and debate. This is mainly because, coffee production declined by 61% in the cooperative sector between 1988 and 1998. Numerous studies have revealed that the coffee cooperative sector as the most mishandled and unproductive. Whether this is true or not required studies of this notion. It was therefore, pertinent to examine the state of coffee cooperative societies in Kipkelion, Kericho County given that Kipkelion was a colonial settlement and the origin of the first cooperative movement in Kenya. This study focused on evolution and growth of coffee cooperative societies in Kipkelion, Kericho County from the period 1923 – 2012. The study traced the emergence of coffee cooperative societies in Kipkelion, Kericho County during the colonial period to 1963; Secondly, it examined the growth and the transformation of the coffee cooperative societies in period of 1964 – 1980 and lastly, it analyzed the effects of Structural Adjustment Programmes and liberalization in the coffee cooperative societies in Kipkelion, Kericho county in the period between 1991 and 2012. Group theory and collective action theory were used with a view to analyze coffee cooperative emergence, growth and transformation. Historical research design was used in the study in which both qualitative and quantitative approaches were used in data collection and analysis. The study was carried out in Kipkelion, Kericho County and covered the areas of Chepkechei, Muhoroni, Forttenan, Koisagat, and Kapngetuny. Purposive sampling and convenience sampling techniques were applied in the selection of the target population. This enabled the researcher to collect data from different respondents. Primary and secondary sources of data were utilized. Data analysis was done by organizing data into concepts, themes and periods. Ethical considerations were adhered to. The findings revealed that coffee cooperatives in Kipkelion have their origin in the colonial era. The African participation in the cooperative sector was little before independence due to settler dominance. The attainment of independence brought about social,
economic and political changes in Kenya. Key was the structural changes in smallholder agriculture that included land ownership that consequently transformed the coffee sub-sector. On the other hand, liberalization of the coffee sector in the 1990s exposed coffee factories to competition among themselves and other firms which was resulting from entrance of new firms into the coffee sector. Moreover, factories have been obliged to streamline their operations to cope with competition. Farmers on the other hand have been playing a significant role in decision-making on matters affecting their societies and in the management of their societies and factories through elected representatives. This study is significant to the government, policymakers, researchers and coffee cooperatives especially in regard to understanding origin, growth and historical transformation of coffee cooperatives in Kipkelion and in comprehending the effects of liberalization on the coffee cooperatives. This study is anticipated to lay foundation for future research on the history of coffee cooperatives in Kericho County.

AN INVESTIGATION OF THE DRIVERS OF DIVERSIFICATION TO BANANA FARMING AMONG HOUSEHOLDS IN MERU COUNTY, KENYA

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Dr. Ishmail O. Mahiri

Banana farming is a practice carried out in many countries in the world for commercial and subsistence purpose. India is the world largest producer of banana and Uganda the second. However, Uganda is the leading producer of banana in Africa. On the other hand, Kenya is one of the countries practicing banana farming with several regions in the country growing the crop for subsistence and local markets. Meru County, specifically Imenti South sub-County, has embraced this activity with many households engaging in banana farming at a high rate. The study addressed the following specific objectives: to establish the extent of diversification to banana farming among households in Imenti South sub-County; to determine socio-economic factors influencing diversification to banana farming among households in Imenti South sub-County; to assess the benefits of diversification to banana farming among households and determine constraints of diversification to banana farming by the households in the study area. The study used a cross-sectional study design where quantitative and qualitative methods of data collection were applied. Quantitative data was collected using questionnaires while qualitative data was collected using key informant interview guides. A total of 388 farmers were selected using cluster sampling while 20 key informants were purposively selected to take part in the study. The study applied descriptive and regression which analyzed quantitative data using SPSS version 20. The qualitative data was also analyzed thematically using Nvivo software so as to understand the emerging themes in the study. In regard to extent of diversification, findings showed that 72% of the respondents had diversified to banana farming from coffee farming. In relation to socio-economic factors, age (p=0.033), education (p=0.014), average monthly income level (p=0.024), ecological area (p=0.021), land size (p=0.016); availability of labor (p=0.014); availability of farm inputs (p=0.024) and availability of hybrid seedlings (p=0.012) had a statistically significant relationship with banana diversification. In regard to benefits of
diversification, 86% of the respondents cited high market returns (profitability) and high crop productivity to be the main benefits of diversification. In regards to constraints of diversification, small land sizes (89%), inadequate farm inputs (76%) and shortage of water (73%) were the main constraints facing banana farming diversification. In conclusion, there is a high rate (72%) of diversification to banana farming which is driven by high crop returns and productivity of the banana crop. On socio-economic factors, higher education attainment, improved monthly income, bigger land sizes, ecological area positively affected diversification. However, lack of sufficient farmer support systems such as lack of sufficient water and inputs remains a key challenge for diversification to banana farming. Therefore, there is need for the government to develop and implement policy guidelines which create a supportive environment for diversification to banana farming such as proper market price regulation, supply of water to farms and easy access to production inputs to farmers.

CONTRIBUTION OF WORTH VILLAGE BANKING TO ECONOMIC EMPOWERMENT OF WOMEN IN SALVATION ARMY IN BUNGOMA COUNTY, KENYA.

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Economic empowerment of women is part of the holistic mission of the Salvation Army (SA) which evangelizes both in word and deed. The holistic mission of the SA aims at restoring the right relationship with God through redemption from both sin and economic disempowerment. In Kenya, particularly in Bungoma County, the SA executes her holistic mission through redemption from sin and economic empowerment of women using the Women of Worth (WORTH) program. This study explored the contribution of SA’s WORTH program to economic empowerment of women through WORTH village banks in Bungoma County, Kenya. The purpose of this study was to bring to light the activities of SA’s WORTH village banking program that economically empower women in the study area. Guiding objectives were first, to discuss the teachings of the SA on holistic transformation and redemption in relation to economic empowerment of women; second, to assess the contribution of the SA towards God’s mission of shalom in reference to economic empowerment of women. The third objective was to examine the nature of WORTH Village banking. Finally, the study sought to address the challenges facing WORTH village banking in its economic empowerment of women. The study is significant in assisting the SA in and outside the study area as well as other Christian denominations interested in coming up with sustainable economic empowerment initiatives for women and other vulnerable groups in the society. The study reviewed the literature related to the objectives. The study was conducted in Cheptais Ward, in Bungoma County because of poor penetration of formal women microfinance institutions. Holistic Christian Transformation and Social Gospel theories guided the study. Holistic Transformation theory advocates for transforming lives holistically and restoring relationships with God and humanity through the local church. The SA is an agent of this holistic transformation due to its ability to mobilize people for change. Through the WORTH Village banking program, it mobilizes women to accumulate savings and
use them for investment in income generating activities (IGAs). On the other hand, the Social Gospel Theory attempts to bring the Kingdom of God on earth by using the Church to address the contextual social and economic realities in the society. The researcher employed the descriptive research design to gather both primary and secondary data. This was because it allowed the researcher to conduct in-depth interviews, focused group discussions (FGDs) and observations. Simple random and purposive samplings were used to select 136 respondents who participated in the study from a study population of 351 members and leaders of WORTH groups. Quantitative data was analyzed using descriptive statistics and presented in form of frequencies, tables, graphs and charts. Qualitative data was organized into study themes and presented in form verbatim and narratives. The study findings revealed that the SA’s WORTH village banking has enabled women to become economically independent by reducing the financial dependence on men. Further, inadequate skills and knowledge on investment as well as inadequate loan capital have thwarted efforts to investment in IGAs. The study recommends the need for WORTH groups to form linkages with formal microfinance institutions (MFIs) and Uwezo Fund so as to boost the loan capital. It also calls the successful investors through WORTH program to share their stories so as to inspire the other member

SOCIAL VALUES IN YOUNG ADULTS NOVELS: A STUDY OF SELECTED WORKS BY NAHIDA ESMAIL

Moikan Senyi-M.A

Department: Literature

Supervisors: Prof. John Mugub

Dr. Macharia Mwangi

This study focused on the critical investigation of social values in three Young Adults novels by Nahida Esmail: Living in the Shade (2011), The Detective of Shangani: The Mystery of the Lost Rubies (2014) and Lessilie the City Maasai (2011). The novels address issues about Young Adults (YA) as they are employed by the author of the selected novels. Young Adult Literature (YAL) is a genre that both adults and young adults love to read because of its small size and simplicity. The study was undertaken in order to establish, analyse and bring to limelight the social values portrayed by the author, explore the literary devices that the author employs to communicate social values and explore the author’s social vision with regard to the youth in her society. The study employs two theories, Sociological literary theory and Formalism to analyse the three novels. Sociological literary theory was crucial because it helped the researcher to analyse the novels by examining how the social functions in literature and how literature works in the society, while formalism enabled the researcher to read the novels closely as the independent entities. This being a subjective study, the researcher applies the descriptive approach to understand and appreciate philosophical issues found in the novels and brings them to limelight as she associates them with practical social life. The researcher uses purposive sampling to get the three novels for the study. The data were obtained from the three young adult novels, library researches, journals, periodicals and other relevant materials. These data were also used to enhance and enrich the work. The objectives of the study were achieved through extensive reading and analysis of the three novels. Therefore, the Social values which were established, analyzed and brought to limelight from reading the
three novels in different perspectives and the specific literary devices used to underscore such social values, are compared with other data from different texts, articles, theses and journals to validate and support the findings. The study also describes the author Social vision about the Youth in her society and recommends literary studies on Esmail"s social vision using works which have not been sampled in this analysis and as well as on YAs novels by other contemporary African writers from Tanzania and beyond. The study has, however prescribes that every scholar who is a literary writer, creating for YA has to ensure that the subject of any literary text they write for YA is about YA and it revolves on the centre of their learning experiences and they should stick on doing studies on youth to enlighten them with their potential cultural aspects or communal ethos that make them to be valued and accepted in their communities.

PROTRACTERED CONFLICT IN MT. ELGON REGION (1963 - 2008): TOWARDS A MULTI-CAUSAL ANALYSIS

Caleb Maikuma Wafula-M.A

Department: History, Archeology and Political Studies

Supervisors: Dr. Joseph O. Wasonga
Mr. Peter Mbae

This study set out to examine the protracted nature of the Mt. Elgon conflict and the motivations driving it. The thesis of the study was that a multi-causal analysis of protracted conflicts provides a basis for a more comprehensive approach to conflict management and conflict transformation. The main objective of the study was to find out what has fueled and sustained the conflict in Mt. Elgon region. This is because the Mt. Elgon conflict has proven difficult to bring to an end. The choice of the study location was motivated by a number of factors such as the area being prone to political instability and violence resulting from complex and rapidly changing social economic dynamics. In addition, there is paucity of literature on the protracted nature of the conflict in Mt. Elgon region and on the motivations driving it. Methodologically, the study adopted a qualitative design, drawing from both primary and secondary sources in my discussion. This study used Edward Azar’s theory of Protracted Social Conflict (PSC) and conflict trap theory by Paul Collier, V.L. Elliott, Harvard Hegre, Ankle Hoeffler, Marta Reynal-Querol and Nicholas Sambanis (2003) as its analytical tools. These theories were purposely selected to explain and enhance the understanding of each of the variables affecting the research questions. The study examined Kenya’s historical and political development and established that the conflict in Mt. Elgon region has partly been contributed by the different regimes in independent Kenya. Consequently, the study found out that Mt. Elgon conflict is motivated by a number of factors among them land distribution, marginalization, shortchanging of the people of Mt. Elgon among other factors. The research recommends that there is need for full implementation of the devolution agenda, developing national consciousness, working on practical land reforms and lastly, need for justice and reconciliation in Mt. Elgon.

ASSESSING THE ROLE OF DEMAND AND SUPPLY ASPECTS IN BOOK PIRACY: CASE OF NAIROBI CITY COUNTY, KENYA
Piracy is a willful theft of intellectual and creative efforts of others due to increased demand for academic books in our learning institutions. It is a social and economic menace that involves the outright reproduction and distribution of the creative works of others, for commercial purposes, without the consent of the copyright owner. The general objective of the study was to establish the determinants of book piracy in Nairobi City County. The specific objectives were to determine the practices and patterns and to investigate the demand side, supply side and legislative/legal side determinants of book piracy in Nairobi City County. This study employed descriptive design. The target population for this study street vendors, secondary school teachers and parents, book shop owners and consultant firms' employees. A sample consisted of 170 respondents. The quantitative data were collected using semi-structured questionnaires while qualitative data were collected using Key Informant Interview (KII) guide. The tools were pre-tested for reliability and validity. Statistical Package for Social Sciences (SPSS) was used to analyze data. Descriptive statistics were used to summarize the results. Chi-square ($\chi^2$) was used to determine the relationship between independent and dependent variables. Significance level 0.05 was used. Approval to undertake research was granted by the graduate school of Kenyatta University and permission obtained from National Commission for Science, Technology and Innovation (NACOSTI). Informed consent was sought from all participants. The results indicated that 41 (27.3%) of the respondents agreed to have photocopied and sold hardcopies of original books, followed by printing at 40 (26.7%), then scanning at 37 (24.7%) and the least was downloading and distributing online at 28 (18.7%) without authorisation. Chi-square ($\chi^2$) was used to ascertain the association between education level and engagement in book piracy. The analysis revealed a significant relationship $\chi^2=10.205$, DF=3, $P=0.017$ with an effect size of 0.31 based on Cramer’s $V$. Further, descriptive analysis used revealed that 43.5% of the supply side respondents had access to internet, 34.8% had access to scanners and printers and the least (21.7%) had access to photocopy machines. The relationship between access to technology and book piracy was sought. According to Chi Square analysis, access to technology had a significant association with book piracy ($\chi^2=6.955; DF=2, P=0.031$) with an effect size of 0.43 based on Cramer’s $V$ test. Finally, the findings on the law of enforcement revealed that 129 (88.4%) of the respondents indicated that the enforcement was not efficient or adequate. Only 17 (11.6%) respondents indicated that enforcement of the law on book piracy was sufficient. The results of chi-square also indicated that there was a significant relationship between lack of law enforcement and the level of engagement in book piracy ($\chi^2=5.293; DF=1, P=0.021$) with effect size of 0.19. In conclusion the research findings showed that demand side, supply side and legal/legislation side have positive and significant effects on book piracy in Nairobi City County. The research recommends among others that there is need to supply cheaper books to local readers to discourage buying of pirated books. The right holders should protect their works by putting special copyright features. Kenya Copyright Board should create awareness to all stakeholders on the legal issues associated with on book piracy.
DETERMINANTS OF CONTRACEPTIVE USE AMONG WOMEN IN KAITI DIVISION, MAKUENI COUNTY, KENYA

Hannington Kiio Kinyungu-M.A.

Department: Geography

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The purpose of this study was to investigate determinants in the use of contraceptives among women in Kaiti Division, Makueni County, Kenya. The division experiences a high fertility rate and a high population density which requires proactive measures to control a likely increase of population in the area. The general objective of the study was to explore factors determining the use of contraceptives among married women or women in the union in Kaiti Division, Makueni County. The study was conducted within the framework of the Revised Bongaarts Model of the Proximate Determinants of Fertility. A descriptive research design was selected to guide the study. Purposive, stratified and simple random sampling methods were applied to select samples in this study. Data was collected from 323 females using the questionnaire method and from 11 Key Informants using Interview Guide. The SPSS computer programme was used to organize the data. A total of 13 independent variables were tested in this study. Results of the analysed data showed that awareness was significant in determining contraceptive use. However, age of a woman, marital status, number of children, level of education, income, fear of side effects, religion, denomination among Christian adherents, ease in obtaining contraceptives, availability of contraceptives services, sources of contraceptives and methods of obtaining contraceptives were not significant. Further, the study has identified the feared side effects as cancer, barrenness, high blood pressure, headaches and vomiting, promoting the spread of STDs, low libido, paralysis, being fat or thin, swollen legs, giving birth to disabled children, heart attack, not receiving menses and having painful sex. Finally, it was established that there were high opportunities for obtaining contraceptive services in Kaiti Division, which promoted their use by women in the division. To ensure effectiveness in the use of contraceptives, the following recommendations were made: The government should take a more active role in the provision of contraceptive services in Kaiti Division so that all women, including the very poor, can access them; the channels for distributing contraceptives should be diversified so that they can easily be available to the women in Kaiti Division; finally, health workers in the division should be facilitated to reach as many women as possible in Kaiti Division, Makueni County.

IMPACT OF WOMEN ENTERPRISE FUND ON WOMEN’S SOCIO-ECONOMIC EMPOWERMENT IN NAKURU COUNTY- KENYA

Anne Auma Opil-M.A.

Department: Sociology

Supervisors: Prof. Elishiba Kimani
Dr. Casper Masiga

The study sought to investigate the impact of Women Enterprise Fund on the empowerment of women in Nakuru County Kenya. The study objectives were; to establish the demographic characteristics of women who obtained funds from WEF, examine how women had utilized the same funds, identify the challenges women faced in accessing and utilizing the funds, establish the impact of WEF on women’s socio-economic empowerment and come up with the strategies that could enhance accessing and utilization of the funds from WEF by women. The study was guided by Sara Longwe’s framework on Economic empowerment. A descriptive research design was used in the study. Data was generated through Focused Group Discussions with randomly selected women groups, and interviews with the officials of the Women Enterprise Fund. Qualitative data was cleaned, sorted and analyzed based on the common themes which were generated from the study objectives. The study results indicated that many of the women in the groups were married with an average of five to ten dependents. The funds received from WEF were utilized in various business enterprises and projects ranging from livestock rearing, poultry farming, construction of rental houses and starting up business enterprises. The study also established that the women were empowered both socially and economically in that they acquired trainings which accorded them opportunities to share information with others in addition to increased income from income generating activities which supplemented their other sources of income. The study further identified a number of challenges experienced by the women groups while accessing the fund these included; stringent fund policies, lack of information, delays in loan disbursement, low loan limits and spousal consent. Challenges encountered while utilizing the funds included; limited and shrinking market, lack of skills, spousal demand of the fund, emerging family needs and loss of funds due to uncalculated spending. The strategies identified to address the challenges during accessing the funds were increasing the loan amounts, individual loan lending and reviewing the lending policies so that they are flexible to individual lending as opposed to strictly lending to women in groups. Strategies addressing challenges experienced while utilizing the funds were; timely disbursement of the loans, regular and continuous trainings and sensitization forums.

GENDER LABOUR RELATIONS IN SELECTED INDUSTRIES IN THIKA, KIAMBU COUNTY, KENYA, 1945 - 2010

Gituma Doris Kanorio-M.A.

Department: History, Archeology and Political Studies

Supervisors: Dr. Felix Kiruthu

Dr. Felistus Kinyanjui

This study examined gender labour relations in some manufacturing industries in Thika, Kiambu County. It mainly focused on the formal industries, covering the period between 1945 and 2010. The study was guided by three objectives with first one examining the historical development of industries within Thika Town Constituency between 1945 and 1963. The second objective focused the effect of those industries on gender relations from 1963 to 1985 whereas the third objective examined the impact of the Structural Adjustment Programmes (SAPs) on gender relations from 1985 up to 2010. The data
collection methods entailed descriptive research design with an interview guide, which was designed to collect qualitative information on gender labour relations. Purposive sampling technique was used targeting 33 respondents mainly males and females aged between 20 to 80 years. The sample population included the former and current workers of the existing and collapsed industries, officials from labour office, development officer, social services officer and local administrators within Thika Town Constituency. In addition, data was collected from primary and secondary sources. Primary data included oral interviews and archival sources from Kenya National Archives and government papers. Secondary information was obtained from the Post-Modern Library (Kenyatta University) and Jomo Kenyatta Memorial Library (University of Nairobi), Kenya National Libraries (Thika branch) and department of labour in Thika Town Constituency. The information gathered was organized into historical themes and analysed using gender analysis theory. This is because gender-based analysis deviates from women issues to consider structures that are affected by both men and women. The study revealed that although education could be necessary, it is not a sufficient condition to explain the inequality and discrimination existing for the employment of women within the manufacturing industries. In addition, it revealed that gender differences provide a mechanism, which provides a limited range of occupation options for women and consequently hindering their job opportunities.

DETERMINANTS OF WOMEN’S INVOLVEMENT IN COACHING INDIVIDUAL AND TEAM SPORTS IN NAIROBI CITY COUNTY, KENYA

Gitau Kariuki-M.A.

Department: Sociology

Supervisors: Dr. Pacificah Okemwa

Prof. Elijah Gitonga

This study sought to investigate the involvement of women in coaching individual and team sports in Nairobi City County, Kenya. Specifically the study focused on: establishing and distinguishing between participation of women and men in coaching individual and team sports, assessing the factors influencing women’s participation in coaching individual and team sports, determining the challenges faced by women in individual and team sports coaching and identifying strategies to address the challenges faced by women in individual and team sports coaching. The Social Dominance Theory (SDT) guided the study. The study was conducted using a descriptive survey research design. It involved a broad category of issues related to women’s participation in coaching sports in Nairobi City County. The population for the study comprised women and men involved in both individual and team sports in Nairobi City County. Stratified random sampling was employed to select a sample of 164 women and men in individual and team sports. The coaches and heads of organizations who participated in the study were selected through purposive sampling. The involvement in coaching in individual and team sports is skewed towards men. Factors influencing women’s involvement in coaching individual and team sports include family constraints, attitudes, perceptions and resources. The challenges are lack of clear career pathways and administrative support, competition from men and the high cost of training with minimal returns. Proposed strategies to enhance women’s involvement include workshops, proper
remuneration, change in stereotyping women involved in coaching sports, courses targeting women with flexible learning modes, promotion of women coaches and coaching, and sponsorship through sports organizations. The conclusions of the study are that few women than men coached individual and team sports in Nairobi City County, gender related factors and challenges influenced women’s participation in coaching individual and team sports, which if addressed could mitigate the situation. The study recommends further investigations that would establish how many women athletes’ transit to coaching compared to their male counterparts; and to address the lack of awareness of initiatives put in place to support their involvement in coaching sports.

AN INVESTIGATION OF LANGUAGE AND CULTURAL BARRIERS TO EFFECTIVE COMMUNICATION OF INFORMATION ON CANCER IN KENYA

Peter Mbugua-M.A.

Department: English and Linguistics

Supervisors: Dr. Phyllis W. Mwangi

Dr. Eunice Nyamasyo

This study set out with three objectives. First was to establish whether the information on cancer was physically available to the Kenyan public. Secondly was to ascertain whether the public was able to linguistically access the information availed to them. Thirdly was to identify the kind of language and cultural challenges encountered during face-to-face communication between health practitioners and the public. The research was guided by Bachaman and Palmer’s Communicative Language Ability model as well as Grice’s Theory of Conversational Implicature. Elements of both quantitative and qualitative design were incorporated into the study. First, library sources provided quantitative data on information on breast, cervical and prostate cancers that was availed to the public via mass media. Secondly, primary data was collected from the public in Kiambu and Nairobi counties using a questionnaire, comprehension tests and cloze tests. This data helped to ascertain whether the information on breast, cervical and prostate cancers was linguistically accessible to the public. Lastly, structured personal interviews were used to collect qualitative data on language and cultural challenges encountered during face-to-face communication between conventional medical practitioners and the public. In order to establish how the variables of sex, age, level of education and linguistic codes of conveyance associated with linguistic accessibility, Pearson Correlation Coefficient index was computed. The research found that breast, cervical and prostate cancers were featured in more than half of the information available to the public. Of the three cancers, breast cancer received the widest coverage. Information on cancer management also received the widest coverage while the aspect of prevention was least covered. The newspaper and English language were most dominant medium and language of conveyance respectively. Considering linguistic accessibility, majority of the respondents were able to comprehend the information they read or listened. Higher education was strongly associated with comprehension of information in newspapers while English and higher education were strongly associated with greater understanding of information aired via television. The study recommends that originators of cancer information should avail more information on prevention since this information is associated with
greater reduction of cancer incidence and mortality. They should also consider covering each of the BCP
cancers separately in order to increase clarity of the information. Finally, trained medical interpreters
should be availed in health facilities to help medical practitioners navigate the language and cultural
challenges they encounter during face-to-face communication between them and the public.

ANALYSIS OF STUDENTS’ POLITENESS STRATEGIES IN STUDENT – TEACHER INTERACTIONS OUTSIDE THE
CLASSROOM SETTING IN NDIGWA SECONDARY SCHOOL, SIAYA COUNTY

Otonde Lydia Anyango-M.A.

