MBARARA UNIVERSITY OF SCIENCE AND TECHNOLOGY

DIRECTORATE OF RESEARCH AND GRADUATE TRAINING

POSTGRADUATE BOOK OF ABSTRACTS

28th Graduation Ceremony

28th May 2022

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FORWARD

Welcome to the 28th Mbarara University of Science and Technology (MUST) Graduation Ceremony. We shall witness a total of 228 Postgraduate Graduands (29 Doctor of Philosophy and 199 Masters) being awarded their new qualifications. Our graduate programs are designed to be responsive, challenging and innovative. The graduate students come from all over the world to undertake Postgraduate Diploma (1 year) and various non-Clinical Masters Programs of 2 years duration to 3 years in the case of Clinical and Doctor of Philosophy Programs. Students spend time in training and education activities which include participation in courses, competence and skills training, seminars, conferences; as well as placements including industrial training and working visits. All programs consist of conducting research resulting into dissertations/theses. The abstracts presented here have been extracted from the primary research carried out by today's graduands.

Associate Professor Vincent Batwala

DIRECTOR

DIRECTORATE OF RESEARCH & GRADUATE TRAINING

1.0 POSTGRADUATE PROGRAMS

Faculty of Business and Management Sciences
1. Master of Business Administration (Duration 2 yrs)

Faculty of Computing and Informatics
1. Postgraduate Diploma in Business Informatics (Duration 1 yr)
2. Postgraduate Diploma in Health Information Technology (Duration 1 yr)
3. Postgraduate Diploma in Information Systems (Duration 1 yr)
4. Masters in Business Informatics (Duration 2 yrs)
5. Master of Science in Health Information Technology (Duration 2 yrs)
6. Master of Science in Information Systems (Duration 2 yrs)

Faculty of Interdisciplinary Studies
1. Postgraduate Diploma in Criminology (Duration 1 yr)
2. Postgraduate Diploma in Development Studies (Duration 1 yr)
3. Master of Arts in Conflict Analysis and Inclusive Development (Duration 2 yrs)
4. Master of Arts in Governance and Planning (Duration 2 yrs)
5. Master of Arts in Development Studies (Duration 2 yrs)

Faculty of Medicine
1. Master of Medicine in Anaesthesia (Duration 3 yrs)
2. Master of Medicine in Community Practice/Family Medicine (Duration 3 yrs)
3. Master of Medicine in Dermatology (Duration 3 yrs)
4. Master of Medicine in Ear, Nose and Throat (Duration 3 yrs)
5. Master of Medicine in Emergency Medicine (Duration 3 yrs)
6. Master of Medicine in General Surgery (Duration 3 yrs)
7. Master of Medicine in Internal Medicine (Duration 3 yrs)
8. Master of Medicine in Obstetrics/Gynaecology (Duration 3 yrs)
9. Master of Medicine in Ophthalmology (Duration 3 yrs)
10. Master of Medicine in Paediatrics & Child Health (Duration 3 yrs)
11. Master of Medicine in Pathology (Duration 3 yrs)
12. Master of Medicine in Psychiatry (Duration 3 yrs)
13. Master of Medicine in Radiology (Duration 3 yrs)
14. Master of Public Health (Duration 2 yrs)
15. Master of Public Health with Research Ethics (Duration 2 yrs)
16. Master of Medical Laboratory Science (Duration 2 yrs)
17. Master of Science in Anatomy (Duration 2 yrs)
18. Master of Science in Biochemistry