Department: English and Linguistics

Supervisors: Dr. Gatitu Kiguru

Dr. Joyce Wangai

Politeness in an interaction is a means employed to show awareness of another person's face, that is,
his or her public self-image. It is expected of everyone in society regardless of age or status. In the
process of student-teacher interactions, complaints of impoliteness have been made. In order to
minimize the possibility of one suffering social disgrace, politeness strategies are applied. Building on a
pragmatic approach, this study sought to identify the politeness strategies evident in student - teacher
interaction, the contextual factors that determine the choice of politeness strategies as well as establish
what factors contributed to the differences in pragmatic competences of Form 1 and 3 students. The
discussion was based on negative and positive politeness strategies, tenets of Politeness Theory by
Brown & Levinson (1987) which helped to categorize the polite forms used by students during
interaction with teachers. Purposive sampling technique was used to select the three out of classroom
settings. The target population was 300 students, all the Form 1 and 3 students of Ndigwa Secondary
School. According to Mugenda and Mugenda (2003), a sample size of 10% is considered adequate for a
descriptive study. The sample size therefore consisted of 45 students who spoke during the student -
teacher interactions. The linguistic samples of this study were utterances during student-teacher
interaction outside the classroom setting. The contexts were dormitory assemblies, guidance and
counseling sessions and staffroom interactions. The data, which was the utterances during the
interactions, were collected through observation method and interviews and the results were analyzed
using content analysis method. The findings show that the students, most of the time use politeness
strategies during interactions with their teachers outside the classroom setting and the choice was
determined by a variety of factors including peer pressure, level of discipline, setting, topic of discussion,
some of which are not mentioned in Brown and Levinson”s (1987) theory. The research findings of the
study may help teachers to emphasize the importance of applying politeness to the students in their
interactions.
LES DÉMARCHES DE LA DIDACTIQUE DE LA GRAMMAIRE DU FLE DANS LES ÉCOLES SECONDAIRES DU DISTRICT DE KAYONZA, AU RWANDA

Rugigana Aimable-MA.

Department: Literature

Supervisors: Dr Chokah Milcah
Dr Oyugi Caroline

The main objective of this research was to present the current situation of the teaching of grammar of FFL in secondary schools of Kayonza district with a view to propose practices and approaches. In particular, this research was to achieve the following objectives: (1) To explore the practice of approaches to the teaching of French grammar in secondary schools in Kayonza district; (2) To determine challenges of teaching grammar in FFL classes in Kayonza district; (3) Suggest strategies for the teaching of FFL grammar in secondary schools in Kayonza district. The study adopted a cross-sectional survey research design. Qualitative and quantitative approaches were adopted to collect the data. A sample of 312 participants was used in this research. This includes 10 teachers of French and 302 pupils (2nd and 5th forms) from the six secondary schools in Kayonza district: FAWE Girls’ School, E.S. Rukara, G.S. Kayonza, G.S. Nyagahandagaza, and I.P.M., G.S. Muzizi. These schools were purposively selected for their contribution to variety of data in this research. The researcher conducted the study in this particular field since the interest and motivation to learn French, especially grammar, has significantly decreased during these eight years.

I used three types of instruments: the questionnaire, semi-structured interview and non-participant observation. This research revealed that the majority of French teachers in Kayonza district still use the deductive approach. They often follow the steps of the inductive approach while the active approach of discovery is neither known nor used. The challenges of teaching grammar in FFL class in Kayonza district are due to the current situation of teaching French as a foreign language, which also prevails in other countries that teach French, its public and its integration in multilingualism, the integration of ICT into the teaching of FFL as well as the limits of the active approach of discovery. So as to improve the teaching of grammar in FFL classes, this research proposes to adopt strategies of cognitive learning, planning and resources management, affective strategies as well as metacognitive strategies. The conclusion is that the teachers of FFL of the district of Kayonza do not have adequate knowledge in the practice of the new approaches of the didactics of the grammar of FFL. It was recommended that it is necessary to train teachers in the inductive and active approach of discovery, to create a favourable
environment for the teaching of learning strategies of French grammar. Key words: Teaching and learning FFL, Approaches, Learning strategies

RÉSUMÉ

L’objet principal de cette recherche était de présenter la situation actuelle de la didactique de la grammaire du FLE dans les écoles secondaires du district de Kayonza en vue de proposer une meilleure pratique de ses démarches. Plus particulièrement cette recherche devrait atteindre les objectifs suivants : (1) Etablir le bilan sur la pratique des démarches de la didactique de la grammaire du FLE dans les écoles secondaires du district de Kayonza ; (2) Relever les défis de la didactique de la grammaire du FLE dans les écoles secondaires du district de Kayonza ; (3) Suggérer des stratégies pour la didactique de la grammaire du FLE dans les écoles secondaires au Rwanda. Cette recherche est de nature exploratoire par le modèle d’enquêtes uniques : les approches qualitatives et quantitatives ont été adoptées pour recueillir les données. Un nombre de 312 participants constitue l’échantillon de notre recherche. Ceci inclut 10 enseignants de français et 302 élèves (de 2ème et de 5ème année) des six écoles secondaires du district de Kayonza : FAWE Girls’ Schools, E.S. Rukara, G.S. Kayonza, G.S.Nyagahandagaza, et I.P.M., G.S.Muzizi. Ces écoles ont été objectivement sélectionnées vues leur accessibilité, leur volonté de participer à notre recherche et leur contribution à la variété des données collectées. Nous avons mené la recherche dans ce domaine particulier puisque l’intérêt et la motivation d’apprendre le français, spécialement, la grammaire, ont sensiblement régressé durant ces huit ans environ. Nous avons utilisé trois types d’instruments : le questionnaire, l’entretien semi-dirigé et l’observation non-participante. Cette recherche a révélé que la majorité des enseignants de français du district de Kayonza utilisent toujours la démarche déductive. Ils suivent souvent la démarche inductive ; la démarche déductive n’est ni connue ni utilisée. Les défis de la didactique de la grammaire en classe de FLE dans le district de Kayonza sont dus à la situation actuelle de l’enseignement du français langue étrangère, son public, son insertion dans le multilinguisme, l’intégration des TICE dans la didactique du FLE ainsi que les limites de la démarche active de découverte. Cette recherche propose d’adopter et d’enseigner les stratégies d’apprentissage cognitives, les stratégies de planification et de gestion des ressources, les stratégies affectives ainsi que les stratégies métacognitives en classe de FLE. La conclusion est que les enseignants de FLE du district de Kayonza n’ont pas assez de connaissances dans la pratique des nouvelles démarches de la didactique de la grammaire de FLE. Il a été recommandé que ces derniers soient formés dans la démarche inductive et la démarche active de découverte.

Mots clés : Didactique du FLE, démarches, stratégies d’apprentissage.

CONTINUITY AND CHANGE IN THE INDIGENOUS THERAPEUTIC SYSTEMS AMONG THE ABAKUSII OF NYAMIRA COUNTY, KENYA, 1880-2010
Department: History, Archaeology and Political studies

Supervisors: Dr. Edwin Gimode

Dr. Pius Kakai

This study is an historical exposition and analysis of the developments of indigenous therapeutic systems among the Abagusii of Nyamira County, Kenya, between 1880 and 2010. Abagusii belong to the Bantu communities of western Kenya, including the Luhyia, Kuria and Suba. The study traces continuity and change in indigenous medical practice among the Abagusii. The study has examined the status of Gusii herbal medicine on the eve of British colonialism; the encounter between Gusii indigenous medicine and western medicine, education and Christianity; and manifestations of the interface between contemporary lifestyles of the Gusii and indigenous medicine. These three issues formed the objectives of this study. The study examines practitioners of herbal medicine; the diseases treated using indigenous therapy; the herbal medicines used; witchcraft as a science or indigenous medicine; the process of procurement; administration of the medicine; processing; storage; sales and packaging. The study shows how the introduction of western education, Christianity and conventional medicine interfered with the traditional Gusii herbal therapies, which nonetheless proved resilient and continued side by side with western medicine. Over this long period, the study found that indigenous medicine was not annihilated. By using the rational action theory, the study found that even during the colonial and post-colonial era, the Gusii, being rational human beings, had the opportunity to seek and choose alternative medicine to diagnose, treat and prevent illnesses by even attending conventional medical centres. Modern health centres were set up in various places and the use of conventional medicine increased during the colonial and post-colonial period. The study applied the resilience and rational choice theoretical frameworks to analyse continuity and change in the use of herbal medicine among the Gusii. The study established that there has been continuous use of indigenous medicine even in the presence of modern medicine. At the same time, indigenous medicine has been commercialised, with new packaging, practices and sales methods adopted. The study used both primary and secondary sources to analyse continuity and change of Gusii indigenous medicine. Primary sources were obtained from oral informants and the Kenya National Archives. Purposeful sampling techniques were used in identifying informants with vast knowledge in herbal medicine. A pilot study was carried out to determine validity and reliability as well as clarity of the question guidelines. Data was then collected using interview guidelines and more than 244 informants of both genders were interviewed. Collected data was analysed, processed and presented in descriptive design format. The study, in conclusion found that indigenous therapeutic system among the Gusii was a firmly established and comprehensive system of healthcare delivery in the pre-colonial era. Rather than declining, the system increased and diversified in the colonial and post-independence period inspite of the presence of western medicine. The study recommends for government support to indigenous medicine practitioners in an effort to boost the country"s health sector and also preserve the country"s natural forests which are the source of indigenous medicine.
THE PHONOLOGICAL PROCESSES IN OLUMARAMA: NC EFFECTS AND VOWEL HIATUS

George Nanjira Mulama-M.A.

Department: Literature

Supervisors: Dr. Nandelanga Simiyu

Dr. Ayieko Gerry

This study investigates the phonological processes found in nasal consonant sequences and vowel hiatus resolution of Olumarama, a dialect of Luhya spoken in Kakamega County, of Western Kenya. Olumarama is an under-described language thus the need for further linguistic description of the language. The overriding objective of the study was to investigate the phonological processes found in Nasal Consonant sequences and vowel hiatus resolution in Olumarama and how Optimality Theory constraints account for the structure of the output. Since the root of these processes lies in the syllable, this study highlights the syllable structure of Olumarama. Data on NC effects and vowel hiatus resolution was generated by the researcher as a native speaker of Olumarama. Two respondents were then used to verify the data. This study is particularly important as it is based on the premises that the Nasal Consonant sequences and vowel hiatus resolution can be the source or product of various phonological processes in Olumarama. The study revealed that various phonological processes apply in both the repair of NC sequences and vowel hiatus resolution and Optimality theory can account for the phonological alternations in the structure of words. This study is expected to help in the partial documentation of Olumarama. In addition, the study can be used as a resource in Luhya dialectal studies.

ASSESSMENT OF ACCESS TO AND UTILISATION OF TREADLE AND HIP PUMP TECHNOLOGY BY FARMERS IN MACHAKOS COUNTY, KENYA

Teresiah Waithera Gitau-M.A.

Department: Gender and Development Studies

Supervisors: Dr. Grace Mose Okong’o

Dr. Casper Masiga

The purpose of this study was to assess the access to and utilization of the treadle and hip pump technology by farmers in Machakos County, Kenya so that gender responsive strategies can be suggested to improve the uptake of the technology among the farmers. This was due to low adoption of the two pumps in Machakos county after previous KSI/WSU study that marketed and distributed the technology among farmers in the county. The specific objectives of the study were: to establish which irrigation technologies used before introduction of hip and treadle pumps; to find out how the farmers were accessing to and utilizing pumps; to examine the challenges facing farmers when accessing to and utilizing the pumps in the county and to suggest gender responsive strategies that would enhance access to and utilisation of pump technology. The study was guided by the social relations framework of
analysis by Naila Kabeer. The framework, which gives a political, rather than a technical or informational solution, was complemented by the diffusion of innovations theory. The study used experimental and descriptive research designs for both qualitative and quantitative data. The study had 70 respondents comprising 42 farmers who were pump buyers purposively selected for the study and 28 pump non-buyers identified via snowball sampling method. Data were collected using interview schedules, key informant interview guides and focus group discussion guides. Findings indicate that the majority of respondents used irrigation tools that were powered by human and/or animals. In access, the most preferred type of pump among pump buyers was the hip pump over the treadle pump. Cash and credit payment option was preferred over savings option of pump purchase. In utilization, men used the pump more than women did since men were involved in operation and maintenance as they pedal while women distribute water using pipes. The major challenges to access to and utilization of the pump technology were at family level and market level. The study concluded that the use the treadle and hip pump technology was still appropriate in relation to the tools they were previously used to. However, the pump technology design in itself hampered use by women since it requires a lot of energy to use. The study recommends putting gender responsiveness in design of pumps, consistent intergenerational marketing and distribution of the pump technology with follow up by the marketer for adoption among women, men and youth. The marketer should also consider marketing and distribution through working with female opinion leaders, establish demonstration plots with women headed households as well as appoint enterprising women such as the group secretary as pump dealers to build supply networks and create linkages with farmers. The marketer can also consider advertising and marketing that does not conform to gender stereotypes and type of media chosen and content of message about the pump to reach women should consider their low mobility level outside their home or village. The study also recommends recruitment of female salespersons by KSI/WSU team as well as train male staff on the importance of seeing women as potential customers and how to interact with them while holding consistent talks with men in the family too. There is also need to for KSI/WSU team to have gender relations conceptual awareness building and implementation through writing brief policy statements on gender issues in the context of the organization.

DETERMINANTS OF CONTRACEPTIVE USE AND FERTILITY PREFERENCE AMONG WOMEN OF REPRODUCTIVE AGE IN KAKAMEGA COUNTY, KENYA

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Dr. Mark Kiptui

This cross-sectional study was conducted to find out the determinants of contraceptive use and fertility preference among women of reproductive age in Kakamega County, Kenya. The study utilized a descriptive survey design comprising quantitative and qualitative approaches. The target population was 444,350 women in the childbearing age in Kakamega County. To obtain the sample population size, the formula for finite population was used. The sample size consisted of 384 women in the reproductive
A structured questionnaire, a focus group discussion guide and an interview schedule were used as research tools. The data was analyzed using descriptive and inferential statistics. Descriptive statistics included frequency distribution tables, means and percentages while inferential statistics comprised correlations, Chi-square and the ANOVA test. The KDHS (2014) report shows that the fertility in Kakamega County was high at 5 per woman in spite of a decline at the national level from 4.6 to 3.9 from 2008 to 2014 respectively. Kenya has experienced relatively high incidences of mistimed (26%) and unwanted (17%) pregnancies among all women of childbearing age, with young women (15-24 years) recording higher mistimed (32% versus 30%) and unwanted (15% versus 10%) pregnancies compared to women in other age groups. Annually, about 13,000 Kenyan girls drop out of school due to accidental pregnancies and 103 out of every 1000 births in Kenya are delivered to girls aged (15-19) (NCPD & UNFPA, 2013). This study, therefore, sought to find out the determinants of contraceptives and fertility preference in Kakamega County that contribute to high fertility. Low utilization of contraceptives has been generally associated with unwanted and mistimed pregnancies resulting to high parity. This has impacted negatively on the socioeconomic development of the county. The study’s general objective was to identify the determinants of contraceptive use and desired family size amongst women of reproductive age in Kakamega County, Kenya. The specific objectives were threefold: to identify levels and determinants of contraceptive use among women of reproductive age in Kakamega County, to determine the role of socio-cultural factors on fertility preference among women of childbearing age in Kakamega County; and to identify the role of demographic factors in determining fertility preference among women of childbearing age in Kakamega County. The results showed that increase in family planning use corresponds with the desire to have fewer children while the desire to have an increased number of children is influenced by low use of family planning. The advancement in education level and increase in age at first marriage showed a reduction in the desire to have many children. Women residing in urban areas were found to have fewer children than their counterparts in rural areas. Further, women with low income were found to have more children compared to those who had high income. The study also found out that the perceived mean number of children translates to long fertility duration as adolescence start giving birth at an early age hence; age factor and sexual behavior were established to be predictors of fertility preferences. The study recommends that the government develops good plans and policies to encourage maximum utilization and access to health care services for effective implementation of family planning use to all women particularly those in rural areas, in an equitable, indiscriminate and socially sensitive way. The government also needs to adequately train and facilitate community health workers to enable them take reproductive information and supplies directly to peoples’ homes. Further, efforts to increase girls’ education must address the problem of pregnancies among young girls aged 18 years and below so that they do not become mothers before adulthood. To lower school drop-outs among girls, the Ministry of Education Science and Technology ought to work closely with stakeholders in ensuring that the back-to-school policy is being fully implemented to end early marriages.

A PORTRAYAL OF DYSFUNCTIONAL FAMILIES IN ELLEN BANDA’S PATCHWORK AND ALMAS KHAN’S POPPADOM PREACH.

Ojowi Anne Achieng’-M.A.
This study explores two novels, Patchwork (2011) by Ellen Banda and Poppadom Preach (2011) by Almas Khan. The research endeavors to scrutinize how the texts under study explore how the behavior of members in a family impact on a children’s overall development. Banda and Khan covertly or overtly incorporate the issue of child development in dysfunctional families in their works. They carefully narrate their stories with detail and honesty of children voices, bringing to the fore tales of children who live in hostile atmosphere, in their parent’s homes. The study is hinged on the assumption that there are few critical studies of children in dysfunctional families in the selected texts. This study is, therefore, keen on giving an account of how children when confronted with antagonistic situations in a family, adapt to survive, and the way these children are affected in the long run. This study is steered by the postulations of Sigmund Freud, Erik Erikson and Karen Horney on psychoanalysis. This theory assists in the exploration of how a child’s growth and development is influenced by behaviors of members of a family, with close reference to Patchwork and Poppadom Preach. Qualitative research methodology was used in this research; this will involved a close reading of the selected primary texts and apt secondary sources.

EFFECTS OF SOAPSTONE QUARRYING ON GEOMORPHIC AND SOCIO-ECONOMIC ACTIVITIES IN TABAKA REGION, KISII COUNTY- KENYA

Tilji Tabitha Chepchumba-M.A.

Soapstone quarrying activities have immense effects on the physical and human environments. However, it is not clear how individual soapstone quarrying activities influence the occurrence of a specific geomorphic event. The effects of resultant soapstone residues on farming and whether soapstone rocks can regenerate from such debris require deeper investigations. It is on these constructs that this study seeks to probe the influence of soapstone quarrying activities on geomorphic processes and farming activities within Tabaka region in Kisii County, Kenya. The study, therefore, seeks to determine the association of soapstone quarrying activities with the occurrence of geomorphic processes; examine how such activities affect farming and suggest concrete policy framework for sustained soapstone quarrying activities in Tabaka region. The study used a multi-point descriptive and qualitative survey technique. It analysed four (4) out of twenty-four (24) quarries in the region and used interviews, observation, photography, measurements, questionnaires and group discussions to collect information. The study used excel and SPSS programmes to analyse data on different aspects of the study objectives. The hypotheses were tested using Pearson Rank Correlation to test the relationship
between variables. It was determined that soapstone quarrying activities accelerate the rate of weathering, soil erosion and mass movement in the area under investigation. In addition, it was observed that soapstone quarrying activities takes up to 22% of the total farmland. At the policy level, the study found out that there are sufficient policy provisions including the: Constitution of Kenya 2010, Mining Act, 2014, the Environment Act, 2012 and the Mining Policy 2011. These policies are not effectively being implemented and most of those interviewed (68%) are not aware of their provisions. The study concluded that soapstone quarrying activities influence the occurrence and the rate of mass movement, soil erosion and weathering processes. Soapstone quarrying activities has reduced the available land for farming thus curtailing agricultural production in Tabaka region. The study recommends that the local county government in conjunction with the Ministry of Environment and Mining should ensure that residents engaged in soapstone quarrying activities adhere to the provision of regulatory policies in force. Further, soapstone quarries should be owned by the national government for proper control and management.

ALIENATION OF ABASHITAHO’S LAND RIGHTS, 1920-1963

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This study interrogates the effect of European colonialism on traditional land ownership, access and use. The exposure of European capitalism on traditional land ownership, access and use abolished the land rights of Abashitaho between 1920 and 1963. The precolonial land ownership, accessibility and user rights had made the community stable and peaceful. It also investigated European colonial land policies and its pitfalls on the community leading to legacy of land right question after independence of 1963. This study is necessary because a lot of studies by scholars have focused on large general areas and communities to the exclusion of minority but important communities in the locality. While those studies were important, there is need to explore issues in such isolated localities which dominated outcomes that impacted on large communities during colonial period. The study narrowed down the unit of focus to that of Abashitaho land rights to help provide a more detailed account. The overall objective of the study was to demonstrate factors that have undermined land rights among Abashitaho despite Kenya
having attained independence. The study employed a descriptive research design and applied the purposive and simple random sampling techniques. The study focused on Abashitaho knowledgeable elders and any other persons within Kakamega County to obtain information. A total of 40 respondents were sampled for oral interviews, focus group discussions and some filled questionnaires. Analysis of library and archival sources was also used to obtain information. The study used a systems approach and dependency and underdevelopment theories to interrogate traditional system of land rights and capitalist system as they clashed to analyze the outcomes of problems of land rights within an African community. These theories helped provide an avenue for understanding reasons why land rights and the land question was still a major problem in independent Kenya in 1963. The study was premised on argument that colonialism introduced changes in land ownership accessibility and use that removed the community’s base of wealth accumulation. Colonialism also brought in new methods of land ownership with title which ignored traditional rights to access and use land which weakened African modes of production and created class differences in society. The study revealed that due to differences in ownership, accessibility and use of land some people grew richer as others became progressively poor due to policies institutionalized. The study therefore exposed the challenge of land question that endures and undermines wealth accumulation and stability of society at independence.

THE CONSTRUCTION OF IMAGES OF POWER AMONG THE SABAOT OF KENYA AS REPRESENTED IN THEIR MALE INITIATION POETRY

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This study examined the construction of images of power in initiation male oral poetry of the Sabaot with a view to revealing how this community contests power relations with its neighbours. The study also investigated how this contest of power relations creates or
maintains a cultural identity, which like in any other community is derived from a sense of imagined superiority. Oral Poetry is an incontestable reservoir of values, sensibilities, aesthetics and also a genre through which traditional thought and imagination is achieved. The study assumed that initiation provides a cultural arena where Sabaot artists express those values, virtues, aesthetics and traditional thought and identity. The study postulated that the meaning(s) of words in the initiation poetry can only be understood within the context of performance of these poems. By analysing these poems the study set out to establish how the attendant images of power contribute to the creation of the Sabaot identity in contesting power relations. The study used a composite theoretical framework that integrates Ethno-poetics theory and Psychoanalytic Criticism theory to analyse collected oral poems. This framework enabled the study to gather and interpret data with respect to meanings that ‘words’ or ‘utterances’ take during performances as opposed to basic referential language outside the “performance arena” or “interpretive frame”. Psychoanalytic Criticism theory was beneficial in analysing the imagined superiority of the Sabaot as demonstrated by the images of power found in their male initiation poetry. Backed with a corpus of library research information the study narrowed down to the Sabaot living in Kopsiro division of Mt. Elgon District for the reason that initiation is still actively practised there. The findings are quite interesting, especially the fact that words acquire different meanings when placed in an “interpretive frame” or “a performance arena”. For example a community’s name becomes a symbol of cowardice. The mention of a monkey or rain in that arena takes an entirely different meaning from the basic referential meaning. The study offers compelling opportunities for research on many aspects of poetry of the Sabaot and reveals conflict resolution efforts.

INFLUENCE OF YOUTH SELF-HELP GROUP MEMBERS’ SKILLS ON GROUP PERFORMANCE IN ALDAI CONSTITUENCY, NANDI COUNTY, KENYA

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The study explored youth self-help groups performance in relation to members skill levels. It focuses on the effects of acquired skills through education and training on the performance of youth Self-Help Groups. Although a number of studies have been done on youth groups, little knowledge exist on the relationship between skills acquired and the performance of such youth groups. In Kenya, youth programmes such as Youth Development Fund requires the youth to form groups to access finances. Therefore there was need to find out whether the youth utilize skills acquired for their daily activities in their groups. To examine the relationship between
group members’ skills and their performance, the study was guided by the following specific objectives: To determine demographic characteristics of the youth in SHGs, to determine members skills in youth SHGs, to examine the performance levels of youth SHGs, to establish challenges facing youth SHGs and to find out possible strategies that can be used to improve youth SHGs performances. The study was guided by human capital theory. The study adopted Cross-sectional survey design. Multi stage sampling was used to sample out the size with the use of purposive and simple random sampling. A sample of 136 youth SHG members participated in the study from the 56 youth groups that were sampled from 226 groups in Aldai constituency. Key informants were also interviewed. Data was collected by use of both qualitative and quantitative approaches. Quantitative data was analysed descriptively whereas qualitative data was coded and analysed thematically. The study showed that there was no relationship between the level of education and the income earned by Youth SHG members. There was no significance difference between income earned by youth with basic education ($M=6586.67, SD=3976.60$) and those with higher education ($M=6483.61, SD=6294.16; t=0.12, p=0.91, two-tailed$). Lack of specialization by youth Self-Help group members influenced their poor performance and skill utilization. Entrepreneurship, vocational and technical skills were the most preferred by the youth to influence the output of Youth Self-Help Group. Inadequate skills, ignorance and limited finances were found to be some of the challenges affecting youth SHGs. The study recommends continuous training and follow up of youth programmes by local administrative leaders. Practical skills should be embraced in all skill development levels, community polytechnics should also be facilitated to enhance the quality of skills offered.

SOCIO-ECONOMIC, CULTURAL AND INSTITUTIONAL FACTORS INFLUENCING MODERN BOX HIVES ADOPTION IN KITUI COUNTY, KENYA

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Modern technologies in beekeeping at the global level have advanced in the recent past in countries that have embraced the new technologies such as China, Argentina and the USA, which are making honey exports worth millions of dollars. Modern beekeeping in Kenya is still a new idea as in most other African countries leading to low economic benefits. Efforts by the government, NGO’s and international donors to boost the adoption in various regions in Kenya such as Mwingi have gained little success as most of the beekeepers continue to use the log hive leading to low quality and quantity of the honey produced. The study was carried out across the five selected locations of Mwingi Central Sub-county namely; Waita, Nuu, Kivou, Mwingi and Mui since they have a high number of registered beekeepers. The main objective of this study was to evaluate the socio-economic, cultural and institutional factors
influencing adoption of the modern box hives in Mwingi Central Sub-county. The specific objectives were to; explore the types of hives, honey production levels and apiculture related institutions in the study area, identify the socio-economic, cultural and intuitional factors that influence adoption of modern box hives, establish the challenges to adoption and sustained use of modern box hives and to evaluate the financial benefits of adopting modern box hives. Simple random sampling on the basis of proportional allocation was employed to select 110 beekeepers (42 adopters and 68 non-adopters) from the five locations. The required data was mainly collected through questionnaires administered to the beekeepers. In-depth interviews conducted on key informants and content analysis also provided more data. The collected data was fit into the Statistical Package for Social Sciences (SPSS) version 20.0 for quantitative analysis. Descriptive statistics such as, frequencies and percentages were used to describe and summarize the data while inferential statistics including chi-square, t-test and Pearson’s correlation enabled making of generalizations about the population. A logistic regression model was employed to identify the socio-economic and institutional factors that influence the adoption. Partial Budgeting was applied to evaluate the financial benefits of modern box hives adoption. Chi-square tests revealed a statistically significant relation between adoption of modern box hives and; modern beekeeping training, apiary visit, off-farm employment, credit use and extension contact at P<0.05. T-test analysis revealed significant mean differences between the groups (adopters and non-adopters) in terms of; age, education level, knowledge and experience in beekeeping at P<0.05. Logistic regression showed that the predictor variables; education level, modern beekeeping training, apiary visits, off-farm employment, age, knowledge score on modern box hives, credit access and extension contact were significant. Significant challenges facing the adoption based on chi-square test were; unavailability of the box hives, unsuitability to local bees and lack of skills. On challenges facing sustained use of the box hives; honey market unavailability, absconding of bees, and drought were found significant. The outcome of partial budgeting revealed that modern box hives (langstroth) are financially beneficial when compared to log hives. It was concluded that the low adoption rate was linked to a number of socio-economic and institutional factors which must be addressed in order to increase adoption of the modern box hives and the subsequent increase in honey production in the area. The study therefore recommends among other things; establishment of more honey processing and marketing centres and facilitation of more extension contact with beekeepers.

EFFECTS OF SOCIAL CONFLICTS ON THE LIVELIHOODS OF HOUSEHOLDS IN KERIO VALLEY BASIN, KENYA

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The United Nations (UN) and World Bank (2017) indicate that the emerging forms of violent conflicts have tended to be more complex and protracted. They involve more non-state and state agencies and are characterized by substantial loss of lives, displacement of population, destruction of property, social and economic wellbeing. Conflicts in the North Rift Region of Kenya, particularly in Kerio Valley, similarly
have had severe effects on the socio-economic wellbeing and livelihoods of households. This study sought to examine the effects of the social conflicts on the livelihood of the households, and necessary intervention measures in Kerio Valley Basin. Specifically it sought to establish: the characteristics of the households and the scope of hostilities; effects on the livelihood, social and economic wellbeing; and interventions undertaken to mitigate the conflicts. The study adopted a descriptive cross-sectional survey design. The site of study were locations most affected by conflict and these included; Chesegon Division in Pokot County, Tot Division in Elgeyo-Marakwet County, Kolowa Division in Tiati Sub-County of Baringo and Kinyach location in Baringo County. Data collection entailed an interview schedule, focus group discussions and key informant interviews. The unit of study was the household and through systematic sampling, from an estimated total of 3170 households, a sample of 422 was interviewed. Key stakeholders were identified for key informant interviews while a cross section of community leaders participated in an FGD. Qualitative data was analysed thematically while quantitative data was entered into SPSS and results analysed and presented descriptively. Ethical and logistical issues were addressed through seeking approvals and permissions from relevant authorities such Graduate School, KUERC and NACOSTI. The study established that foremost, the typical characteristics of respondents were that the majority were male, married, middle aged and occupied mainly in pastoralism and farming; Secondly, Kerio valley conflict assumes inter-clan and inter-ethnic dimensions and are fairly frequent; Thirdly, main causes of conflict included theft of cattle, access to and control of pasture and water. Fourthly, social conflicts have negatively affected the lives and livelihoods of communities by way of, among others, loss of household income when livestock, the main source of family income, is stolen; loss of lives; strained relationships among family members and also neighbours; and loss of marketing opportunities.; Fifthly, some of the interventions undertaken included development of integrated county development plans; diversification of livelihoods through introducing irrigated agriculture and agro-processing, and intensification of security interventions. The study concluded that communities in Kerio valley have been experiencing periodic conflicts which have adversely affected the households in Kerio region and negatively affected pursuit of livelihoods; interventions put in place have to an extent contained the conflicts and especially the engagement with stakeholders. So as to mitigate the adverse effects of conflicts on livelihoods, the study recommends diversification of livelihoods by way of adoption of high value crops through irrigated agriculture; institutionalization of peace committees in the community, and enhancing infrastructure development so as to ease movement of people and their produce as well as quicken the response time by security agencies.

RELIGIOUS APPROACHES TO PEACE BUILDING AND RECONCILIATION IN AREAS AFFECTED BY ETHNIC CONFLICTS WITHIN KURESOI NORTH-NAKURU COUNTY, KENYA (1992-2008)

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In Kenya, the issue of ethnic related conflicts seems to be very prominent. Its effects have been felt both at local and national levels. Religion represented by religious individuals and organizations is often at the heart of rural communities involving many people. Guided by the biblical principles of peace, love and justice, religion has an important role to play in peace building and reconciliation. Religion has the theology and language of healing, forgiveness and reconciliation. In areas affected by ethnic conflicts globally, religion has helped ease tensions and heals wounds brought therein. Despite the role of religion in peace building and reconciliation however, ethnic conflicts continue to escalate from time to time. The main objectives of this study therefore is to evaluate various approaches used by the religious peace makers and organizations and factors which hinder their effectiveness in peace building and reconciliation in Kuresoi North –Nakuru County. The study was conducted among various religious leaders, individuals and groups represented by churches. The research was guided by a combination of Holton model, Montville and Burton theories. It is hoped that the study will be helpful to the Department of Philosophy and Religious studies, Kuresoi North community and the country at large in the process of peace building and reconciliation in areas affected by ethnic conflicts. In this study different variables were considered; Independent variables are peace building and reconciliation while dependent variables are the religious approaches. The study employed a mixed research design. The primary data were contained in duly filled questionnaires and interviews while the secondary data were in notes form. The sample size was that of one hundred and ninety-three drawn from the Roman Catholic Church, Pentecostal Assemblies of God and the Baptist Churches. Data was presented using frequency distribution and percentage tables, bar graphs and pie charts in relation to the research topic. The study established that the main causes of ethnic conflicts in Kuresoi North include competition for resources, political instigations, security and recognition and acceptance. The study’s findings indicated that religious methods such as, problem solving workshops, mediations and negotiations and confessions have been very effective in peace building and reconciliation. However, the study established that the religious approaches are not applied continually so as to promote peace and reconciliation. Religious leaders and organizations should therefore promote peace and reconciliation continuously and not wait for ethnic conflict to erupt so as to be relevant.


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Conflicts can result from the clash of two fundamentally different sets of expectations of behaviour. Conflicts in Turkana County have existed since 1960 and they have had adverse effects on residents of the region. The Turkana people are pastoralists and largely depend on livestock for their livelihood. These conflicts are the major causes of social, economic and political stagnation in the region. Various stakeholders have tried to manage and resolve these conflicts. This study investigated the role of the
Catholic justice and peace commission (CJPC) in conflicts management in Turkana County. The study was
guided by three objectives; To examine the role of the CJPC in conflicts management in Turkana County,
to investigate the approaches of the CJPC in conflicts management in Turkana County and to analyse the
economic, social and political effects of the interventions by the Catholic Justice and Peace commission
(CJPC) in Turkana North and Turkana East Sub-Counties, 1960-2015. The study employed protracted
social conflict (PSC) theory by Edward Azar (1990) to analyse the CJPC in conflict management, the
approaches used and the economic, social and political effects of the interventions by the Catholic
Justice and Peace commission (CJPC) in Turkana North and Turkana East Sub-Counties. This study was
limited to the locations of Turkana East, and Todonyany in Turkana North sub-counties, because these
are the areas whose development has lagged as result of lack of peace due to internal and external
raids. The study utilized a descriptive research design. The study employed both primary and secondary
sources in data collection. The main sources of data accessed were the archives, library and field work.
From these, source, data was collected through mainly qualitative techniques. Purposive sampling was
used to identify the respondents for the interview. The targeted population was 400 participants. The
research instruments used in data collection were the questionnaires and interview guides. Data
analysis was done mainly through qualitative methods by first arranging the data thematically and
periodically before being presented in a narrative form. The period covered by the study starts from
1960 and ends in 2015. Local actors such as elders, women, Karacuna, Ngimurok, Religious leaders,
peace committee members and activities by some NGOs, CBOs and FBOs sustained this conflict.
Interventions by the Government and other bodies failed in mitigation efforts due to poor conflict
management strategies. CJPC stepped in through a different approach to effectively address the
problem of conflicts in the region. The government of Kenya together with other bodies expanded
educational facilities in these two regions and sensitized the two communities on the effects of conflicts.
It was recommended that the two communities should come up with traditional strategies that conform
to their belief systems and practices that can be used to mitigate the prevailing conflicts. Therefore, the
Pokot and Turkana communities needed to revive their practices of intermarrying, hold traditional
ceremonies together and borrow customs from each other to strengthen their relations.

CHAPLAINCY AND BEHAVIOUR CHANGE OF STUDENTS IN CHURCH SPONSORED PUBLIC
SECONDARY SCHOOLS IN SIAYA COUNTY, KENYA

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Dr. Humphrey M. Waweru

Many learning institutions around the world have endeavored to develop chaplaincy in the past
decades. Literature reviewed however reveals that education systems in African countries and
more specifically Kenya have been overburdened by rote learning which negates the real purpose of education that is to address secular, religious and ethical concerns coherent with world view. This denies an educational system a broader and inclusive approach to develop holistic students. This study was based on Structural Functionalism and Social Disintegration theories developed by Emile Durkheim that gave insight to the contributing factors for delinquency among students. Correspondingly, pilot study was carried out and feedback obtained was used to correct research instruments that were afterwards used to collect data in the field. Likewise, a descriptive survey design was utilized to analyze data both qualitatively and quantitatively using a computer software packages, SPSS version 22 and Microsoft Office excel 2007. The analyzed data revealed that a considerable number of learners were affected by cases boy-girl relationships, pregnancies, abortions, homosexuality, examination malpractices as well as drugs and substance abuse. Coupled with weak chaplaincy structures and nonchalant attitude in the society, many students were sometimes overwhelmed with stressful situations such as anger, revenge and suicidal thoughts thus distorting their moral reasoning. These occurrences also contributed to systematic declining of intra-psyhic and social development of students. The study similarly revealed major challenges that inhibit school chaplains in their attempt to socially and spiritually develop students. To start with, majority of chaplains conducted their church services in schools’ dining hall once a week without the necessary church equipment. This minimized students’ participation and active involvement in chaplaincy activities. In the same way, there was no any instituted body at the sub-county level mandated to supervise, guide or tackle issues related to chaplaincy. Therefore, the researcher concluded that chaplaincy activities are based on chaplains’ own judgment, doctrines and traditions of the church sponsors that is contrary to chaplaincy principles. Therefore, church in conjunction with educational stake-holders need to work together to develop a joint chaplaincy curriculum to enable chaplains to carry out their responsibilities in a more structured manner. Finally, it is the objective of the study to contribute to the ever increasing intellectual debate on the area of chaplaincy in the world and particularly in Africa.

FOREIGN ELECTRONIC DONATIONS AND ENVIRONMENTAL SUSTAINABILITY IN KENYA

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Dr. Lazarus Ngari
A dominant and current assumption is that, if Africa is to develop, it should incorporate ICT strategies such as e-commerce, e-governance, e-health, e-education, e-gender, e-agriculture, e-commerce as part of its development strategies. Accordingly, ICT has become an essential global resource in Kenyan development. However, Kenya is experiencing digital gap in terms of affordability, accessibility and usage. As such, computers have been donated from global North to South to fill this gap. These donations though beneficial, they have unintended and anticipated consequences that are unknown to donor organizations in the North. The study explores whether these donations can contribute to sustainable development in Kenya. The study examines the nexus between communication and state building. The research also demonstrates how e-waste is a challenge to sustainable development. The study adopted modernisation theory to explain how ICT donation was one of the strategies for nation building. The research design was based on exploratory research using both qualitative and quantitative method. Non-probabilistic sampling using purposive sampling technique was used to collect data. Both primary data and secondary data were collected; the latter was collected through interviews and questionnaire. Data analysis was done by employing the thematic analytical technique. The premises in this study were analyzed, and it was observed that communication is a significant resource in nation building in Kenya. However, low penetration of information, communication and technology presents socio-economic and political developmental challenges. Despite Kenya being a signatory to both Basel and Bamako Convention, she is yet to domesticate the policy. Although, there is established e-waste guideline, the standard of e-waste control is still wanting and the trend of domestication has been slow. As such the research concludes that ICT donations bridge the digital divide, but the presence of e-waste will prolong achievement of sustainable development. Accordingly, the question of sustainability should be part of development strategies which involve the application of ICT.
The East Africa Revival Movement (EARM) has had a great impact on many of the protestant churches in Eastern Africa for many years, renewing their life and offering to individuals the challenge of a deeper experience of salvation in Christ and more radical commitment to Christian discipleship and evangelism. The Revival Movement is considered to have contributed significantly to the growth of the church in East Africa, despite having other revivals that emerged in the region. However, Christian discipleship and evangelistic activities in the ACK Churches in Kisumu Central Archdeaconry is in great danger of decline.

ACK is currently struggling with massive controversies, wrangles and conflicts resulting to estranged relationship among EARM members and ACK leadership. There is limited research to explain this phenomenon especially in Maseno South Diocese, and specifically in Kisumu Central Archdeaconry. This study aimed at investigating the spread of EARM between 1930-1970 and the contribution of EARM teachings, beliefs and practices to the evangelism among the Anglican Churches in Kisumu Central Archdeaconry. It further aimed at investigating the challenges facing the spread of EARM among ACK churches in Kisumu Central Archdeaconry. The study employed a mixed research methodology with a descriptive cross sectional survey research design to collect quantitative data, while Focus Group Discuss and key informant interviews were used to collect qualitative data. The area of study has got nine parishes, out of which three parishes were sampled to represent the entire Kisumu Central Archdeaconry. Multistage sampling technique was used to sample the three parishes. A sample size of 143 respondents was used to obtain data. Key informant interviews and focus group discussions were used to obtain qualitative data from the church members, church vicars and EARM leaders. Primary and secondary data, both published and unpublished literature relevant to the subject was consulted and reviewed. The qualitative data was analyzed using thematic content analysis. The study found that historical background of EARM was anchored on revival of the gospel that factored in the African values and ideas and because it got spread majorly through conventions, this could influence the spread of the word of God, given that through these conventions, major components of EARM, which was evangelism was championed. The spread of EARM was based on revival of gospel that was to be led in African way with responsibility of reaching out to the Africans and spreading the gospel to them. Further, it was noted that the historical background of EARM as a lay movement encouraged the importance of lay leadership and responsibility that encouraged evangelism in the church. It was also found that EARM taught about salvation of Jesus Christ and also emphasized the commitment to the Christian discipleship and centrality of Jesus Christ. EARM teachings and practices emphasized the conversion of sinners, spreading of the gospel from one nation to another. Although EARM influenced positively the spread of the gospel, it also encountered certain challenges such as corruption, gospel of prosperity and doctrinal conflict in the church. The study concluded that the Revival movements were mainly ignited following spiritual reflection, fervor and calling to repentance of sins and to preach the word of God to win the souls for Christ. The study recommends that there is need to bridge the doctrinal gap between EARM and ACK. All preaching and teachings within the fellowship should conform to its formularies like the historic creed. It also recommends that the church should take a firmer control of the Revival Movement.

AN ECOCRITICAL READING OF SUBJECTIVITY IN HELON HABILA’S OIL ON WATER AND KAINÉ AGARY’S YELLOW-YELLOW
The objective and impetus of this study is to investigate the representations of postcolonial subjectivity and the portrayal of ecological devastation in Helon Habila's Oil on Water and Kaine Agary's Yellow-Yellow. Both texts succinctly capture the exploitation and struggles of the inhabitants of the oil rich Niger Delta. They also portray the causes and consequences of the characters’ fight against these injustices. This exercise has sought to study ecological destruction and how it has influenced the characters in the two texts. The study also has interrogated the manner in which the exploitation of oil by multinational oil companies has affected the subjects and natural settings, and how this has led to the displacement and disenfranchisement of the characters out of homes and natural resources. The characters in the texts are marginalised and resort to violence against the government and the multinational corporations as an expression of disaffection and to create an avenue through which they can alleviate themselves from political disenfranchisement to economic emancipation, environmental development, and the protection of their cultural values. Employing the postcolonial theory and an ecocritical approach, the study has addressed itself to the various forms of subjectivity and ecological issues raised in the texts. It has adopted a qualitative research methodology employing the close textual analysis technique to interpret the primary texts. Library materials, articles and journals have been used optimally to interpret the data acquired from the primary texts in a bid to meet research objectives. The findings of this research show that the exploration of oil has far reaching consequences on the human social- cultural fabric, whilst, on the other hand, oil spillages have devastating effects on human, animal, and aquatic life. The study concludes that the forces of subjectivities are responsible for the denial of fundamental human rights and the collapse of infrastructure in the Niger Delta region. The study, therefore, has recommended that further research be undertaken on texts that show the consequential destruction of species, impact on life and the decadence of culture within the region.
Human African Trypanosomiasis (HAT) is a protozoal disease that is caused by the extracellular parasite and also transmitted by vector known as tsetse fly that belong to genus Glossina. HAT commonly known as Sleeping sickness is a tropical disease that is neglected, historically endemic among 36 countries of Africa in sub-Saharan. In the last decade, WHO reports shows a tremendous decline in cases due to collaboration from both national and international efforts. Early diagnosis especially in cases of low parasitaemia is crucial in management of HAT. Loop-mediated isothermal amplification (LAMP) assay has been used to detect low number of trypanosomes in the host blood in an effort to improve management of HAT. There is need to improve on this diagnostic procedure by using non-invasive samples. The aim of current study was to assess urine use as the non-invasive diagnostic sample for trypanosomiasis in a rat model. Sixteen female Sprague-Dawley rats (Rattus norvegicus) weighing 181 - 281g were utilised in the current study. Rats were divided into three groups. Group I comprised seven rats which were inoculated with 1×10⁵ trypanosomes, serial sacrificed at 14, 21 and 28 days post inoculation (dpi), or when paresis was observed. Group II had seven rats similarly inoculated and then treated with Diminazene Aceturate (40mg/kg of body weight (bwt) intraperitoneally (IP)) at 21 dpi, and then followed up till relapse. Group III was the control group and had two rats which were non-infected and served as negative control. Following infection, the parameters monitored included body weight, urine volume, haematology, parasitaemia and LAMP involving urine or blood. The infected rats developed parasitaemia and treatment with 40mg/kg bwt of DA cleared parasitaemia in rats within five days to non-detectable levels. However, relapse in parasitaemia occurred starting day 117 after infection. The decrease was significant (P=0.02728) in urine volume voided after treatment with DA compared to urine volume voided before treatment. Secondly, a decrease that was significant (P=0.03590) in weight at 21 days post infection compared to starting weight before infection was observed. Also, infected group recorded a significant reduction (P=0.00283) in PCV blood. The LAMP assay detected infection in both samples of urine and serum. However, even though the sensitivity of LAMP test when using serum samples for detection of the infected animals was higher compared to urine samples, the difference between the samples was not significant (P=0.48481) in terms of infection detection. Therefore urine provides a major advantage over serum considering that it is non-invasive. The LAMP test performed on fresh urine and urine stored at -20°C did not show any significant difference (P=0.13704) between the samples, meaning that urine storage has no effect on LAMP performance. The analysis of diluted urine sample with two volumes of absolute ethanol in a ratio of 1:2 (optimization) and stored at -20°C yielded consistent results for trypanosome DNA detection as compared to undiluted urine sample stored at -20°C, which yielded inconsistent results. Based on these results, dilution of urine appeared to optimize urine sample for utilization in LAMP. The difference between optimized and non-optimized sample was significant (P=0.00225) with optimized urine giving better results. The urine sample can be used as an alternative sample to blood which offers the unique advantage of being noninvasive. Based on this study, it is recommended that rat is a suitable model of HAT studies and urine samples provide a favourable non-invasive option in diagnosis of Trypanosomiasis.

MAGNETOTELLURIC AND TRANSIENT ELECTROMAGNETIC IMAGING FOR GEOTHERMAL RESOURCES IN ARUS-BOGORIA AREA IN KENYA
Details of the Earth’s subsurface are largely obscured because it’s difficult to make direct observation of the Earth’s subsurface. Geophysical exploration methods, however, provide a means of remotely examining the Earth’s subsurface. This study therefore seeks to image for geothermal prospects in Arus-Bogoria area using Magnetotelluric (MT) and Transient Electromagnetic (TEM) methods. MT method has the greatest exploration dept whereas TEM has the best resolution at shallow depths. MT and TEM measurements were conducted in Arus-Bogoria geothermal prospect area and the resulting data analyzed and interpreted. The MT data were corrected for static shift using TEM data from stations in their proximity and an integrated data set obtained. WinGlink interpretation software was used to perform 1D inversion on the TEM and MT data and the results obtained used to plot iso-resistivity maps and cross-sections for Occam inversion at different elevations to describe the resistivity distribution. Two-dimensional resistivity models were generated using five profiles cutting across the study area. The results from the resistivity analysis indicate that the hotter reservoir conditions are to the Northwest (NW) around Molo Sirwe area. This area is potentially a good high-temperature area. This may well be the upflow of the geothermal system. Resistivity distribution confirms a possible geothermal system up flowing to the NW and is structurally controlled. TEM imaging shallower depth indicates a small irregular relatively resistive anomalous body that may be gas reservoirs; this may explain the numerous gas emitting holes in Mukuyuni area. The potential area determined using resistivity anomaly is about 36 km2 to the west of the study area. More infill data however need to be collected. Feasibility studies to be conducted to determine whether the naturally existing hot springs and gas reservoirs are commercially viable.

PROFILES OF BACTERIAL COMMUNITIES MEDIATING PRODUCTION OF TSETSE ATTRACTIVE PHENOLS IN URINE OF SELECTED MAMMALS

Harry Asena Musonye-M.SC

Animal African Trypanosomiasis (AAT) is a major constraint to livestock health and production. The disease has for years continued to contribute towards economic and developmental setback in the sub-Saharan Africa. Tsetse flies belonging to Glossina species are the main vectors for transmission. They
are attracted to livestock and wildlife hosts where they feed on blood meal contaminated by trypanosomes, the disease causing parasites. Host ageing urine has been shown to be the source of phenolic blend attractive to the tsetse. The identities and ability of bacteria to mediate production of these phenols has however, not been well investigated. This study aimed at profiling bacterial communities mediating production of tsetse attractive phenols in mammalian urine. Urine samples were collected from, disease free, African buffalo (Syncerus caffer), domestic cattle (Bos taurus) and eland (Taurotragus oryx) at Kongoni Game Valley Ranch in Nakuru County and Kenyatta University in Nairobi County. Urine samples collected for each animal species were aseptically pooled together. Each animal urine sample was then divided into two portions; 400 ml portions were used for fresh urine analysis while the other 400 ml portions were left open to age at ambient conditions. Bacteriological and phenols analysis was carried out on the ageing urine portions at 4 days ageing interval for 24 days. Morphological and biochemical analyses of bacterial isolates from fresh urine tentatively revealed presence of Proteus spp., Enterobacter spp Serratia spp., Klebsiella spp., Stapylococcus spp., Streptococcus spp. and Enterococcus spp. Bacterial counts were significantly different across ageing intervals in each of the urine samples of the study animals (p≤0.0001). Highest (9.40×10^7 CFU/ml) and lowest (4.36×10^5 CFU/ml) bacterial counts were observed in urine samples of cattle (day 20) and eland (fresh) respectively. Bacteriological analysis of ageing urine revealed nineteen morphologically different isolates. On subjecting the isolates to PAST software for morphological diversity, Shannon Weiner (H) showed highest diversity index at days twelve and sixteen, both at 2.639 and lowest diversity index in fresh urine, at 1.099. GC-Phenols analysis of ageing urine extracts showed a total of nine volatile phenols: P-cresol, o-cresol, m-cresol, phenol, 3-ethylphenol, 3-propylphenol, 2-methyloxyphenol, 4-ethylphenol and 4-propylphenol. There was important qualitative difference among ageing intervals for these phenols in all the urine samples. Phenols concentrations in urine extracts of the animals were statistically different, at P≤0.05, across ageing intervals. The concentration increased with ageing urine up to day 20 and depreciated at day 24. Comparison between animals, ageing intervals and their interaction revealed significant difference in amount of phenols emitted across days (P≤0.0001). Statistical comparison of specific phenols concentration among animals showed no significant difference at P≤0.05. When screened for potential to mediate phenols production, 8 isolates were found positive. Morphological, biochemical and 16S rRNA gene characterization of the isolates closely resembled Enterococcus faecalis KUB3006, Psychrobacter alimentarius PAMC 27887, Streptococcus agalactiae 2603V, Morganella morganii sub.sp. morganii KT, Micrococcus luteus NCTC2665, Planococcus massiliensis strain ES2, Ochrobactrum pituitosum AA2 and Enterococcus faecalis OGIRF. This study established that some of the bacterial communities colonising mammalian urine are well characterized by certain phenols, which influence tsetse-host seeking behaviour. The study opens potential pathways of reducing attraction of tsetse to the host animals and enhancing “push-pull” models in vector control that combines the use of these bacteria.

IN VITRO ANTIOXIDANT ACTIVITIES OF DICHLOROMETHANE EXTRACTS OF Strychnos henningsii G. AND Ficus sycomorus L.

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Most of biochemical reactions in the body generates Reactive Oxygen Species (ROS), which are involved in the pathogenesis of oxidative stress-related disorders like diabetes, nephrotoxicity, cancer, cardiovascular disorders, inflammation and neurological disorders when they attack biochemical molecules like proteins, lipids and nucleic acid. Antioxidants are used to protect the cells or tissues against potential attack by ROS. Natural based antioxidants such as catalase, glutathione, superoxide dismutase, vitamin C and E in the body are known to quench free radicals. Most medicinal plants possess a rich source of antioxidants such as flavonoids, phenols, tannins, alkaloids among others. These phytochemicals are currently pursued as an alternative and complimentary drug. Strychnos henningsii and Ficus sycomorus are used in Africa as traditional medicine for treatment of various ailments including rheumatism, syphilis, gastrointestinal pain, snake bites, abdominal pain diabetes as well as anaesthesia, healing of wounds and as a mouth antiseptic. This study was designed to evaluate in-vitro antioxidant activities of DCM leaf extract of S. henningsii and stem bark extract of F. sycomorus using 1,1-diphenyl-2-picrylhydrazyl (DPPH), Hydrogen peroxide and Ferric reducing power assays. The antioxidants activities were assayed against ascorbic acid as a reference drug. Total flavonoids and phenolic compound were determined by Folin–Ciocalteu reaction. The results obtained showed both extracts significantly (p<0.05) exhibited antioxidants activities at different concentrations tested. The DCM leaf extract of S. henningsii and stem bark extract of F. sycomorus scavenge hydrogen peroxide radicals (H2O2) in a dose dependent manner. The half maximal percentage inhibition (IC50) of S. henningsii and F. sycomorus was 0.325 mg/ml and 0.330 mg/ml, respectively. The two extracts also scavenged DPPH in a dose dependent manner. Their IC50 value was 0.068mg/ml for S. henningsii and 0.062mg/ml for F. sycomorus. Both DCM leaf and stem bark extract of S. henningsii and F. sycomorus were found to have strong ferric reducing power in a dose dependent manner. Both the total phenolic and flavonoid content of DCM stem bark extract of F. sycomorus was lower than the leaf extract of S. henningsii. Preliminary phytochemical screening showed that both extracts possess saponins, flavonoids, phenols, steroids, alkaloids and cardiac glycoside however terpenoid were found to be absent in S. henningsii. Therefore, the results in this study showed both extracts possess secondary metabolites which are associated with antioxidants activities. The present study therefore recommends a further screening to enhance their ultimate application in management of oxidative stress-related disorders.

IN VITRO REGENERATION AND TRANSFORMATION OF Striga hermonthica (Delile) Benth

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Dr. Mark Wamalwa
Striga is an obligate root hemi-parasitic angiosperm that causes devastating cereal crop losses to millions of smallholder farmers in sub-Saharan Africa (SSA). The parasite causes the greatest effects on infertile soils thereby directly affecting the lives of the poorest subsistence farmers. The parasite attaches to a host crop’s roots, and exploits its water and nutrients leading to stunted growth and death. Several cultural control methods including; crop rotation, use of trap crops, intercropping, management of soil fertility and seed based technologies have been practiced for decades with limited success. The molecular and genetic mechanisms underpinning Striga-host interactions are poorly understood mainly because functional genetic tools that require aseptic parasite growth, genetic transformation and subsequent regeneration are complicated by the complex Striga life cycle and the obligate nature of the parasite; which may have specific host requirements not available in the culture media. This study describes the growth of Striga hermonthica under aseptic conditions. S. hermonthica seeds were surface sterilized in a laminar flow and preconditioned for 14 days in the dark at 28ºC. The seeds were then germinated using GR24, a synthetic strigolactone analogue, and then cultured on hormone free Murashige and Skoog (MS) media for 14 days. A seedling was formed within 14 days which was then sub-cultured to MS media in the light. Striga plants were produced after 28 days which proved useful in the provision of clean explants for tissue culture. This study also optimized the conditions for the regeneration of S. hermonthica through somatic embryogenesis and direct organogenesis. The best concentrations of growth regulators for callus induction, with a callus induction frequency of 96.7%, was 2.0 mg/l Naphthaleneacetic acid (NAA) and 0.5 mg/l 6-Benzylaminopurine (BAP). For shoot induction, the optimum concentration was 1 mg/l BAP without NAA, which had a 93.3% shoot induction frequency. With regard to explant type, there were no significant differences in the frequency of callus induction between stem, leaf and whole seedling explants of S. hermonthica. No callus was formed when seed radicals were used. Co-culturing rice, a Striga host, with S. hermonthica calli in the same media did not influence the growth of the parasite. However, the parasite negatively affected the growth of the rice by causing necrotic lesions on the leaves of the rice despite there being no attachment. Finally, Agrobacterium tumefaciens harboring a plasmid with the β glucuronidase (GUS) reporter gene was used to test the transformability of S. hermonthica calli and found that the calli tissues tested positive for GUS staining. The protocols described in this study will enhance further understanding of the complex Striga-host interactions by providing a channel for the functional analysis and validation of Striga genes identified through genomic and transcriptomic analyses.

ANTIPROLIFERATIVE ACTIVITIES, GENE EXPRESSION PROFILES AND TOXICITY OF SELECTED MEDICINAL PLANTS AGAINST CANCEROUS AND NORMAL CELLS

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Cancer is among the leading causes of morbidity and mortality worldwide and accounts for up to 28,000 deaths annually in Kenya. Globally, approximately 13% of all deaths annually are attributed to cancer.
Surgery, radiation and chemotherapy are the current treatment techniques for cancer; however, these methods are expensive, have high failure rates and have been associated with detrimental side effects. Plants derived products could be good candidates in alleviating challenges being experienced with current methods. This study aimed at evaluating the phytochemistry, antiproliferative potential, safety and probable mechanism of action of Albizia gummifera, Senna didymobotrya, and Rhamnus staddo extracts. Preliminary phytochemical screening was done as per standard procedures. The common 3-(4,5-dimethylthiazol-2-yl) -2, 5-diphenyltetrazolium (MTT) dye was used in the determination of the antiproliferative activity of the extracts. Extracts induction of VEGF (angiogenesis) and p53 (apoptosis) genes’ expression was evaluated using Real Time Polymerase Chain Reaction with GAPDH as the endogenous control. Acute oral and sub-acute toxicity was evaluated in female Albino Swiss mice. Phytochemical screening revealed presence of alkaloids, tannins, glycosides, flavonoids, terpenes, phenolics and saponins in the plants extracts. A. gummifera’s stem bark methanol: dichloromethane extract had the highest activity against the cancerous cell lines tested viz: HCC1395 (IC50 6.07±0.04μg/ml), DU145 (IC50 3.34±0.05μg/ml), CT26 (IC50 5.78±0.08μg/ml) and Hep2 (IC50 7.02±0.01μg/ml). R. staddo root bark methanol: dichloromethane extract had an IC50 value of 15.71±0.04μg/ml on HCC, 9.81±0.09μg/ml on Hep2 and 11.14±0.39μg/ml on CT26. S. didymobotrya root bark methanol: dichloromethane extract inhibited HCC with an IC50 65.06±0.07μg/ml, CT26 with an IC50 15.71±0.04μg/ml and Hep 2 with an IC50 62.10±0.11μg/ml. From the results obtained, the plants exhibited selective inhibition to cancer cells while sparing the normal cells (SI ≥ 3). A. gummifera, S. didymobotrya and R. staddo plant extracts upregulated p53 and down-regulated VEGF gene. For the acute toxicity, no mortality and no significant changes were observed in body weight and wellness parameters at 50, 300 and 2000mg/kg body weight doses of the plants’ extracts. The sub-acute toxicity, however, demonstrated toxic effects as evidenced by the hematological and biochemical parameters changes, weekly change in body weights, changes in organ weights and relative organ to body weights of mice. In conclusion, this study confirms potential application of these plants in cancer management and act as a lead to cancer drug development. The phytochemicals present in these plants are most possibly responsible for the antiproliferative and potential anticancer activities.

PROFILES AND ANTIMICROBIAL RESPONSE PATTERNS OF HUMAN FEET BACTERIAL ISOLATES OF INDIVIDUALS WITH DIFFERENTIAL ATTRACTION TO ANOPHELES GAMBIAE IN KILIFI, KENYA

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Malaria is a mosquito-borne illness caused by Plasmodium parasites carried by certain species of mosquitoes. It is currently a global problem where more than 2 billion people in 110 countries at risk, with an estimated 2.7 million deaths per year of which the majority are children. In Kenya, Anopheles gambiae s.s is the most effective vector in human malaria transmission. Studies have indicated that some of the chemical cues in the feet odour that mediate attraction of An. gambiae s.s to their
preferred feeding site may be of microbial origin. However, the profiles and phylogenetic affiliations of the microbes have not been fully characterized. The objectives of this study were to determine the different levels of attraction of female Anopheles gambiae s.s to the feet odours, to isolate and characterize the bacterial isolates, and to assess their antimicrobial response patterns. Ten volunteer male adult participants in Kilifi, Kenya, were recruited for the differential attraction experiment. Swab samples from the most to the least attractive individuals were used to isolate feet derived bacterial isolates. The isolates were then characterized based on cultural, morphological and molecular techniques. Specifically, the isolates were characterized based on 16S rRNA gene-based Sanger sequencing using 27F and 1492R bacterial primer pair. The phylogenetic analyses were then done on MEGA7 together with its available software tools. The antimicrobial patterns of the bacterial isolates were characterized using commercially available antibiotics and antiseptics. Results indicate that, of the ten (10) participants recruited in the study, participant two (2) was the most attractive while participant six (6) was the least attractive to the female An. gambiae s.s mosquitoes. There was a significant (p=0.001) variation in the attraction of the female mosquitoes to the feet sites (front and back), the front site being more attractive. On the other hand, the attraction of the mosquitoes to the left and right legs did not differ significantly (p=0.274). Nineteen (19) bacterial morpho-groups were obtained from the samples with a majority of them fourteen (14) being mainly present on the front part of the feet. Phylogenetic analysis revealed diverse bacterial communities belonging to different genera. Based on phylogeny, participant two (2) was mainly dominated by isolates belonging to Staphylococcus capitis and Staphylococcus simulans, both are associated with the production of lipase enzyme that breaks down lipids in sweat leading to production of foot odour. Isolates belonging to Staphylococcus xylosus and Bacillus pumilus were shared among participant two (2) and participant six (6). Two novel isolates, PTXV and PTXVI, could not be identified based on phylogeny. Antibiotic response patterns revealed that isolates belonging to Bacillus safensis, Bacillus pumilus and a potentially novel isolate PTXV were susceptible to the six antibiotics. Ciprofloxacin was the most effective antibiotic while antiseptic A was the most effective antiseptic against the bacterial isolates. The results show that the differential attraction of Anopheles gambiae s.s females to individuals in malaria-endemic regions is evident and mediated by differing bacterial numbers among the participants.

USE OF OYSTER MUSHROOM (Pleurotus ostreatus) TO DEGRADE USED DIAPERS AND SANITARY PADS IN SELECTED ESATATES IN THIKA, KIAMBU COUNTY, KENYA

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Sanitary materials (pads and diapers) are mainly made of cellulose and non-degradable synthetic elements including superabsorbent gel which collects fluids. These materials are disposed of in the open together with other domestic waste in the low-income urban settlements in Kenya. The waste remains uncollected for long, thus posing health risk to street children and the neighborhood especially when
scattered by stray dogs, cats and chicken. The scattered sanitary materials are a nuisance to the public who consider it a taboo to view. Therefore, a study was designed to evaluate the use of disposable baby diapers and sanitary pads as a substrate for cultivation of oyster mushroom instead of wheat straw (positive control) and therefore recommend the use of oyster mushroom for clearing the environment. It will also facilitate the unlocking of structural carbon locked up in the sanitary materials, which is a contributory element to global warming when incinerated. This will also provide a solution to blockage of sewage and drainage in urban centers and clear covered sites for cultivation, grazing and recreation. Five samples per site from 4 sites from each of the 5 phases totaling to a 100 samples per sanitary material. The materials were washed in running tap water, autoclaved and cooled overnight, then hygienically cut into 4 cm pieces and soaked overnight. Wheat straw was similarly treated. Then 230 g of each of the 3 substrate were weighed (while wet). Thereafter wheat bran and lime powder were added to each substrate and thoroughly mixed, hand compressed in a polypropylene bag, pasteurized, then inoculated with grain spawns (2 % w.w) of Pleurotus ostreatus. Each of the inoculated substrates was replicated 12 times and inoculated bags incubated in a room maintained at 20-25oC and 85-90 % relative humidity. Growth parameters: weights, cap diameter, the height and the base stipe circumference measurements were taken on days: twenty, forty and sixty. The residual weight of the substrates and the percentage of carbon were concurrently determined. The results were analyzed using Anova followed by Tukey’s test. The mushroom weight in pads and diapers did not differ significantly (p<0.05) but was significantly (p<0.05) lower than in wheat straw. The mushroom diameter, height and circumference in diapers and wheat straw did not differ significantly (p<0.05). However, the mushroom diameter and circumference was significantly (p<0.05) lower. Furthermore, the growth of the mushroom in all the substrate declined (with respect to the values of growth parameters) with subsequent cropping (days 40, 60). Similarly, the carbon percentage and the weight of the residual substrate decreased with subsequent cropping. It can therefore be concluded that sanitary materials can be used as an alternative substrate for growing mushroom. Such approach would therefore be significant in that, it clears the environment of discarded sanitary materials and provides an alternative source of producing mushroom for food and feed. Hence, it is recommended that a system be established that utilizes sanitary materials as a substrate and harvest mushroom as a product as a motivation to stakeholders to participate in clearing the environment as well as earning from mushroom sales.

POLLINATION AND GUTTATION IN SWEET MELON CUCUMIS MELO L. GROWN UNDER FIELD AND GREENHOUSE CONDITIONS IN NAIROBI COUNTY, KENYA

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Sweet melon (Cucumis melo L.) is a plant that produces a fleshy edible fruit and belongs to the family Cucurbitaceae. As an economic crop, the sweet melon is highly consumed by the urban population in
Kenya. The pollination ecology of the crop is not well understood. Effective pollination is essential for fruit set and overall productivity of sweet melons. The use of pest control products can adversely impair pollination provision through direct decimation of pollinators or their repellence from flowers. Guttation, which refers to secretion of water through pores in the leaves, can act as a mode of exposing pollinators to pesticides. This study aimed at investigating pollination ecology and guttation fluid production in sweet melons grown under field and greenhouse conditions. Experiments were conducted under field and greenhouse conditions at Kenya Agricultural and Livestock Research Organization-Kabete site situated along Waiyaki way, Nairobi County. A completely randomized design with three replicates was used for the field experiments to identify pollinators, determine the best pollinators in greenhouses and assess guttation production. Treatments were honey bee pollination, stingless bee pollination and the control experiment with no pollinators. Sampling of guttation fluid on sweet melon leaves was done at dawn using a small spoon and a syringe. The consumption of guttation water by bees in the field was also observed. To identify pollinators in the open-field, insect visitors were captured and identified using the dichotomous key and their duration of visit on sweet melons flowers in the field and greenhouses were observed and recorded using a stopwatch. Data on number of visits and durations of visits was subjected to one way analysis of variance (ANOVA), to determine the significant difference between honey bees, butterflies and hoverflies. Data on weight of fruits and number of developed seeds collected from the honeybees, stingless bees and control greenhouses was subjected to one way ANOVA, and means compared using Turkey’s test to determine the best pollinator of greenhouse sweet melons. Results showed that honey bees were the most common insect visitors on sweet melon flowers in the field. Honey bees (Apis mellifera) also spent more time on the sweet melon flowers than butterflies (Papilio dardanus) and hoverflies (Syrphys ribesii). There was a significant difference (P<0.001) in mean number of fruits and developed seeds between pollination by honey bees and pollination by stingless bees.Guttation was recorded in sweet melons in the field in the early morning hours. The results of the present study showed the potential of using managed honey bees in pollinating sweet melons in the field and in greenhouses to improve yields. Stingless bees should not be used as alternatives to honey bees for pollination in the greenhouses. It is further suggested that pest control products selected by farmers should consider pollinators to ensure pollination is effected.

EVALUATION OF PRE-ATTACHMENT AND POST-ATTACHMENT Striga hermonthica (del.) BENTH. RESISTANCE IN PEARL MILLET (Pennisetum glaucum (L.) )

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Striga species are parasitic weeds, one of the most devastating biological constraint
threatening agriculture especially production of cereals in sub-Saharan Africa (SSA), causing approximately 30% to near crop failure, thus endangering the livelihood of more than 300 million poor smallholder farmers. One way of combating Striga is having natural host resistance which is cost effective and efficient for tolerance to phytopathogenic damages. Such resistance can either be due to failure of the host to stimulate germination of the parasite (pre-germination resistance) or blockage of the parasite penetration by the host (post-germination resistance). From field evaluations, wild pearl millet (Pennisetum glaucum) accession 29 AW was shown to get less Striga attachments compared to the cultivated variety, SOSAT-C88 P10. However, the mechanism of resistance was not established. The aims of this study were to investigate pre- and post-attachment Striga resistance in pearl millet using SOSAT-C88 P10, a cultivated susceptible pearl millet and 29 AW. Pre-germination resistance was determined using an agar-gel assay which measured the maximum germination distance (MGD), whereas post-germination resistance was determined using rhizotron based approach as well as histological analyses. A high Striga germination activity was observed in SOSAT-C88 P10 (MGD= 35.94 + 2.88>10 mm) coupled with elevated percentage of germinated Striga seeds (>85.04%) compared to 29 AW (MGD= 7.96 + 2.75 mm<10 mm) with few sprouts (8.14 %) of the parasite. Moreover, macroscopic screening showed that there were highly significant differences between SOSAT-C88 P10 and 29 AW in terms of number of Striga attachments, Striga dry weight and the length of Striga seedlings (P-value < 0.05). SOSAT-C88 P10 had many Striga attachments, with much longer Striga seedlings with significant weight, while, 29 AW had very few Striga seedlings attachment, smaller and slow growth seedlings with lower biomass. Further histological analyses revealed that the high number of attachments of Striga on SOSAT-C88 P10 compared to 29 AW was due to biochemical or
physiological barriers at host endodermis layer. This work therefore demonstrated that there are multiple forms of Striga resistance (pre- and post-attachment) in wild pearl millet 29 AW. These findings will be useful for future resistance breeding of pearl millet.

DETECTION OF PATHOGENIC HUMAN ADENOVIRUSES AND ENTEROVIRUSES IN WATER SAMPLES COLLECTED FROM LAKE VICTORIA ALONG HOMA BAY TOWN, HOMA BAY COUNTY, KENYA

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Lake Victoria is the main source of water in Homa Bay town as well as the surrounding community. Increase in population in the recent past has led to intensified human activities with a possible compromise on the sanitation standards around the town consequently resulting into increased fecal load to the lake through fecal pollution. Increased fecal contamination of the lake has consequently led to an increase in pathogenic microorganisms including waterborne enteric viruses. These viruses can affect both human and animals health by causing diseases such as gastrointestinal infections. Research on viral water quality in Lake Victoria is limited. The objectives of this study were to determine the occurrence of these pathogenic enteric viruses with respect to human adenoviruses and enteroviruses in Lake Victoria Waters. Factors that may have influenced the levels of contamination of the lake water by the viruses such as physical water parameters, seasonal variations, proximity to sewage effluent and pit latrines were assessed. Water samples were collected from six sites commonly used for domestic and commercial purposes spanning approximately 3 km along the shoreline for analysis for the presence or absence of the two groups of enteric viruses over a seven month period. A total of 216 water samples were analysed for possible contamination with the viruses using nested PCR method. Paired t test, ANOVA, Odds Ratios, Correlation and Regression analysis (STATA ver.13.0) were performed to determine factors associated with the virus contamination of the waters. P-values<0.05 were considered significant at 95 % confidence interval. Analysis showed that the lake is contaminated with adenoviruses and enteroviruses which were discovered in 11(5.09 %) and 7(3.24 %) of the samples, respectively. The presence of the enteric viruses was strongly associated with the distance from possible sources of contamination (odds ratio 20.28 and 4.86, confidence interval 2.42, and 0.95) for pit latrines and the sewage treatment plant respectively. Neither wet season nor dry season was associated with the prevalence of the viruses. Of the 72 samples collected from the sites (L5 and L6) closer to the sewage effluent points 13(18 %) tested positive for the two types of viruses. This research clearly signifies that waste water discharge and wastewater-impacted surface waters along the shores of Lake Victoria contain some enteric viruses. This contamination may be due to the fact that the enteric viruses can highly persist in the environmental waters due to their ability to be resistant to environmental
conditions. This viral analysis will provide the much needed information in controlling the source of pollen of the lake, such as untreated sewage effluents. It will be useful in ascertaining health risks from the analysis of viral exposure. Further research and analysis is recommended to ascertain the true position concerning the public health implication and whether the contamination may be as a result of ineffective waste water treatment.

GENETIC CHARACTERIZATION OF HONEYBEE (Apis mellifera) IN COMO-ROS ISLANDS USING MITOCHONDRIAL AND MICROSATellite MARK-ERS

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Honeybees, Apis mellifera, are key contributors to the global economy, nutrition, food security and ecological biodiversity. Despite their robust benefits, declines in honeybee populations have been reported owing to a number of factors. Such include pests and diseases, climate change, poor management practices, change in land usage and low genetic diversity. High intra-colonial genetic diversity is associated with resilience and resistance to pest and diseases as well as increased colony level fitness. The use of morphological characters to characterize honeybees is limited by the fact that they are subject to manipulation by environmental selection pressures and introgression resulting from hybridization between sub-species. Hence, mitochondrial and microsatellite markers which are more powerful and neutral have been used. Honeybees native to the Comoros islands have not been characterized despite the fact that islands often possess endemic species which serve as distinct genetic reservoirs with unusual adaptations. This study aimed at generating extensive knowledge on the genetic diversity and population structure of honeybees in Comoros islands using mitochondrial and microsatellite markers. In the study, 160 wild and managed colonies were sampled across the Comoros archipelagos and characterized. Mitochondrial analyses involved PCR amplification and sequencing of the intergenic region spanning between COI-COII genes followed by phylogenetic analyses. In addition, 16 colonies distributed across the three islands were analyzed using 19 microsatellite markers. The mtDNA sequences analyses revealed the existence of three haplotypes in Comoros Islands where A1 haplotype, with a distribution of 51%, 80% and 91% in Anjouan, Moheli and Ngazidja respectively was predominant. Two other haplotypes (L1 and L2) were newly described in this study. They had a cumulative distribution of 48% in Anjouan, 20% in Moheli and 9% in Ngazidja. L1 and L2 showed high levels of variability as compared to A1 lineage. L2 arose from rare mtDNA recombination between L1 and A1 lineages. Discriminant Analysis of Principal Components, Provesti’s neighbor joining tree and Bayesian clustering in STRUCTURE clustered the samples according to geography suggesting a restricted gene flow between islands. The population is strongly differentiated (GST=0.41±0.068) with a much stronger differentiation between Ngazidja and Moheli (GST = 0.53) than Anjouan and Moheli (GST =
0.37) or Anjouan and Ngazidja (GST =0.38)). High levels of genetic diversity evidenced by high number of alleles per locus (5.92 (±0.05)), and the high expected heterozygosity (0.66 (±0.03)). Private alleles (216 and 218) were detected at A113 locus. In conclusion, mtDNA haplotypes can coexist and undergo rare mtDNA recombination as well as hy-bridization at the nuclear genome. There is need to investigate mechanisms that enable mtDNA recombination in honeybees.

ANTIBACTERIAL EFFECTS OF METHANOLIC LEAF EXTRACTS OF Acacia ataxacantha DC AND Piliostigma thonningii Milne-Redh

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Bacterial infections can become life-threatening if not properly treated. They cause millions of deaths worldwide with more than half of these deaths occurring in the African continent. Rise in bacterial infections is due to increased human population, HIV infections and reversion of previously harmless micro-organisms to pathogens. The discovery of antibiotics in 1940s removed the threat of these infections on human life. However, conventional antibiotics are considerably costly and have adverse side effects. Moreover, limited health facilities are constrained and several bacteria have developed antibiotic resistance raising fear of mankind returning back to pre-antibiotic era. There is still hope even if antibiotics completely fail. Medicinal plants possess bioactive compounds which can provide the best alternative source to obtain new, safe, affordable and accessible antibacterials. It is important to take a fresh look at plants in a bid to discover new effective antibiotics. Acacia ataxacantha and Piliostigma thonningii are indigenous plants used by the Mbeere community to treat various infections but lack scientific data to confirm their activities. This study investigated the in vitro antibacterial activities of of the two plants extract against Staphylococcus aureus ATCC 29213 and Bacillus subtilis clinical isolate, Eschericia coli ATCC 25922, Salmonella typhi ATCC 1408 and Shigella flexneri ATCC 12022. The antimicrobial assays included disc diffusion, Minimum Inhibitory Concentration (MIC) and Bactericidal Concentration (MBC); Gentamycin and DMSO as reference positive and negative control respectively. Both the extracts of P. thonningii and A. ataxacantha inhibited the growth of the studied bacterial pathogens producing Mean Zones of Inhibition (MZI) ranging from 6.33±0.33 to 19.00±0.58 mm and 6.33±0.33 to 17.00±0.58 mm respectively. The MZI, MIC, MBC were statistically significant at p<0.05. Gentamycin inhibited the growth of the bacteria at a lower concentration while DMSO showed no activity against all the bacteria. The values obtained from MBC assays were higher than those of MIC assays. Qualitative phytochemical analysis showed the presence of saponins, steroids, alkaloids, flavonoids, terpenoids, phenols and tannins which could be responsible for the observed antibacterial
activities. The extracts of P. thonningii and A. ataxacantha exhibited a broad spectrum antibacterial activities in a concentration dependent manner hence confirm their usage in folk medicine. There was no significant difference in the antibacterial activities of Acacia ataxacantha and Piliostigma thonningii. The extracts were bactericidal against S. aureus, B. subtilis, S. flexneri and S.typhi while they were bacteriostatic against E. coli. The plants therefore, provide hope for a source of new antibacterial agent. The current study, therefore, recommends the ethnomedicinal and therapeutic use of P. thonningii and A. ataxacantha in treatment and management of bacterial infections after further comprehensive study of their toxicity and safety profiles.

OPTICAL AND ELECTRICAL CHARACTERIZATION OF CuS AND CdS:B THIN FILMS FOR SOLAR CELLS APPLICATION

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Dr. Walter K. Njoroge

Thin film Photovoltaic cells will have high efficiency when a p-type material with a narrow band gap and a n-type material with wide band gap are used. Their Efficiency is influenced by; deposition techniques, deposition conditions and the components in the reaction bath used in depositing the films. These factors influence the optical properties of the solar cell. Hetero-junction devices with Boron doped CdS (n-type) thin films used as window layers in solar cells show improved electrical conductivity. Despite CdS:B and CuS having good qualities for use as window and absorber layers respectively for a solar cell, there is no information on CdS:B / CuS p-n junction solar cell. In this research, CdS:B thin films were prepared by CBD method on glass substrates and optimized for application as a window material. On the other hand, copper sulphide (CuS) layer was prepared using same method on ordinary glass substrates and optimized as an absorber material. The film’s electrical resistivity was determined using the four point probe to determine their sheet resistance. Optical properties like Reflectance(%) and Transmittance(%) were measured by UV-VIS NIR 3700 spectrophotometer and used to calculate other optical constants like band gap (Eg),refractive index (n),extinction coefficient (k) and absorption coefficient (α). The results were analysed to determine how optical transmittance, absorbance and the electrical resistivity varied with the conditions of deposition using the Scout software. Conditions that gave Boron doped CdS and CuS optimum optical and electrical properties were then chosen and used to prepare CdS:B-CuS photovoltaic cell. The CdS:B thin film deposited at 85oC using 20cm3 of boric acid was selected as the best for fabricating the solar cell’s window layer. It had the highest electrical conductivity of 83.71 (Ωcm)-1, transmittance of 82.2% and band gap of 2.4468eV. The CuS thin film deposited in a time of four hours was selected as the best for preparation of solar cell’s absorber layer, with low band gap of 1.77 eV. Solar cell simulator was used in characterizing the prepared CdS:B/CuS solar cell. The cell had the following parameters: Open circuit voltage (Voc) = 0.39V, Short circuit current (Isc) = 0.032A, maximum current (Imax) = 0.028A, maximum voltage (V max) = 0.26V, Maximum power = 0.00728W cell area = 1.425× 10-3m2 , Field factor (FF) =0.583 and efficiency (η) of 0.51%.
IN VITRO ANTIBACTERIAL ACTIVITIES OF DICHLOROMETHANE- METHANOLIC EXTRACTS OF Croton megalocarpus Hutch, Strychnos henningsii Gilg and Psorospermum febrifugum Spach

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Pathogenic bacteria cause infectious diseases that affect many life forms. Antimicrobial agents have played a significant role in reducing mortality and morbidity associated with human infectious diseases. However, due to emergence of multi drug resistant bacteria, the side effects associated with antibiotics and the high cost of antimicrobial drugs, management of bacterial infections has become difficult in developing countries. Herbal medicines are easily accessible with minimal side effects. They therefore provide an alternative in the management of bacterial infections. Croton megalocarpus, Strychnos henningsii and Psorospermum febrifugum are medicinal plants used to treat bacterial infections traditionally. The aim of this study was to determine the antibacterial activities of dichloromethane-methanolic extracts of these plants against human pathogenic bacteria. Stem barks of C. megalocarpus and S. henningsii and roots of P. febrifugum were collected from Mwingi Sub-county of Kitui County and transported to Kenyatta university laboratory. The plant samples were dried under shade then ground into fine powder and extracted using dichloromethane-methanol (1:1). Crude extracts from the plants were screened against five strains of bacteria: - Esherichia coli ATCC 25922, Salmonella typhi ATCC 19430, Bacillus subtilis ATCC 6051, Shigella flexneri ATCC 700930 and Staphylococcus aureus ATCC 25923 obtained from department of Biochemistry, Microbiology and Biotechnology, Kenyatta University. Antibacterial susceptibility tests were done using disc diffusion method. 6 mm sterile discs were impregnated with different extract concentrations and then placed on Mueller Hinton agar plates inoculated with the bacterial strains. The plates were incubated at 370C for 24 hours. The activity was determined by measuring the zones of inhibition in millimeters. Data was analyzed using one-way ANOVA and expressed as mean and standard error of mean. Generally, S. henningsii stem bark extract had the highest inhibitory activities, producing the lowest MIC values ranging between 9.38 mg/ml and 37.50 mg/ml. This could have been due to wide range of phytochemicals. B. subtilis and S. aureus were the most sensitive bacteria to the extracts. The antibacterial activities of the extracts were found to be much lower compared to the reference drug Ciprofloxacin. The qualitative phytochemical analysis of the extracts revealed presence of bioactive components such as tannins, alkaloids, saponins, sterols, phenols, flavonoids and terpenoids, which are associated with antibacterial properties. The results provide support for the use of plants in traditional medicine.

IMPACT ASSESSMENT OF RADIONUCLIDE DISPERSAL AROUND THE NANDI-HILLS TEA FARMING COMPLEX IN KENYA

Busienei Mark-M.SC
Natural radioactivity levels vary widely in the Earth’s environment; existing in soil, plants, water and air in different concentrations. Various anthropogenic activities such as phosphate fertilizer supported agricultural activities may enhance the concentrations of these radionuclides relative to the natural background as phosphate fertilizer contains not only traces of heavy metals, but also potassium and naturally occurring radionuclides such as thorium and uranium and their decay products. In this study, the levels and immobilization of the radionuclides (40K, 238U, 232Th, 228Ac and 214Pb) was investigated; laterally outwards, downstream and vertically down through the soil profiles in Nandi Hills tea farming complex in Kenya where there is intense use of artificial fertilizer which started in 1940s. To establish whether these radionuclides were transferring from grass to the grazing livestock to man via the milk/food chain, the natural radioactivity levels in grass sampled at 5 m, 10 m and 15 m outwards from the river bank was studied. The activity concentrations of the radionuclides were determined using NaI(Tl) gamma ray spectrometry and the data analyzed using multivariate chemometric techniques, namely Principal Components Analysis (PCA) and Hierarchical Cluster Analysis (HCA) to characterize the patterns and radionuclide sources. The activity concentrations in soil samples (in Bq/kg) measured at depth of 10-15 cm, 5 m outwards from the river bank along the two river basins ranged from 706.44±12.87 – 865.15±13.47 for 40K, 49.10±7.01 – 57.71±6.04 for 238U and 64.39±7.06 – 86.46±8.13 for 232Th. It was found that the naturally occurring radionuclides 40K, 238U and 232Th in soil and grass samples were immobilized both outwards from the river bank and downstream, there was no observable trend for 228Ac and 214P. The ratio of 232Th/238U and 232Th/40K in soils and grass samples were higher than control point values, this revealed uranium and potassium enrichment respectively in the study area. The calculated radium equivalent activity (Raeq), the absorbed dose rate (D), and the external hazard index (Hex) were within the international recommended values. Multivariate chemometrics techniques enabled to classify the samples according to region of origin; either upstream, midstream, downstream or control point and to assess the impact of phosphate fertilizer tea farming by identifying the possible sources of the radionuclides. The results showed that 40K, 238U, 232Th and 214Pb originated from agricultural sources while 228Ac originated from natural weathering of the rocks in the study area.

INFLUENCE OF i-ZnO BUFFER LAYER ON Cu2O–ZnO:Al P-N JUNCTION FOR SOLAR CELL APPLICATIONS

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Department: Physics
Supervisors: Dr. Walter K. Njoroge

Dr. Munji. P.K
Direct conversion of solar energy into electricity using the photovoltaic effects suffers from low efficiency. Thus, increasing the efficiency conversion becomes a major goal of solar cells manufacturers. One way of increasing efficiency is by applying a buffer layer hence widening the depletion layer. Research on new and cheap buffer layers is of paramount importance in enhancing the efficiency of solar cells. When solar energy falls on a P-N junction, Photons with energy greater than the band gap of the semiconductor are absorbed. Electron - hole pairs are created which are driven to the outside circuit by the electric field formed at the depletion layer. The risk of interface recombination is higher for heterojunction solar cells due to lattice mismatch, defects and imperfections at the junction. An appropriate buffer layer enlarges the depletion layer minimizing interface recombination and altering solar cell efficiency. In this work, p- Cu2O, intrinsic Zinc Oxide buffer layer and n-ZnO:Al thin films have been deposited on conducting glass substrates by evaporation technique using an Edward Auto 306 Magnetron evaporation System. Transmittance and reflectance data in the range 300 nm-1200 nm were obtained using UV-VIS NIR Spectrophotometer Solid State 3700 DUV for all the thin films samples that were prepared. Transmittance values of less than 45% for copper oxide and above 70% for aluminium doped zinc oxide were observed. The optical measurements were simulated using SCOUT 98 software to determine optical constants and optical bad gap of the thin films. Band gap values of 2.34 eV – 2.42 eV were observed for Copper Oxide and 3.25 eV - 3.38 eV for Aluminium Zinc Oxide. Cu2O-ZnO: Al p-n junctions with i-ZnO buffer layer were fabricated by thermal evaporation technique on a conducting glass slide. The influence of the thickness of the i-ZnO buffer layer on the fabricated p-n junction was investigated. An optimal thickness of buffer layer was found to be 20.5 nm with a fill factor of 0.6346 for the fabricated p-n junction. Current-Voltage (I-V) characteristic of the fabricated p-n junction was obtained using a solar simulator. From the I-V characteristic the following parameters were determined; open circuit voltage Voc = 0.5599 V and the short circuit current Isc = 0.01193A resulting in 0.656 % solar cell efficiency up from 0.4701% without the buffer layer. An improvement of 39.5% in the efficiency was observed for the p-n junction with i-ZnO buffer layer.

CHARACTERISATION OF DEAD CRUDE OIL FROM NGAMIA REGION TURKANA COUNTY, KENYA

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Crude oil is evaluated by the physicochemical analysis of its constituents. This provides the basis for its economic valuation, engineering design of production and processing facilities. The purpose of this study was to determine the physicochemical properties of dead crude oil from Ngamia oil field. The quality of the crude is not known and needs to be determined. This is the first study to be done in Kenya in this research area and hence the findings will provide the baseline data for reference and other further related research. The dead crude oil samples were collected from the Ngamia oil field (Ngamia well sites: 3, 6 and 8) and analyzed for physical and chemical properties which include; specific density, total sediments (particulate matter), melting point, calorific value, pour point, viscosity, true boiling
point, refractive index, flash point, total acid number, sulphur content, moisture content, mineral salts (ions) and pH. The study utilized experimental approach to meet its objectives where each parameter was determined using specific analytical techniques in compliance with the accepted International American Standard Test Methods (ASTM). The results show that the mean of the physicochemical levels of dead crude oil obtained during the study were: moisture content $0.70 \pm 0.17\%$, melting point $39.75 \pm 2.22$ oC, boiling point $225.79 \pm 40.0$ oC, pour point $38.43 \pm 0.60$ oC, viscosity $5.72 \pm 0.27$ centipoises measured at $30$ oC, sulphur content $0.0924 \pm 0.0022\%$, total acid number $0.66 \pm 0.39$ Mg, KOH, calorific value $31.85 \pm 3.53$kJ g$^{-1}$, % weight of total sediments present $93.79 \pm 0.07\%$, density $30.85 \pm 0.06$, pH $7.33 \pm 0.45$, flash point $68.82 \pm 0.94$ oC and that of the metal ion concentrations for the presence of Zn, Cu, Pb, Mn, Cd, Fe, Na, K and Ca ions were Zn$(8.90 \pm 1.03)$ μgg$^{-1}$, Cu$(25.28 \pm 3.99)$ μgg$^{-1}$, Fe$(12.91 \pm 1.63)$ μgg$^{-1}$ and Mn$(8.10 \pm 1.84)$. The mean concentrations in μgg$^{-1}$ for Sodium, Calcium and Potassium were $(70.50 \pm 2.52)$, $(1983 \pm 2.58)$ and $(22.0 \pm 3.57)$ respectively. The concentration levels of both Cadmium and Lead were below the detection limit therefore will not influence the choice of the catalysts during refining while the levels of the other metal ions were within the accepted Institute of Petroleum (IP) limits. It is concluded that Ngamia oil is weakly acidic, not highly flammable due to its low flash points, contains high % sediments, has low moisture content % $(0.70 \pm 0.17)$ and is free from high heavy metal ion concentrations. Its quality therefore meets the accepted API standards and it will have low costs of production for refinery since it has both low moisture and sulphur contents and will not cause spillage while on transit as it is viscous. It is recommended that heated equipment be utilized for storage and transportation to minimize the potential risk of wax deposition in vessels. The results, findings and recommendations of this study will be availed to the Ministry of Petroleum and Mining, Tullow Oil Company, Society of Petroleum Engineers, American association of Petroleum geologists and other stakeholders in the oil and gas sector.

CHARACTERIZATION OF SnSe-ZnS: Al PN JUNCTION THIN FILM FOR A SOLAR CELL APPLICATION

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Dr. M. Munji

Energy crisis occasioned by decline in the availability of fossil fuel and increasing carbon dioxide emission that are causing global warming has enhanced interest in the development of clean and renewable sources of energy. Solar energy is becoming primary source of energy replacing fossil due to its abundance and its reliability in most part of the country. Since time in memorial silicon based solar cells have been in the market, but their cost and conversion efficiency have been wanting. There is need to find an alternative material which can maintain the efficiency and the cost of these cells. SnSe and ZnS:Al thin films are critical for the creation of a future improved more efficient solar cell devices. This is because of their better optical characteristic in the visible region of the solar spectrum. In this study, both Tin selenide and Al doped Zinc Sulphide thin film was coated on the glass substrate by evaporation technique using Edward Auto 306 evaporation system. The optical properties such as transmittance and
reflectance for both SnSe and ZnS:Al were measured using Spectrophotometer 3700 for all the samples that were prepared. The optical band gap and the thickness of each sample prepared were calculated from scout software using OJL, Drude and harmonic oscillator models. Four point probe interface with Keithley 2400 Source meter was used to measure surface resistance after which resistivity was calculated. The I-V data were measured using solar simulator from which power, fill factor and the efficiency of the cell were calculated. Transmittance values of SnSe thin films deposited ranges between 1-55% while reflectance ranges from 4-45%. The values of band Gap obtained for SnSe thin films were in the range of 0.9-1.73eV and showed a decrease in resistivity from 238 Ωcm to 63Ωcm. The optical properties of ZnS:Al showed high transmittance in the visible region which varies slightly with aluminium doping concentration. Transmittance ranged from 70-89% and reflectance average of 12.5%. As Al concentration increases, the band gap decreases from 3.86 to 3.57 eV up to 6% Al concentration. Resistivity decreases with the increase of Al from concentration from 2.5×105 Ωcm to 1.6×102 Ωcm. The solar cell was fabricated using optimized sample of Sn/Se of 1 and 6% doped ZnS:Al forming SnSe-ZnS: Al a junction. The I-V characteristics calculated were open circuit voltage (Voc) of 0.6V; short circuit current (Isc) of 10.0mA/cm², fill factor (F.F.) of 0.526V and an efficiency of 0.53%.

PREVALENCE OF INTESTINAL PARASITIC INFECTIONS AND TRANSMISSION RISK FACTORS IN PRIMARY SCHOOL CHILDREN IN MBEERE NORTH SUB-COUNTY, EMBU COUNTY, KENYA

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Dr. Ng’ethe Muhoho

Globally, intestinal parasitic infections (IPI) such as soil transmitted helminths (STH) and protozoa have been noted as one of the most common causes of illnesses and diseases especially among economically disadvantaged communities. With an average prevalence rate of 50% in the developed countries and almost 95% in third world countries, it is estimated that intestinal parasites result in 450 million illnesses. Although IPIs are known to cause retardation in growth, diarrhoea or even death, the prevalence in primary school-going children in Mbeere North sub-county in Embu County is not documented, though there are many cases reported in health centers in the area. The aim of this study was to establish the current prevalence of IPIs in primary school children in Mbeere North sub-county and the factors that perpetuate transmission which is necessary for implementation of suitable control programs in the study area. The study was done among primary school children from nine public schools. Three schools per administrative ward were randomly selected to represent each of the three administrative wards. Stratified sampling technique was used where each ward formed a stratum. Balloting was done to sample three schools per stratum. Systematic sampling was done to sample pupils per class using the class register where the sampling interval was calculated by dividing the class size by the proportionate sample size (N/n). A total of 414 pupils whose parents/guardians gave consent participated in the study, 46 pupils per school. Each participant provided a thumb size of early morning stool. The stool samples were processed by Formal-ether concentration technique and direct wet
preparation method for microscopic identification of intestinal parasites namely E. histolytica, G. lamblia, Trichuris trichiura, A. lumbricoides, and hookworm species. A structured questionnaire was used to collect data on age, sex, ward, sanitation and hygiene practices. The overall point prevalence of intestinal parasitic infections amongst the pupils was 43%. Chi-square (χ²) test was done to determine the relationship between prevalence and the pupils’ age and sex. There was no significant association between prevalence and sex (χ² = 0.184, P = 0.668, df = 1) but a significant association was found between prevalence and age where children 11 years and below were more pre-disposed than those above 11 years old (χ² = 4.770, P=0.043, df = 1). Similarly, a significant association was found between water source and prevalence of IPI; the parasites infection prevalence decreased when tap water is used and increases when open surface water is used (F = 6.15, P = 0.006). However, there was no significant association noted between prevalence and ward of pupil residence (F = 1.644, P = 0.200). From this study there is clear indication that IPIs particularly E. histolytica are a problem in schools in Mbeere North. There is urgent need for provision of safe domestic water in Mbeere North Sub-county and to broaden the Mbeere water and sanitation piped water project to reach all the homesteads. Additionally, community education on sanitation and IPI transmission risk factors is urgently required. The data collected is beneficial to the public health service in designing control strategies for areas of high transmission.

IN VITRO AND IN VIVO ANTI-PLASMODIAL ACTIVITIES OF EXTRACTS FROM LEUCAS CALOSTACHYS AND AJUGA INTEGRIFOLIA AGAINST PLASMODIUM FALCIPARUM AND PLASMODIUM BERGHEI

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Dr. Hastings Ozwara

The causal agent of malaria is the Plasmodium parasite. The disease is transmitted to humans by infected mosquitoes during blood meal. Due to difficulties in accessing health facilities that are scarce and distant located, many people in rural areas often use traditional remedies from plants prior to seeking treatment at hospitals, despite the fact that there is no scientific record of their efficacy. The use of conventional anti-malarial drugs as treatment for malaria is hindered by drug resistance exposed by the parasite. Many studies have shown that plants contain bioactive ingredients which have anti-malarial activities. Leucas calostachys and Ajuga integrifolia has been used by herbalist in different parts of Kenya to treat malaria and fever. This study was carried out to determine the in vitro and in vivo anti-plasmodial activities of Leucas calostachys and Ajuga integrifolia crude extracts from Molo Sub-County against Plasmodium falciparum and Plasmodium berghei. The in vitro assay was performed in triplicate in 96-wells microtiter flat bottomed plates. Methanol and aqueous crude extracts of A. integrifolia were assayed for in vivo anti-malarial activity in early, established and curative infections against P. berghei in BALB/c mice. A total of 185 male and female mice were used in suppressive, prophylactic and curative
tests where mice were treated orally with extracts at dose rates of 100 mg/kg/day, 200 mg/kg/day and 400 mg/kg/day respectively. The control groups received Phosphate-Buffered Saline and chloroquine diphosphate at 10 mg/kg/day. Mean percentage parasitaemia and inhibitions were recorded as means ± SEM while mean survival time values were reported as mean ± SD and compared using one-way analysis of variance (ANOVA) and student t-test. All p-values < 0.05 were considered statistically significant. In vitro assay showed that aqueous extract of A. integrifolia had the lowest IC50, of 2.856 µg/ml and 2.975 µg/ml with chemo-suppression of 77.4% and 73.6 against 3D7 and W2 strains of Plasmodium falciparum, respectively. Aqueous extract of L. calostachys showed IC50 of 3.124 µg/ml with chemo-suppression of 73.3% against W2 strain of P. falciparum. Hexane extract of L. calostachys recorded a high IC50, of 22.15 µg/ml against 3D7 strain of P. falciparum. The results from the in vitro assay revealed that there were no significant differences between the sensitivity of chloroquine-resistant and chloroquine sensitive strains of Plasmodium falciparum in the three extracts (p > 0.05). The crude extracts in suppressive and prophylactic curative showed a dose-dependent reduction in the levels of parasitaemia in the experimental groups of mice relative to the non-treated group (p < 0.0001). The three extracts showed a significantly parasitaemia inhibition at a dose rate of 400 mg/kg/day (p > 0.05) in suppressive, prophylactic and curative tests respectively. The most effective chemotherapeutic agent was the aqueous extract with an average mean percentage inhibition of parasitaemia of 75.08%, 67.16% for suppressive and prophylactic tests respectively. Methanol extract was the most effective in curative test an average mean percentage inhibition of parasitaemia of 94.56%. The extracts prolonged the mean survival time in all the experimental groups relative to the non-treated group (p < 0.0001). Toxicity results indicated that the LD50 was 3162.278 mg/kg body weight and the extracts were safe when administered in high doses to mice. A. integrifolia and L. calostachys whole plants possess bioactive antimalarial compounds. The study recommends further studies on isolation and characterization of bioactive compounds from Leucas calostachys and Ajuga integrifolia against P. falciparum and P. berghei.

SILVER NANOPARTICLES AND THEIR ANTIBACTERIAL ACTIVITY SYNTHESIZED USING SELECTED MEDICINAL PLANT EXTRACTS

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Prof. Sauda Swaleh

Studies have shown that medicinal plants can mediate synthesis of gold, copper, selenium, silver and titanium nanoparticles of various sizes and different morphology. The plants have an advantage over other green synthetic methods as they stabilize and cap the nanoparticles. In this study, silver nanoparticles (AgNPs) were synthesized using Kenyan medicinal plants namely: - Prunus africana (Muiri in Kikuyu), Adansonia digitata (Kamba in Kamba, Mbuyu in Swahili) Bridelia micrantha (Mukwego in Embu/ Meru) Warburgia ugandensis (Muthiga in Kikuyu) and Urtica dioica (stinging nettle) known for treatment of various ailments. The synthesis was done on stationary and by use of ultrasound bath
The formation of silver nanoparticles (AgNPs) was monitored by UV-VIS absorption spectroscopy where surface Plasmon resonance of the AgNPs was observed between 400 to 450 nm. The Selected Area Electron Diffraction (SAED) analysis showed the crystallinity of the silver nanoparticles. High Resolution Transmission Electron Microscope (HRTEM) analysis showed the silver nanoparticles formed were monodispersed, spherical and their size ranged from 13 nm to 45 nm. Energy Dispersive X-ray (EDX) analysis confirmed the synthesized nanoparticles were of pure silver. Fourier Transform Infra-Red (FTIR) was used to show the functional groups of biomolecules present in the plants responsible for reducing, capping and stabilization of the AgNPs. FTIR spectra showed that O-H stretch and –C=C- functional groups were responsible for the reduction and capping the AgNPs. The synthesized AgNPs were found to be toxic against E. coli and S. aureus. AgNPs mediated by P. africana leaves had the best antibacterial activity on E. coli of 19.06±1.00 mm. The lowest inhibition was shown by those synthesized using P. africana bark on stationary method (11.9±0.251 mm). AgNPs synthesized using U. doica showed the highest activity against S. aureus followed by those synthesized using W. ugandensis with inhibition zones of 19.8±0.163 mm and 19.05±0.048 mm respectively. The study contributes towards application and documentation of some local Kenyan medicinal plants in the generation of useful silver nanoparticles in the fight against diseases.

DETERMINATION OF NATURAL RADIOACTIVITY AND ESSENTIAL ELEMENTAL CONCENTRATION LEVELS IN THE VICINITY OF MINJINGU MINING – TANZANIA

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Dr. Mwijarubi M. Nyaruba

Minjingu mining is located in the Northern part of Tanzania, the area which is known for high natural background radiation, due to the presence of phosphate mining. Tanzania has several phosphate deposits, of which Minjingu is the largest and its phosphate is exported or used in the preparation of fertilizers. In this research work, the results of studies on essential elemental concentration and activity in the vicinity of Minjingu phosphate mine in Tanzania are presented. The essential elemental concentration, outdoor dose rate and the activity levels of samples from around the mine were determined by Energy Dispersive X-ray Fluorescence and a gamma spectrometer system with a Hyper Pure germanium detector system, respectively. In all sides of the mining the concentration of P, Mn, Ti and Th is high, while Mg, K, Fe, Co, and Ni have high concentration on East, West and North. High concentration of Ba is on the South, West and North. This shows that elemental concentration for more than 50% of randomly selected elements in the vicinity of Minjingu is high. The determination of activity was made for the 238U, 232Th and 40K radio nuclides. Results show that the activities of 238U, 232Th and 40K range between 49±1 Bqkg⁻¹ to 241±6 Bqkg⁻¹, 51±2 Bqkg⁻¹ to 211±5 Bqkg⁻¹ and 666±29 Bqkg⁻¹ to 1076±45 Bqkg⁻¹, respectively at Minjingu. These values are above the limit average activity concentration of 40 Bqkg⁻¹, 35 Bqkg⁻¹ and 420 Bqkg⁻¹ for 238U, 232Th and 40K relative to selected research sites. The dose received by the population around Minjingu is 147±3 nGyh⁻¹ which is almost
three times the average limit of 50 nGy h\(^{-1}\). Therefore, the mean dose rate received by the population at Minjingu for each radionuclide (K, Th and U) is about 49 nGy h\(^{-1}\), which show that the absorbed dose rate at Minjingu is beyond the average limit of about 18.99 nGy h\(^{-1}\). Annual effective dose received by population at Minjingu is about 1.98 mSv y\(^{-1}\), which is above the average limit (1 mSv y\(^{-1}\)). These findings suggest a radiation health risk to the population and therefore realistic quantification of the overall exposure of workers and public at Minjingu, and remedial measures for future radiation safety to be taken.

EFFECTS OF CLIMATE VARIABILITY ON MAIZE YIELD IN NAKURU COUNTY, KENYA

Koimbori Jackson Kinyanjui-M.Sc

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The current climate in East Africa is characterised by large variability in rainfall and temperature with occurrence of extreme events such as prolonged and severe droughts that have led to increased cases of crop failure, hunger and destruction of habitats. This study analyzed the effects of climate variability on maize yield among farm holders in Bahati Sub-County, Kenya for the period 1985 to 2015. The specific objectives of this study were: to establish climate variability trends in rainfall and temperature experienced by farm holders in Bahati Sub-County, Kenya for the period 1985 to 2015. The specific objectives of this study were: to establish climate variability trends in rainfall and temperature experienced by farm holders in Bahati Sub-County, to analyze the effects of climate variability on maize yield in Bahati Sub-County and to identify and evaluate the existing climate variability adaptation strategies practised by farmers in Bahati Sub-County, Kenya. The climate parameters used included rainfall onset, rainfall cessations, seasonal rain, annual rainfall, annual mean temperature, maximum and minimum temperature. A descriptive case study was used relying on both primary and secondary data. Stratified random sampling technique was used to select 394 households from Dundori, Kabatini, Kiamaina and Bahati wards based on Yamane (1967) formula. Primary data was collected through household surveys and secondary data on rainfall and temperature for the past 30 years (1985 to 2015) was purposively sampled and collected from Nakuru Meteorological Station. Maize yield data for Bahati Sub-County was collected.
from the MOA, Tegemeo Institute and Nakuru County Agricultural Office for the period 1985 to 2015. The data collected on rainfall, temperature and maize yields was analyzed using Microsoft Office Excel 2010 and SPSS software version 23 to generate frequency tables, pie charts, graphs and moving averages. The findings were that annual rainfall and maize yield have shown a decreasing trend, while the average annual, maximum and minimum temperature have shown an increasing trend from 1985 to 2015. Rainfall has shown a decreasing trend during the long rain season and an increasing trend during short rain season. Rainfall variability is significant in both seasonal and annual trends with the highest annual rainfall variation below average occurred in 2000 with a variation of 350.40mm and highest annual variation above average occurred in 2010 with a variation of 475.80mm. The long rain season recorded the highest rainfall variation below average in 2000 with a variation of 253.17mm and the highest rainfall variation above average in 2010 with a variation of 263.53mm. The Short rain season recorded the highest rainfall variation below average in 1985 with a variation of 111.08mm and the highest rainfall variation above average in 1997 with a variation of 247.31mm. Annual average temperature has shown an increasing trend ranging from 17.7°C in 1989 to 19.7°C in 2009. Maximum temperature trend has shown a slightly gradual increase of 0.008°C annually. Minimum temperature trend has shown a slightly gradual increase of 0.075°C annually. Annual maize yield variability has shown a decreasing trend ranging from +11,913 Tonnes in 2000 to +62,615 Tonnes in 1988 above average. The findings revealed that there is a significant, positive and strong relationship between rainfall trend and maize yield (r= 0.741, p = 0.000). The study also revealed that there is a significant, moderate and negative linear relationship between maximum temperature and maize yield (r= -0.510, p= 0.03). However, the study findings also revealed that the relationship between minimum temperature and maize yield had an insignificant, weak and negative relationship (r= -0.166, p= 0.372). Eighty-six-point three percent of the respondents from the opinion findings strongly agreed that climate variability has
influenced their annual maize yield levels in Bahati Sub-County. Sixty-four-point five percent of the respondents disagreed that the adaptation strategies implemented have improved maize yields in the area. The study suggested for further research to be done on maize varieties that are tolerant to climate variability and on the best adaptation strategies of reducing maize farmer’s vulnerability to climate variability. Also, Nakuru meteorological station should provide forecast prediction to the farmers on the onset and cessation of the growing season so as to help maize farmers plant and harvest on time.

SCREENING OF SUPA AROMATIC RICE (ORYZA SATIVA L.) F2 POPULATION FOR BLAST (MAGNAPORTHE ORYZAE) RESISTANCE AT IRRI-ESA BURUNDI

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Blast disease (Pyricularia oryzae or Magnaporte oryzae) is a disease of the economic importance in rice, causing up to 100% yield loss. The aroma trait of rice grain encoded by the badh2 gene significantly increases its market value. Unfortunately, the aromatic IR97012-27-3-1-1-B (Supa234) line developed at IRRI is susceptible to Pyricularia grisea pathotypes. Improvement of IR97012-27-3-1-1-B (Supa234) rice has been carried out through introgression of R genes (Pi9 and Pita) at IRRI-ESA, Burundi. However, studies confirming if the genes have been introgressed into the Supa234 F2 generation have not been carried out. Therefore, this study aims to; determine blast disease severity of the segregating (F2 rice plants) population at vegetative and reproductive stages, to assess the introgression of Pita and Pi9 genes for blast resistance and to assess the presence of badh2 gene for aroma in F2 plants. Blast resistance of F2 IR97012-27-3-1-1-B plants was evaluated in IRRI-ESA breeding HUB from August 2017 to April 2018. One hundred and thirty-five plants selected from the F2 plants grown in trays were inoculated in vitro with two blast isolates (POBDI A11-01 and POBDI A11-02) on detached leaves. Disease severity was determined by analyzing the transformed scores of symptoms recorded on the inoculated leaflets. The DNA was extracted and genotyped from leaves of 103 selected rice plants which had grown to maturity. The genotyping was carried out using KASP genotyping method targeting Pita, Pi9 genes for blast resistance and badh2 gene for aromatic fragrance. Variations of disease severity mean score among the rice plants were analyzed using Two-way Analysis of Variance (ANOVA). There was a significant difference (p < 0.001) in infection scores between the rice genotypes and disease
severity scores between Pyricularia oryzae Burundi A11-001 (POBDI A11-001) and Pyricularia oryzae Burundi A11-002 (POBDI A11-002) isolates. There were 31.85% resistant plants at vegetative stage while at reproductive stage, 15.56% of the plants were high resistant and 46.67% of the plants were resistant. The plants with high resistant (HR) type of infection response had the mean of transformed scores ranging from 0 to 0.075 while plants with resistant (R) type of infection had mean of transformed scores varying from 0.151 to 0.367. Disease severity decreased from vegetative stage to reproductive stage. At vegetative stage, 25.63% of the screened plants were moderately susceptible while at reproductive stage 2.22% were moderately susceptible. The genotyping results show that 38 F2 plants had Pita gene represented on both alleles, 31 F2 plants with Pita gene on one allele and only one plant (3B1) was found with Pi9 gene on one allele. The badh2 gene for aroma was detected in 27 F2 plants on both alleles and in 57 F2 plants on one allele. There were thirteen plants which had both Pita gene and badh2 gene for aroma and only one plant (3B1) had a combination of three genes (Pita, Pi9 and badh2). By comparing phenotypical and molecular results, 7 resistant plants (2H2, 2H4, 1G2, 1C12, 1E13, 1B12 and 1C5) with Pita and badh2 genes were found and only one resistant plant (3B1) had a combination of three genes Pi9, Pita and badh2 which is recommended to be bulked and evaluated for grain quality (Supa type) for the development of Supa aromatic variety resistant to blast disease. The resistant Supa aromatic variety will be used to enhance rice quality in Eastern and Southern Africa.

PESTICIDE APPLICATION, THEIR RESIDUE LEVELS IN THE ENVIRONMENT, KALES AND TOMATOES IN EWASO NAROK WETLAND, LAIKIPIA COUNTY, KENYA

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PROF. ALEX K. MACHOCHO

DR. HELIDA OYIEKE

Pesticide use in agriculture is beneficial in controlling losses from pest and diseases. However, unsafe pesticide use can harm environment and human health. The aim of this study was to assess pesticide use among Ewaso Narok wetland farmers and to determine their residue levels in environment, kales and tomatoes. A total of 86 farmers purposively selected participated in this study. A pre-tested structured questionnaire was administered on the farmers with the help of trained enumerators in which data on pesticide use was collected. For laboratory analysis, a total of 276 samples of soil, water, tomatoes and kales were collected and analyzed during wet/rainy and dry/sunny seasons. Quick, Easy, Cheap, Effective, Rugged and Safe (QuEChERS) protocol was followed for sample preparation. Extracts were analyzed using LC/MS/MS and data analyzed using SPSS version 22. The study revealed that farmers use pesticides in violation of safe recommendation; 99% of farmers used unsafe storage facilities, 60.5% did not use appropriate personal protective equipment (PPE), 38.4% mixed pesticides during application and 100% use unsafe disposal methods for the empty pesticide containers. Majority (97%) of the farmers had no training on pesticide use. On laboratory analysis, the results revealed the
presence of residual organophosphorus, carbamates, pyrethroids, triazoles, morpholine, phenylamine, carbazate, anilinopyrimidine and beta-methoxyacrylate in soil, water, kales and tomatoes. Residues namely aldicarb, triadimefon, azoxystrobin, chlorpyrifos, buprofezin, cyproconazole I and II, fenpropathrin, paclobutrazole, pyrimethanil, metalaxyl, diazinon, bifenazate, azinphos methyl and spiroxamine were detected and quantified. The levels of triadimefon (132-150)μg/L, cyproconazole I (59-66.50)μg/L and II (71-81)μg/L, fenpropathrin (27-30)μg/L, bifenazate (16-18)μg/L, pyrimethanil (62-89)μg/L, and spiroxamine (55-150)μg/L in kales and cyproconazole I (54-82) μg/L and II (80-92) μg/L, fenpropathrin (16-19) μg/L and spiroxamine (51-105) μg/L in tomatoes were above the European Food Safety authority Limits (EFSA-MRLs) which ranged between 10-100μg/L. All residue levels in tomatoes and kales were within the Maximum Residue Limits as set by the World Health Organization and Agricultural Food Organization. Pesticide residues levels in soil ranged between 2.17-1000.21μg/L which was significantly higher than the levels in kales and tomatoes. In water, six pesticide residues were detected and quantified in the range of 0.09-5.85μg/L which were above the European Union-Maximum Contamination Limits (EU-MCL) for the drinking water of 0.10 μg/L for individual residues and 0.50 μg/L for the sum concentrations of all the residues in water. Farmers need training to comply with the safety requirements which include but not limited to the use of appropriate and complete PPEs, reading of pesticide labels before use, adhere to safety intervals (re-entry and pre-harvest intervals), safe storage and disposal of empty pesticide containers. Farmers need to embrace Good Agricultural Practice and Integrated Pests Management to reduce overreliance on synthetic pesticide use. Further study on pesticides residues levels in cabbages, french beans, chilies and potatoes should be done. The findings of this study can be used by policy makers (Government, Non-Governmental Organizations), researchers/scholars and farmers in making informed decisions on safe pesticide use that ensures safety of environment and human health.

MOVING DOMAIN QM/MM METHODS FOR DETERMINATION OF INTERACTIONS BETWEEN HUMAN ESTROGEN RECEPTOR ALPHA AND ENDOCRINE DISRUPTERS

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Human Estrogen Receptor alpha (hERα), a fundamental protein responsible for the detection of the sex hormone estrogen and regulating downstream gene expression is, usually, activated upon binding of a natural hormone. The hERα has flexibility to interact with and its functioning interfered with by many synthetic and natural chemicals, referred to as endocrine disruptive chemicals (EDCs). Malfunctioned estrogen receptor pathways have been indicted for causing breast cancer. In silico screening of a series of small molecules for endocrine disrupting capacity based on their interaction with the Human Estrogen Receptor alpha (hERα) was conducted to determine whether they would constitute a risk factor in
breast cancer incidence. The force field polarization model, Moving Domain Quantum Mechanics/Molecular Mechanics (MoDQ3M), was used to describe the electric fields and electronic polarization effects inside the hERα protein. Molecular dynamics on the wildtype, polarized proteins, and in silico mutated proteins were conducted for five nanoseconds on both the agonist and antagonist poses using Desmond engine from DE Shaw research. Docking was performed using Glide as implemented in Schrodinger 2015.1 suite. In-depth analyses were carried out in order to understand the underlying molecular mechanism using techniques including force field polarization, molecular dynamics, ligand-protein residue interaction and free energy landscape analysis. These showed that the mutated residues, N537Y and N532D, changed the overall electrostatic environment of the system along with the ligand-protein interactions. Mutation on two residues were carried out in silico, and the results were compared between the wild type and mutant for both the agonist (PDB ID: 2B1Z) and antagonist (PDB ID: 3ERT). The mutation of N537Y on the agonist and N532D on the antagonist within the ligand binding domain of the protein altered the interaction of the top ranked EDC compounds giving an MM-GBSA binding energy of ~5.531 kcal/mol and ~8.047 kcal/mol, better than that of the wild type for the antagonist. Glide docking studies gave top-ranked EDCs as DES, Genistein, Nonylphenol-9, DDE, BPA with glide scores (kcal/mol) of -10.332, -11.127, -8.627, -8.735, -9.007, respectively, on the agonist and -10.459, -10.119, -8.612, -8.507, -9.988, respectively, on the antagonist. Similar EDCs ranks were also realized for the mutants. It was also realized that Genistein, Oxybenzone, Vinclozolin, E216, DDE, Nonylphenol-9, and DES were more stable in the active form (higher occupancy averages) than in the inactive configuration showing the probability of activation of the protein receptor. The insights from this study could be of great relevance while designing new drugs for the treatment of breast cancer. Design would have to ensure stability in the antagonist more than the agonist and the same time counter the effect of mutation on the antagonist system. It is suggested that products that lead to exposure to Genistein, Oxybenzone, Vinclozolin, E216, DDE, Nonylphenol-9, and DES should be avoided as much as possible because of their possible effects on the protein receptor.

THE EFFECT OF HEAT STRESS AT MOLECULAR LEVEL DURING THE TRICELLULAR STAGE OF POLLEN DEVELOPMENT IN MAIZE (Zea mays)

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Heat stress is one of the major limiting factors for crop productivity, resulting in significant yield losses annually. Reproductive development is extremely sensitive to increased temperatures. With the increase in the frequency and intensity of short waves of high temperatures, a detrimental effect on plant development is expected to rise especially on the reproductive development. Within cereals, maize is a fundamental crop from a global food security perspective. Therefore, understanding how heat
stress affects male gametophyte development in maize is critical to improving crop resilience to adverse conditions. During maize pollen development, MADS-box transcription factors among other genes have been found to be strictly regulated, implying their role in ensuring optimal pollen development and quality. However, a gap in knowledge exists on the genetic pathways that regulate gene expression during heat stress, which remains unfilled. As such, this research investigated the effect of heat stress during tricellular stage of pollen development. Maize plants at early tricellular stage of pollen development were subjected to moderate heat stress regime (35o C /25o C, day/night) for forty-eight hours, while a parallel set of control plants were maintained at (25o C /21o C) control conditions. Maturation of anthers contribute to accumulation of biomolecules important for pollen tolerance to stress and proper germination. Heat stress hastened development of maize anthers resulting in improper maturation and reduction in pollen dehiscence. Furthermore, pollen germination was strongly decreased (P value < 0.001 at 95% level of significance) in heat stressed plants (25.82% ± 3.4 55%) in comparison to control plants (81.05% ± 2.84%2.84%). Using quantitative real time PCR (qRT-PCR), the transcriptional responses caused by heat stress on pollen specific genes were further evaluated. The late pollen gene (zmMADS2), pollen specific protein C13 and Tigro1570 proteins were down regulated (a negative fold change ≥ 0.5X) in heat stressed plants, while, those genes coding for CBL-interacting protein kinase 20, Profilins and plastocyanin proteins were upregulated (a positive fold change ≥ 1X). Maize heat shock factor fourteen (zmHSF14) had the highest expression among the five maize heat shock transcription factors (zmHSFs), activated by moderate heat stress in pollen. Overall, these findings provide a great opportunity to screen for more heat tolerance during reproductive development in other maize genotypes. The results of this work are important in breeding for abiotic stress tolerance in maize and respond to the needs of keeping agriculture competitive while ending world hunger, through producing crops that are resilient to climate change.

ANTIPLAMODIAL ACTIVITY, CYTOTOXICITY AND PHYTOCHEMICAL COMPOSITION OF JUSTICIA BETONICA VERONIA DUMICOLA AND ROTHECA MYRICODE AND THEIR COMPOSITIONS

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Dr. Syprine Otieno

Malaria, a disease caused by Plasmodium species is currently the main cause of human sickness and death in the world, more so in the tropics. It mostly affects pregnant mothers and children below five years of age. The parasites develop resistance to antiplasmodial drugs and this has been a challenge in control and treatment of the disease through chemotherapy, something that necessitates the continuous search for alternative antiplasmodial agents. The use of plants to treat malaria and other ailments has been there since time immemorial. The plants: J. betonica, V. dumicola and R. myricoides are among the many that are used traditionally to treat malaria. In spite of this use, their antiplasmodial
activity and toxicity has neither been scientifically confirmed nor evaluated. The World Health Organization suggests scientific evaluation of the safety of medicinal plants though they are generally regarded as safe. There are no reports on the scientific evaluation of the safe and effective concentranon of these extracts. This study aimed at determining the antiplasmodial activity, cytotoxicity and qualitative phytochemical composition of aqueous extracts of J. betonica aerial parts, and leaves of V. dumicola and R. myricoides. The plant materials were collected from Gucha region, Kisii County and transported to Kenyatta University. In vivo antiplasmodial activity of the aqueous extracts of the plants was tested in a four day suppressive assay using Plasmodium berghei in mice. In vitro antiplasmodial activity was done using the D6 strain of Plasmodium falciparum. Cytotoxic evaluation was done using the vero cell-line in vitro using the MTT assay. Qualitative phytochemical screening was done according to standard protocols. The aqueous extract of R. myricoides leaves had the highest chemosuppression with an IC50 value of 1.32±0.03μg/ml while lowest chemosuppression was in the combined aqueous extract of J. betonica aerial parts and leaves of V. dumicola. This recorded an IC50 value of 11.03±1.18μg/ml. For cytotoxicity studies, aqueous extract of J. betonica aerial parts recorded the lowest cytotoxic activity with IC50 value of 690±11.00μg/ml whereas aqueous extract of R. myricoides leaves recorded highest cytotoxic activity with IC50 value of 106.00±8.00μg/ml. According to the selectivity index (SI) criteria, all the extracts showed SI value above 3 indicating the plant extracts were selective. All the plant extracts tested contained anthraquinones, phenols and tannins. They all showed antiplasmodial activity which could be attributed to the phytochemicals observed. The three plants analysed in this study are recommended for development of antimalarial agents.

HEALTH RISK ASSESSMENT OF SELECTED ESSENTIAL AND NON-ESSENTIAL ELEMENTS IN FOOD CROPS GROWN IN KIBRA SLUM, NAIROBI-KENYA

Nyabuti Ohingo George-M.SC

Department:

Supervisors: Prof. Hudson Nyambaka

Dr. Mildred Nawiri

Peri-urban agriculture of food crops is practiced in many cities in developing countries, often involving the use of contaminated water and soils, thereby posing health risks for the consumers. Chemical pollutants such as metals present in minute quantities become part of the food chain through occupational exposure in industrial activities, biomagnification and bioaccumulation. In Nairobi City, peri-urban agriculture is practiced in many slum areas, including Kibra slum. Kibra slum, is a densely populated slum with poor drainage systems. Peri-urban agriculture in Kibra slum involves the growing of kales, amaranthus, arrowroots, and spinach food crops which contain high proportions of elements, some of them exceeding allowed limits by WHO. However, high levels of elements in food crops do not necessarily cause health risks, requiring that health risk assessment is done. The study, therefore, determined the levels of selected essential (Mn, Mg, Cu, Fe, Zn and Al) and non-essential (Cr and Pb) elements and assessed the health risks associated with the consumption of the food crops grown in Kibra slum in Nairobi County. Health risk assessment was done using daily intake of metals (DIM), target
hazard quotient (THQ) and incremental lifetime cancer risk (ILCR). A randomized block design was used to obtain a representative sample from the six gardens including the control for the study. Analysis of essential and non-essential elements was performed using atomic absorption spectroscopy (AAS) and results obtained used to calculate the health risk assessment indices. ANOVA was used to measure significant differences in levels between gardens at 95% confidence limits. The levels of essential elements ranged as follows; Mn 91.04-374.44, Mg 261.28-532.96, Fe 350.74-1273.68, and Zn 1.18-6.3 μg/g were found to be below the recommended limits by FAO/WHO, implying no health risk. Ranges of the non-essential elements were; Cr 1.15-4.32 and Pb 0.14-0.91 μg/g these were found to be above the EU recommendation, implying a health risk. DIM of Fe 5.81-27.61 and Mn 1.97-8.12 μg/g were above the recommended daily intake amounts, implying a health risk. THQ values for Mn and Fe were more than unit, implying a potential health risk. THQ values for non-essential elements were below unit except for Pb in arrowroots in garden U002 (THQ > 1). ILCR showed that from lead alone 73 people are likely to develop cancer this translates to 0.043% of 0.17M residents. The result of DIM and THQ suggests that consumption of arrowroots, amaranthus, kales, and spinach grown in Kibra slum poses a potential health risk to the consumers. There is need for measures to be put in place to de contaminate the water and soils in a bid to eliminate the health risks.

DESIGN AND FABRICATION OF AN AUTONOMOUS LINE FOLLOWER ROBOT CAPABLE OF PICKING AND DROPPING OBJECTS FROM ONE POINT TO ANOTHER

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Department: Physics

Supervisors: Dr. Mathew Munji,
Dr. Willis Ambusso

Robot becomes widely used in industries due to their characteristics. Robot is able to work in 24 hours continuously without feeling tired unlike human that confine to certain time. The cost to setup the robot nowadays becomes more affordable and their long term prospect is bright judging from their capacity to perform. But in reality, there is no robot able to function perfectly and without making errors. A better controller is needed, to allow the robot performs efficiently and make less error. This research try to implement arduino duemilanove ATmega 328 controller on mobile robot to establish whether the robot perform efficiently. This mobile robot has a line tracking module, arm and gripper, where it will follow the track made from white line, pick and drop object. This is an area where the arduino duemilanove ATmega algorithms is implemented, the robot has been able to follow the white line effectively and moving along the track smoothly while at the end of the track, picked, carried and dropped object to destination. All the robot objectives were achieved. The objectives included, constructing a program and uploading it to the microcontroller that was used to control the whole functionality of the robot. However, the recommendation is that, to avoid malfunctioning, steering mechanism should be well managed and more functionality of the system added in order to allow other operations like, sensing color, counting and tracking curving tracks.
Malaria is the commonest parasitic disease that continues to cause considerable number of deaths despite the fact that it is treatable and preventable. In 2016, nearly 3.2 billion persons were at risk of malaria and a total of 216 million cases occurred occasioning deaths of approximately 445 thousand people worldwide with majority of the affected being children below five years of age. These numbers are high for a disease which is treatable and preventable. Plasmodium falciparum, the deadliest human malaria parasite has become resistant to nearly all antimalarials previously used and its drug resistant strains have shown rapid extension thus complicating the fight against malaria. As such there is need for continuous search for new medicines. Studies on plants traditionally used for the treatment of malaria presents one of the most viable strategies of developing new and effective antimalarial drugs. This study evaluated the in vitro effects of crude extracts obtained from Harrisonia abyssinica Oliv., Leucas calostachys Oliv. and Rubia cordifolia L. frequently used in the herbal management of malaria and other infections among the Maasai community in Transmara West sub-county. Aqueous, methanol and hexane extracts were assessed against two Plasmodium falciparum strains namely, Plasmodium falciparum W2, (Chloroquine resistant) and Plasmodium falciparum 3D7, Chloroquine sensitive. The parasite strains were cultured in malaria laboratory at the Institute of Primate Research (IPR). The in vitro effects of the extracts on the parasite strains were evaluated in 12x8 flat bottom wells and sterile microtitre plates. All bioassays were performed in triplicate at eight concentrations ranging between 50μg/ml and 0.4μg/ml. The set-up were then kept in an incubator maintained at 37°C for 48 hours before harvesting and parasitaemia determined microscopically from thin Giemsa-stained slides. IC50 values for the crude plant extracts were graphically determined from dose-response curves. Data was analyzed by ANOVA, student t-test and correlation analysis using Graph pad prism version 5.0. All p < 0.05 values were considered significant. All the three plants were shown to have antimalarial activity with Rubia cordifolia L. Hexane extract being the most active (IC50 =0.5517 μg/ml) against chloroquine resistant Plasmodium falciparum, W2. This same extract was effective against CQ-sensitive strain with IC50 value of 2.747μg/ml. Qualitative phytochemistry on the extracts revealed bioactive compounds being present including Alkaloids, Terpenoids and Flavonoids among others. These results indicate that the plant extracts possess antiplasmodial activity. It therefore confirms the antimalarial properties of the three medicinal plants. The study recommended isolation, identification and characterization of compounds and toxicity studies on extracts from the plants to act as lead molecules in the manufacture of effective antimalarial drugs.
ANTIBODY RESPONSES INDUCED IN BALB/c MICE VACCINATED WITH MALARIA DNA VACCINE CANDIDATE, pSeBCGTT, CO-EXPRESSING CCL5 OR CCL20 AS ADJUVANTS

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Malaria is a leading cause of morbidity and mortality in sub-Saharan Africa. Parasite resistance to current antimalarials and resistance of Anopheine mosquitoes to insecticides have hampered control and elimination of malaria. Over the past twenty years, many vaccine candidates have been under development but none has advanced to clinical trials due to lack of appropriate adjuvant for human use. A vaccine inducing high levels of Immunoglobulin M (IgM), total IgG (or IgG1, IgG2, and or IgG3) would be important for effective control of malaria. DNA vaccines are safer and easy to mass produce and store, but they are less immunogenic and require an adjuvant to boost their immunogenicity. Although the adjuvants CCL5 and CCL20 have chemotactic properties and can immunopotentiate DNA vaccines, no previous study had evaluated their potential use as effective strain transcending blood-stage malaria DNA-adjuvant antibody-inducing vaccine. The present study sought to determine antibody immunity induced in mice vaccinated with malaria DNA vaccine candidate, pSeBCGTT, expressing CCL5 or CCL20 as an adjuvant. Mice in groups of 18 animals each were treated as follows: Group I was vaccinated with pSeBCG/TT/CCL5; Group II was immunized with pSeBCG/TT/CCL20; Group III was injected with pSe/BCG/TT alone while Group IV was inoculated with pIRES plasmid and Group V was a non-vaccinated control. All vaccinations were done intramuscularly with 100 µg of the inoculants per dose on days 0, 21, and 42. Blood samples for sera preparation were collected at day 0, 21, 42 and 63 post-vaccination for determination of antibody levels including IgM, total IgG, and IgG sub-classes. Data were analyzed using one-way analysis of variance (ANOVA) and where applicable, Bonferroni test was used as a post hoc. A P value ≤ 0.05 was considered statistically significant. Results indicated that the mice group vaccinated with pSeBCGTT/CCL20 induced significantly higher IgM antibody levels as compared to pSeBCGTT/CCL5 or pSeBCGTT alone (P < 0.01). Similarly, vaccination with pSeBCGTT/CCL20 produced significantly higher IgG levels as opposed to pSeBCGTT/CCL5 or pSeBCGTT alone (P < 0.01). Further analysis indicated a significant difference in IgG subclasses in vaccinated mice groups with the pSeBCGTT/CCL20 inducing the highest levels of IgG1, IgG2b and IgG3 compared to vaccination with either pSeBCGTT/CCL5 or pSeBCGTT (P < 0.05) while pSeBCGTT/CCL5 induced the highest IgG2a antibody levels as compared to either pSeBCGTT/CCL20 or pSeBCGTT alone (P < 0.05). Comparison between antibody isotype levels showed that IgG levels were significantly higher than IgM (P<0.01). In conclusion, these findings indicate that vaccination with pSeBCGTT/CCL20 induces high antibody levels that may be important in preventing malaria in vaccinated subjects. However, it is recommended that an efficacy experiment of this vaccine be carried out in a relevant animal model of malaria before clinical application.
Plastics have extensive applications ranging from transport industry, building and construction, entertainment, electrical and electronics, households and in hospitals. However, plastic wastes accumulating in the environment pose great danger to the stability of ecological system due to its recalcitrant nature to degradation. Although the use of plastics is indispensable in our daily lives, disposal of plastic wastes in the environment has generated serious global concern due to its nonbiodegradability. Attempts by various governments to alleviate this menace and to create a cleaner environment have not achieved a plastic-free environment as many plastic products still exist. Recycling of plastics reduces the toughness of the original material; landfills limit the spaces available for productive activities while incineration reduces the problem of landfills but paradoxically produces pollutant toxic vapours. Microbial degradation of polymers is possibly one of the most desirable alternatives as it leaves waste products friendly to the environment. In this research, recycled low density polyethylene samples were inoculated with the fungus strain Aspergillus niger and then incubated at room temperature for different periods. DMA 2980TA instrument was used to evaluate mechanical properties of the samples with frequency sweeps of 0.3 to 30 Hz and in temperature range of 25 oC to 80 oC. The storage and loss modulus of the samples decreased as inoculation period increased and as the loading frequency of 0.3Hz was increased to 30 Hz. Creep measurements were done by displacing each sample for 12 minutes and then allowing it to recover for another 12 minutes at 60 oC, 50 oC, 40 oC and 30 oC. The creep stability of the samples reduced significantly with inoculation. In addition, the percentage recovered strain decreased through inoculation as the fractured carbon chains obstructed stress transfer from one chain to another. The Burger’s model was satisfactorily fitted in the creep strain curves while Weibull model was used to test the recovery property of the samples. Furthermore, creep modulus master curves were plotted to predict the long-term behaviour of the samples by using the time-temperature superposition principle. The predicting results confirmed that the inoculated samples had diminished creep resistant for prolonged time beyond 107 s. The shift factors obtained through superposition of the creep modulus curves obeyed the WLF model. Diffusion of samples was investigated by monitoring water uptake at room temperature and then calculating percentage mass difference after every 7 days, for 42 days. From the results obtained, diffusion behaviour of the rLDPE samples was found to be Fickian and the diffusion coefficient increased with inoculation. Thermal gravimetric analysis was done using Lindberg Blue Tube Furnace TF55035C-1 from 25 o C to 600 oC at a heating rate of 5 ooC/minute. Thermal degradation kinetic parameters were obtained by applying the Broido model. The values of activation energy obtained by using the graphs of $\ln[\ln(1/x)]$ versus $1000/T$ indicated that thermal stability of the samples reduced with inoculation
because the porous polymer matrix required less thermal energy to initiate degradation. In this study, Aspergillus niger was found to be an effective agent in attacking and reducing mechanical properties and thermal stability of recycled low density polyethylene and to increase diffusion in the polymer matrix. Hence, pre-treatment of plastics with Aspergillus niger is recommended to accelerate their degradation.

ELASTIC SCATTERING OF ELECTRON BY BARIUM ATOM USING DISTORTED WAVE METHOD

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Knowledge of differential and integral cross sections for electron scattering from atoms and molecules is very important for explanation and understanding of electron interaction with matter and for determining dynamics of collision processes. It is also important in the study of astrophysics, plasma physics and laser development. For the past three decades, experimental and theoretical results for electron-barium elastic scattering have been reported however, these results are inconsistent. Theoretical results do not agree with the experimental results and theoretical results do not agree among themselves. In this study the distorted wave method has been applied to calculate the differential and total cross section for elastic scattering of electron by barium atom at electron impact energies of 10-200 eV and a range of scattering angles of (θ) from 0° to 180°. Being an elastic scattering process, both initial and final distortion potentials are taken as static potential of a barium atom in the initial state. The distorted waves are determined by partial wave expansion method by expanding them in terms of spherical harmonics while the radial equation corresponding to distorted waves are evaluated using Numerov method. A computer program DWBA1, for e-- H scattering was modified for the process under consideration and used for the above calculation. The results for differential and integral cross section are compared with experimental and theoretical results available. The comparison of the integral cross section results with other theoretical and experimental results shows that the present results are in good qualitative agreement with experimental and most of theoretical results. At lower incident energies 10-20 eV the present DCS are not in satisfactory agreement with the experimental and theoretical results. However at higher incident energies, 30-100 eV the present DCS are in satisfactory agreement with other theoretical and experimental results. So, it can be said the present distorted wave method works well for electron-barium elastic scattering and recommend be extended to metals such as gadolinium and radium.

ASSOCIATION BETWEEN HEAVY METALS AND SELECTED REPRODUCTIVE PARAMETERS IN THE NILE TILAPIA, Oreochromis niloticus, ALONG RIVER RUIRU, KIAMBU COUNTY, KENYA

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The Nile tilapia, Oreochromis niloticus, is a tropical fish species of commercial importance in both aquaculture and in the wild. It plays a great role in human nutrition and food security. Industrial effluents, contaminated with pollutants such as heavy metals are released into water bodies such as streams and rivers, in most countries. River Ruiru is one of the rivers faced with pollution from nearby industries. It is inhabited by various species of fish such as catfish, tilapia and common carp, which, may be harvested by surrounding communities for food. High levels of heavy metals disrupt normal reproductive process in fish. Besides, it has been reported that edible fish contaminated with heavy metals has deleterious effects on the health of humans and other animals that consume them. Oreochromis niloticus forms an important source of proteins in many communities. The inhabitants neighbouring River Ruiru, especially those of low socio-economic status obtain fish from the River. This study was aimed at assessing the current status of heavy metal pollution in River Ruiru and their association with selected reproductive parameters in the reproductive cycle of Oreochromis niloticus. Fish and water samples were collected monthly, for 8 months, from the downstream and upstream sections. Morphometric measurements, gonadosomatic index (GSI), serum 17β-estradiol (E2) levels, physicochemical parameters of the river and the levels of five heavy metals (lead, cadmium, copper, iron and zinc) in water and ovaries were determined. The levels of the heavy metals were measured using Atomic Absorption Spectrophotometer (AAS). The level of E2 was analyzed using Enzyme-Linked Immunosorbent Assay (ELISA). The difference in means of GSI, level of E2, fecundity, morphometric measurements of the fish from the downstream and the upstream sections of the river was calculated using a two sample t-test. The relationship between the level of heavy metals versus morphometric measurements; GSI; and the level of serum E2 was determined using Pearson moment correlation. One way analysis of variance (ANOVA) was used to test if there were significant differences in GSI and levels of E2 between different months. Water in both sampling sites was found to have equal levels of heavy metals implying that both sites were equally polluted. There was no significant difference in gonadosomatic index between the upstream and the downstream sites (t=0.82, p=0.416). Similarly, there was no significant difference in the levels of E2 between the downstream and the upstream sampling sections. The mean standard length of the mature tilapia, Oreochromis niloticus, in the upstream was significantly lower compared to the mean standard length in the downstream (t =2.87, p = 0.008). In the downstream, the levels of lead and iron in fish ovaries were significantly higher compared to the upstream (lead: t = 3.36, p = 0.002; iron: t = 4.920, p=0.001) due to their higher levels of accumulation. The results showed that levels of heavy metals did not associate with the selected reproductive parameters in the Nile tilapia, along River Ruiru. Levels of lead and cadmium both in water and fish ovaries were above allowable concentrations for fish consumption when compared to WHO and United States of Environmental Protection Agency (USEPA) recommended levels. The study recommends that the Ministry of Environment and Natural Resources (MENR) should put measures in place to stop discharging raw effluents into River Ruiru. Also, National Environment Management Authority (NEMA) and Department of Public Health of the County Government of Kiambu (DPHCGK)
should hold campaigns for residents of Ruiru in order to safeguard their health by avoiding consumption of fish from the River.

SYNTHESIS AND CHARACTERIZATION OF NIOBIUM PENTOXIDE THIN FILMS PREPARED BY SPRAY PYROLYSIS TECHNIQUE FOR DYE SENSITIZED SOLAR CELL APPLICATION

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There is a rapid increase in demand for energy worldwide and one of the most promising approaches to resolve this crisis is through use of photovoltaic technologies. Dye sensitized solar cells (DSSC) are attractive candidates in this regard. This is because the materials they use are of low cost and non-toxic. Niobium pentoxide (Nb2O5) thin films have been stable as photo anode for DSSC. Methods that are used to deposit niobium pentoxide thin films include hydrothermal method, solgel method, anodization technique, electro-deposition, sputtering, and spray pyrolysis. Among the above mentioned methods, spray pyrolysis is the simplest. It is a low cost method especially with regard to equipment. The technique requires chemicals that can undergo pyrolysis. In this study, Niobium pentoxide (Nb2O5) thin films for DSSC application were deposited on ordinary glass substrates using the spray pyrolysis technique. In the synthesis of Nb2O5, Niobium pentachloride (NbCl5) was used a precursor solution. This was prepared by dissolving Niobium pentachloride in distilled water to which hydrogen peroxide and acetic acid were added. The deposition parameters of the niobium thin films such as spray duration and substrate temperature were varied. The sprayed solution underwent thermal decomposition resulting in formation of niobium pentoxide (Nb2O5) thin films. The optical characteristics of the films were determined using the Shimadzu model DUV 3700 spectrophotometer. From the transmittance spectra obtained, it was clear that the films were 60% to 90% transparent in the visible region and the absorption edge occurred at around 300nm. Sheet resistivity of the films determined by use of the four point probe method was 10^-4Ωcm. XRD studies revealed that the films were tetragonal in nature with well defined reflections at (211) and (220). The average crystallite size was estimated to be 21.25nm. The thicknesses of the films were determined using the KLA Tencor Alpha–step IQ surface profiler and was found to range between 162nm and 517nm. Band gap energy and absorption coefficient were estimated using point-wise unconstrained minimization approach (PUMA) software. Band gap energy values ranged between 3.92 eV to 4.12 eV. From the obtained results, the films considered best for DSSC application were those deposited at substrate temperature of 470oC and at duration of 2 minutes.

GEOPHYSICAL EXPLORATION FOR IRON ORE PROSPECT USING GRAVITY METHOD IN MERU COUNTY, KENYA

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Ground gravity survey covering an area of 60km2 in Kimachia and Mbeu, area of Tigania-West Sub-County of Meru County, Kenya was conducted to establish iron ore extent in the area. A Sodin 410 gravimeter was used to measure the gravity field’s variations in the 278 established stations. At each station the location coordinates and elevation were obtained using Global Positioning System, Garmin 45 model. The time of measurement at each station was also recorded. Gravity reductions and removal of regional trends was done. Computer software Surfer 11 was used to plot Bouguer anomaly contour map. Qualitative interpretation was used to discern positive Bouguer anomalies in the map. Five profiles were drawn on discerned anomalies, one oriented in the SW-NE direction and the other four in NW-SE direction. Half width and Gradient amplitude ratio methods together with Euler de-convolution were used to image the sub-surface and to establish limiting depths of anomalous bodies which were later used for start models. Modeling using Grav-2 dc software was done in fitting models, which established bodies at depths ranging 0-200m below surface. The anomaly map was also used in estimating the excess mass at 3.078109×1013 kg. Chemical analysis of rock samples from selected stations mainly within gravity highs was done to determine the percentages of major minerals, magnetite included. The analysis indicated an average of 19.1 % of iron content. Gravity models indicated high density bodies and chemical analysis confirms presence of iron ore.

TRANSCRIPTOME ANALYSIS AND SNP MARKER IDENTIFICATION OF FINGER MILLET (ELEUSINE CORACANA (L.) GAERTN) AT CRITICAL STAGES OF STRIGA (STRIGA HERMONTICA) INFESTATION

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Finger millet is a highly nutritious annual cereal crop in the semi-arid tropics of the world. However, its yield potential has not been achieved in the Sub-Saharan Africa (SSA) due to deleterious biotic stresses such as Striga hermonthica. The survival of Striga on finger millet depends on a complex host-parasite interaction that is defined by three critical infestation time points, 3 days’ post-inoculation (dpi), 5-dpi and 7-dpi. In this study, the transcriptome of tolerant (GuluE and IE2396) and susceptible (White Sel6 and IE2459) finger millet accessions were analysed upon infecting with Striga, to evaluate the molecular mechanisms involved in Striga tolerance or susceptibility at the critical time points. Roots of finger millet seedlings were infected with Striga seeds and samples collected after 3, 5 and 7 dpi. Total RNA was extracted from the young seedlings, synthesized to cDNA libraries and sequenced using Illumina MiSeq. Although, observable Striga germination commenced at 2 dpi, there were significant differences (mean ± standard error) among the accessions in terms of haustoria development and Striga attachment at 3 dpi and 9 dpi, respectively. At 3 dpi IE2396 (6.583 ± 0.7488) had the lowest number of Striga attachment, when compared to GuluE (8.75 ± 0.5171), IE2459 (9.667 ± 0.2465) and White Sel6 (9.4722 ± 0.2222). At 9 dpi, susceptible IE2459 (2.306 ± 0.314) was significantly different from GuluE (1.306 ± 0.2312), IE2396 (0.25 ± 0.1954) and White Sel6 (0.6944 ± 0.1806). Differential expression analysis identified 407 differentially expressed (DE) transcripts (at least 4-fold) at a false discovery rate (FDR) of 0.1% in a pairwise comparison of all samples. A total of 33527 Gene Ontology (GO) terms and 459 KEGG pathways were annotated at a cutoff e-value of 1e-5. Majority of the annotated transcripts were associated with signal transduction, hormone metabolism, cell wall development, mitochondrial electron transport/ATP synthesis and transport. An average of 1 SNP/153 bps, 1 SNP/160 bps, 1 SNP/358 bps and 1 SNP/189 bps bi-allelic non-homoeologous single nucleotide polymorphisms (SNPs) were identified in GuluE, IE2396, IE2459 and White Sel6, respectively. Finger millet accessions differ in their Striga tolerance regarding growth and yield. GuluE and IE2396 exhibited varying mechanisms of tolerance and escape to Striga infestation. Higher Striga infestation and differentially expressed transcripts observed in White Sel6 and IE2459 when compared to GuluE and IE2396 suggests higher Striga impact on susceptible accessions, especially at 5 dpi. SNP frequency doubling that was observed in GuluE confirms its wide geographical distance from the three other accessions. Genes involved in cell wall development, photosynthesis, signaling and transport should be studied and/or used for breeding in the tolerant accessions. The genes identified at critical stages of Striga infestation will inform key targeted breeding points for Striga tolerance in finger millet. Validation and introgression of these genes and SNP markers into farmer preferred varieties will, substantially, improve finger millet yields in the SSA.

BIOSAFETY ANALYSIS OF BACILLUS THURINGIENSIS TOXIN USING IMMUNOPATHOLOGICAL APPROACH IN BALB/c MICE

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For over 18 years, there has been an increased use of genetically modified foods for both human and livestock and for this reason, there has been a large number of scientific feeding studies carried out to try to find out how safe the GM foods are. The evidence, however, is still far from proving whether long-term consumption of genetically modified foods possess negative effects for human or animal health. This present study was carried out to analyze the safety of Bacillus thuriengiensis (BT) toxin fed to mice. Bacillus thuriengiensis is one of the organisms that has been widely used in transfection. BALB/c mice were used to determine the effect of the toxin on mice growth, weights of internal organs, differential count of white blood cells, plasma proteins concentration, and histopathology of internal organs. Double immunodiffusion test was used to test for immune sensitization to toxin. Weaning male and female mice were fed separately in 4 groups of 10 mice each (n=40). There was one control and three experimental groups. The control group was fed on normal ratio of mice pellets and water ad libitum daily for 90 days. Groups A, B and C mice were fed on 10mg/kg, 30mg/kg and 50mg/kg of Bacillus thuriengiensis (BT) toxin as well as mice pellets and water ad libitum for the same 90 day experimental period. Body weights were recorded for individual mice on weekly basis. Blood was collected by cardiac puncture into EDTA BD vacutainer blood collection tubes. Tissue samples of internal organs were obtained for histopathological examinations. There were no significant differences on mice body weights (p>0.05) between the Bacillus thuriengiensis (BT) fed and controls, there was a significant difference in the mean weight of spleen (p<0.05), of mice fed 30mg/kg of toxin (Group B), compared to other group, the mean weight of the spleen was less. The automated blood count results showed a significant difference in the counts of neutrophils in the groups fed on Bt toxin (50mg/kg) compared to control, (p<0.05) which were fed no Bt toxin. There was also a significant difference in the mean counts of white blood cells from group fed on 10mg/kg of Bacillus thuriengiensis (BT) toxin compared to the control. These proportions were significantly different (P<0.05) with 30mg/kg, 50mg/kg having significantly higher monocyte percentage. Liver tissue from mice in group C showed moderate congestion, spleen from mice fed 30mg/kg of toxin showed reactive white pulp and slight atrophy, kidney tissue section from mice in group A showed congestive glomerulitis while lung tissue from mice fed on 50mg/kg Bacillus thuriengiensis (BT) toxin showed signs of bronchopneumonia. Anti Bt toxin antibodies were detected in the mice group fed on 50mg/kg bwt of Bt toxin. This result shows there was immune sensitization by the toxin which may result in hypersensitivity following consumption of GMO foods. Therefore further safety tests on Bacillus thuringiensis toxin transfected foods to be carried out to determine its effects on mice health when administered for a longer periods.

MICROBIAL CONTAMINATION OF NILE TILAPIA (Oreochromis niloticus) AND AFRICAN CATFISH (Clarias gariepinus) FINGERLINGS REARED IN HATCHERY TANKS AT SAGANA, JAMBO, AND MWEA FISH FARMS

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In Kenya, aquaculture continues to expand as a source of food production and livelihood in all the counties. Mortality of Nile Tilapia and African Catfish fingerlings constitute the biggest loss in extensive and intensive fish farms. The main objective of this study was to determine contamination by bacteria and fungi in Nile Tilapia and African Catfish fingerlings. The study was carried out from March 2014 to July 2014 in fish farms with different water sources, hatchery systems and feed sources. These were; Jambo fish farm in Kiambu County which utilizes borehole water and has a recirculation aquaculture system also known as (RAS). Sagana and Mwea fish farms in Kirinyaga County. Four weeks old and weighing 5-7 g, Nile Tilapia (Oleochromis niloticus) and African Catfish (Clarias gariepinus) 60 each in number were stocked as follows; in every hatchery tank 10 fingerlings of each species regardless of sex. Data obtained from samples was analyzed using descriptive statistics. Fish fingerlings samples and fish feeds were collected from three fish farms and taken to the Laboratory. The bacterial load of the samples was determined using the pour plate method. Identification and characterization of various isolates were based on gram-staining technique, biochemical tests and subculture on selective media. Fungi were isolated on SDA agar, Macroscopy of hyphae and mycelium, microscopic identification of subcultured fungal isolates using LCBS stain and Mycology charts. The mean of bacteria isolated in the two fish species from three farms per cfu/mL was as follows: African Catfish had 9.00±3.85a, 27.752.85a and 21.67±4.82a for the Bacillus spp, Escherichia spp and Salmonella spp, respectively while Nile Tilapia had 8.58±3.68a, 25.25±3.54a and 22.83±4.95a, for the Bacillus spp, Escherichia spp and Salmonella spp, respectively. Penicillium spp 33.1±2.5cfu/g and Rhizopus spp 27.6±2.8 cfu/g occurred less frequently. There was a significant variation (p = 0.015) in the means of bacteria contaminants isolated in Sagana fish farm from Nile Tilapia and African Catfish species. Escherichia spp in the skin did not vary significantly (P= 0.0684) between the fish species, however African catfish skin had the highest 27.7±2.8 Escherichia spp contamination. There was also significant (p< 0.0001) variation in Bacillus spp contamination in fingerlings skins from different farms. The occurrence of Klebsiella species 22.0±4.7 cfu/ml, Salmonella species 22.80±4.9 cfu/ml, Streptococcus spp 25.0±5.4 cfu/ml while Vibrio spp had a mean of 20.0±3.6 cfu/ml. There was no significant (P= 0.4857) interaction between fish species and farm in determining the Klebsiella spp in fish skin. Formulated feeds were more contaminated (25.58) than commercial feeds (1.15) (Table 4.6). Formulated feeds had higher contaminations attributable to high moisture, poor storage facilities, handling and preparation methods. For physiochemical parameters, Salinity varied from 155.47±6.49 to 94.70±0.33 mg/L in Sagana and Mwea respectively with Mwea recording the least levels of salinity. Water temperature in the morning ranged from 20.55±0.49°C to 25.30±0.26°C. In the evening time, there was also a significant variation in the levels of temperature with Sagana recording the highest at 27.10±0.63, followed by Jambo 25.00±0.41 and Mwea had the lowest temperature of 20.15±0.43. Variations of salinity, temperature oxygen levels are among the parameters which determine the contamination for the two fish species among the three farms. It is recommended that all farms supplying fingerlings apply frequent assessment of water parameters, fish feeds and water analysis. Fish farmers should be educated on best practices in aquaculture in order to prevent bacterial and fungal contamination.

MALARIA IMMUNOSURVEILLANCE AND EVALUATION OF RAPID DIAGNOSIS TEST IN MERU SOUTH SUB COUNTY, THARAKA-NITHI COUNTY, KENYA
Despite intensive worldwide attempt to control malaria, it remains one of the most fatal and widespread protozoan infection of mankind. About 2.4 billion people inhabit malaria prone regions which is about forty percentage of the world population. Prompt accurate, diagnosis and treatment is important to avert suffering of malaria patients. Malaria infection is a serious global challenge in the affected countries. The rapid diagnosis tests of malaria are recent diagnostic techniques whose performance has not been evaluated in many malaria endemic regions like Tharaka-Nithi County. The main purpose of this study was to perform malaria immunosurveillance and evaluate performance of rapid diagnosis test for malaria in Meru South Sub County, Tharaka-Nithi County. The study design was hospital based cross-sectional study in the laboratory at Chuka Level 5 Hospital. Three hundred and eighty four blood specimens were used from febrile patients with clinical manifestation of malaria infection. The blood specimens were used for thin, thick smear for microscopy and rapid diagnosis test. The results were analyzed by t-test to compare the two microscopy and Rapid diagnostic methods. A p-value > 0.05 was obtained meaning there is no difference in performance between the Rapid Diagnostic Test (RDT) and microscopic test. The results indicated that RDT had similar performance with microscopy for both positive and negative cases of malaria infection. Analyses for sensitivity, specificity and predictive values of RDT done stood at 98.9%, 97.1% and 96.9% respectively with reference to microscopic tests. The study further sought to determine the incident rates of malaria infections during wet and dry seasons among infants below five years and expectant females with febrile illnesses. Interestingly, incident rates of malaria were significantly high 47.4% during dry season than wet season 30.9%. The results showed that female children had 42.1% incidence higher than male children 30.8%. Further analysis of incident rate of malaria among children less than 5 years and expectant women gave (p < 0.05). There was significant difference in incident rate of malaria among children and expectant women with febrile illnesses p < 0.05, with children having higher incidence rate than expectant women that is 2 to 5 years at 52.34% followed by children less than one year at 41.41% and lowest in expectant mothers at 6.25%. Intensified protection strategies need to be adopted during the dry months of the year. The predominant Plasmodium species diagnosed from children and febrile patients attending Chuka Level Five Hospital was P. falciparum at 81.37% and P. vivax at 18.63%. P. falciparum is relatively higher than P. vivax which is likely to develop anti-malaria infections. In conclusion RDT is appropriate for the use of malaria diagnosis. The study recommends use of RDTs in mass screening for malaria infection, adopt or intensify protective measures during dry seasons and monitoring infections in children.
Neisseria gonorrhoea has progressively developed resistance to previously used drugs and recently to fluoroquinolones. Currently, there have been reports of emergency of N. gonorrhoea strains with reduced susceptibility and some exhibiting extensive multidrug resistant to the cephalosporin class of antibiotics that remains to be the remaining option for management of gonorrhoea. In Kenya, published reports regarding the drug susceptibility of N. gonorrhoea is scantly because of lack of surveillance programs and reliance of syndromic management established 20 years ago. Currently, management of gonococcal infections still utilizes a fluoroquinolone in combination with a macrolide; a treatment option that was revised more than three years ago. This study was undertaken in order to determine the antimicrobial susceptibility profile of Neisseria gonorrhoea cultured from symptomatic men and asymptomatic men who have sex with men (MSM) attending Casino Special Treatment Centre (STC) clinic in Nairobi. A total of 264 participants were consecutively sampled of which 73 were symptomatic men patients that presented with urethral discharges and 191 were asymptomatic MSM during the period between September 2015 and August 2016. Swabs were directly inoculated on modified thayer marten agar plates and transported to the University of Nairobi department of medical microbiology laboratory in candle jars for analysis. Colonies that were suggestive of gonococci were identified and N. gonorrhoeae was confirmed using standard procedures. The Minimum Inhibitory Concentrations (MIC) using Etest for penicillin, tetracycline, ciprofloxacin, spectinomycin, erythromycin, azithromycin, gentamicin, cefixime and ceftriaxone were determined and WHO reference strains used as controls. Data analysis was done using SPSS and descriptive statistics used to analyse both demographic and risk sexual behaviour of MSM. The Chi-square test was used to determine level of significance age category and risk sexual behaviour. There was a significant association between age category and the variables of number of partners and insertive anal sex one MSM was engaged for the last 3 months. The overall isolation rate was 23.8% (63/264) where 20.1% (53/264) were recovered from symptomatic men and 3.7% (10/264) from symptomatic MSM. All N. gonorrhoea strains recovered urethral discharges were highly susceptible to cefixime, ceftriaxone and spectinomycin; gentamicin demonstrated moderate susceptibility (94.3%) levels. High resistance levels were observed in penicillin (49.1%), tetracycline (96.2%), ciprofloxacin (49.1%) and azithromycin 16.9%). Of the total 3.7% N. gonorrhoea strains isolates from asymptomatic MSM, 4/9 (1.5%) were recovered from the pharynx, 5/9 (1.9%) urethral and 0/9 from the rectal. All the gonococci isolated from the pharynx were highly susceptible to cefixime, ceftriaxone and spectinomycin; gentamicin demonstrated moderate susceptibility (100%) levels. High resistance levels were observed in penicillin (49.1%), cefixime (96.2%), ceftriaxone (49.1%) and azithromycin 16.9%). Of the total 3.7% N. gonorrhoea strains isolates from asymptomatic MSM, 4/9 (1.5%) were recovered from the pharynx, 5/9 (1.9%) urethral and 0/9 from the rectal. All the gonococci isolated from the pharynx were highly susceptible to cefixime, ceftriaxone, spectinomycin and gentamicin (100%). Urethral strains were highly sensitive (100%) to spectinomycin and gentamicin only. Susceptibility to both cefixime and ceftriaxone was at 80% and 60% respectively. One strain showed high level MIC to both ceftriazone and cefixme; while one showed cefixime MIC increased level (≥2.0μg/ml) and (≥0.160μg/ml) respectively both recovered from the urethra. Cefixime and ceftriaxone currently used in the management of gonorrhoea are still effective in our local gonorrhoea conditions. The traditional antibiotics previously used to manage gonorrhoea are not effective and there is an emerging resistance of N. gonorrhoea strains towards azithromycin. There is therefore a need to conduct continuous surveillance of gonococcal strains and screen high risk group
as they harbour gonococcal strains that are resistant to antibiotics. The study recommends molecular
coloration of these two gonococcal strains isolated from the urethra of MSM to further
understand if they are the same strains previously associated with extensive multidrug resistance in
other parts of the world.

NICKEL-PALLADIUM NANOPARTICLES MODIFIED GLASSY CARBON ELECTRODE AS AN ELECTROCHEMICAL
NANOSENSOR FOR QUANTITATIVE DETECTION OF FORMALDEHYDE IN WATER

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Formaldehyde is one of the smallest organic molecules with a wide range of uses in the society.
It is used in cosmetics as a preservative. Formaldehyde and formaldehyde releasers are
contained in some cosmetics; hair products, shampoos, nail products, lip and dental care
products, deodorants, antiperspirants, shaving products, swipes, among others. It is also used
in the pharmaceutical industry and in the manufacture of resins and adhesives, permanent
press fabric treatments, tissue preservatives, lawn fertilizers and disinfectants. Despite its
significance, there are concerns about its toxicity. The United States’ Occupational Health and
Safety Administration (OSHA) has set an exposure limit of 2 ppm (for a short period of 15
minutes). Formaldehyde electrooxidation has become a subject of major interest in the recent
past, this is due to its potential application in fuel cell technology, and the need for its detection
at trace levels as a result of its toxicity. The existing methods of analysing formaldehyde such
as; high-performance liquid chromatography, gas chromatography and spectrophotometry, are
expensive, require bulky instrumentation and sometimes require the use of toxic reagents. In
addition, they are impractical for real-time measurements because of the time required for
apparatus set-up. Hence there is need to continually develop simple and sensitive methods of
formaldehyde determination at trace levels. Many studies have been conducted on
formaldehyde electrooxidation, most of which suffer electrode passivation as a result of
adsorbed intermediates such as carbon monoxide adsorbed (COads) and formic acid adsorbed
(H2COOads) formed from electrooxidation of formaldehyde. The objective of this work was to
modify a Ni-Pd/GCE sensor for quantitative detection of formaldehyde in water and determine
the optimum pH, scan rate and potential window for the electrochemical oxidation of
formaldehyde on the Ni-Pd/GCE. Thus, the glassy carbon electrode (Ni-Pd/GCE) was modified
with Ni and/or Pd nanoparticles for electrooxidation of formaldehyde. Palladium nanoparticles were electrochemically deposited onto the bare Glassy Carbon Electrode (GCE) from 2 mM PdCl₂ in 0.1 M H₂SO₄ supporting electrolyte, at a controlled potential of -0.14 V for 240 seconds. The Nickel nanoparticles were electrochemically deposited onto the Pd/GCE from 0.5 M NiSO₄ in 0.1 M H₂SO₄ supporting electrolyte, at a controlled potential of -1.25 V for 40 seconds. The modified glassy carbon electrode (Ni-Pd/GCE) was conditioned in 0.5 M NaOH for about 50 cycles or more to obtain a reproducible voltammogram. The assembled electrode was characterized using; Cyclic Voltammetry (CV), and Chronoamperometry (CA). The analytical performance characteristics of the assembled electrode were also determined. The results show that the electrode has significant electrocatalytic properties with respect to formaldehyde electrooxidation as a result of the synergistic effect of Ni and Pd nanoparticles combined with the glassy carbon technology. A sensitive oxidation peak for 1 mM formaldehyde was observed at about +0.43 V vs. Ag/AgCl/KCl (3 M) in 0.5 M NaOH, with a current density of 17 mA cm⁻². It had a linear detection range from 10 μM to 1 mM (R=0.9985), and a detection limit of 5.4 μM. The electrode showed significant electrocatalytic activity towards the electrooxidation of formaldehyde in aqueous solution, is selective, reproducible and stable, hence can be used to detect formaldehyde to concentrations of up to 1.45 ppm (18 μM) and can find application in fuel cells.

DISTRIBUTION OF PARTHENIUM HYSTEROPHORUS L. AND ITS IMPACTS ON BIODIVERSITY AND AGRICULTURAL PRODUCTIVITY IN NYANDO SUB COUNTY, KISUMU COUNTY, KENYA

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Parthenium hysterophorus L. has been considered to be one of the worst invasive weed in Asia, Africa and Australia. The weed threatens natural and agro ecosystems in over 30 countries worldwide. In Kenya, the weed was first reported in the early 1970s in coffee plantations in Kiambu County and has since spread to more areas in and around Nairobi, central, western and eastern Kenya. Thus, the aim of this study was to evaluate the extent of invasion and impact of P. hysterophorus on plant species diversity and agricultural productivity in Nyando Sub County of Kisumu County. Distribution was determined as presence of the weed in the sampled areas. Geographical co-ordinates were recorded using a hand held geographical positioning system (GPS) receiver. Fifteen transects were established randomly and vegetation surveys conducted.
Soil samples were collected for the seed bank study. A total of 210 respondents were interviewed using semi-structured, open-ended questionnaires to assess the impact of *P. hysterophorus* invasion on agricultural production. GPS data on presence of *P. hysterophorus* was loaded into ArcGPS 9.1 software to develop point distribution maps. One-way ANOVA was used to assess differences in mean density of *P. hysterophorus* and to test differences in size of the seeds among various land use types \((p \leq 0.05)\). Effect of *P. hysterophorus* density on species diversity, richness, and density of other herbaceous plant species was evaluated by correlation analysis. Data from perception survey was summarized using descriptive statistics. *Parthenium hysterophorus* was found to be widely distributed. There was a negative correlation between the density of the weed and species diversity \((r = -0.075, p = 0.029)\) and richness \((r = -0.924, p = 0.001)\). This indicated that where *P. hysterophorus* density was high, species diversity, and richness was low. There was a significant difference in the abundance of seeds in soils from various land use types \((F = 3.88, p = 0.017)\). Most respondents reported a negative effect of *P. hysterophorus* on livestock and crop production. This study recommends the need for increased awareness of *P. hysterophorus*, its impacts, and possible solutions among the local people, researchers, and extension workers. Appropriate control measures should be applied urgently.

**IMPACT OF PHYTOPLASMA INFECTION ON PHYTOHORMONE LEVELS, VASCULAR TISSUE MORPHOLOGY AND PHLOEM MASS FLOW IN NAPIER GRASS**

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The Napier grass stunt (NGS) phytoplasma is a phloem-limited bacterium that is transmitted by insect vector, *Maiestas banda* (Hemiptera: Cicadellidae). The phytoplasma causes NGS disease in Napier grass resulting into huge forage yield losses hence impacting negatively the economy of smallholder dairy farmers in East Africa.

Phytoplasma infections cause massive changes in phloem physiology including the sieve elements which may lead to reduced rate of phloem mass flow that interfere with translocation of food in host plants. Hormonal imbalance also occurs in infected plants.
and is a defense mechanism used by the host plants to counteract the pathogen attack. Therefore, the structures of vascular tissues were examined using fluorescent microscopy and phytoplasmas were visualized by confocal microscopy using 4',6-diamidino-2-phenylindole (DAPI) dye while the rate of phloem mass flow determined using 5,6 carboxyfluorescein diacetate (CFDA) dye in healthy and phytoplasma infected Napier grass plants. The cells of phytoplasma were detected and quantified by real-time qPCR while the levels of phytohormones were investigated using liquid chromatography tandem-mass spectrometry (LC-MS/MS) method. The areas of all vascular tissues in phytoplasma-infected Napier grass leaves were significantly reduced as follows; vascular bundles (34.8 %), xylem vessels (42.6 %), phloem (27.2 %) and sieve elements (53.5 %). The individual and aggregates of phytoplasma cells were detected on the membranes of the sieve elements that demonstrated high yields aan average of 2.29×105 cells/μg of total DNA extracted in the plant leaves by qPCR results. The rates of phloem mass flow were significantly reduced by 40.7 % in the phytoplasma-infected plants. With the exception of SA and ABA, all measured phytohormones were affected by phytoplasma infection. The concentrations of cis-12-oxo-phytodienoic acid, jasmonic acid and jasmonic acid isoleucine were significantly reduced 3, 2 and 8 folds, respectively. This study sheds light on the significance and mechanisms of phytoplasma infection.

GEO-ELECTRICAL RESISTIVITY INVESTIGATION OF MINERAL BEARING ROCKS IN RONGO GOLD MINING AREA IN MIGORI COUNTY

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Rongo Gold field forms part of the Lake Victoria greenstone belt and is a highly prospective area. However, it has to date been underexplored due to overburden which obscure the
mineralized zones beneath. An electrical resistivity survey was used to detect gold bearing rocks and dense bodies of rocks within host formation in Kamwango area of Rongo district, Migori County. To achieve this, a terrameter (ABEM SAS 1000) was used to determine apparent resistivities using Wenner and Schlumberger configurations. For good vertical resolution, Wenner array was employed to map horizontal structures where a total of 30 stations were done with a probe depth of 45m. Values from Wenner array were used to plot a contour map using Surfer 10 software. The eastern central part of the study area (40km²) is a region of low resistivity as seen from the contour map. Sounding was done on this region of low resistivity along transects using Schlumberger array where a total of 8 stations were sounded as identified from the contour map. IP2WIN software was used to process and model the apparent resistivity values to get true resistivity values. Soundings done on this region gave an average basement depth of 21.86m and a steady rise depth of 32.68m which indicate the depth at which the country rock was hit. High resistivity values indicate the compact volcanic Nyanzian system rocks that are porphyritic, andesites and dacites. The values go up to 1000 Ωm in some parts of the study and the depth is in the range between 40m and 130m. Depths with low resistivity are composed of the highly fractured volcanics with resistivity as low as 13Ωm. The subsurface and the weathered section also have low values due to presence of groundwater. The conductive zones give resistivity values that correspond to mineral ores that bear gold and related minerals.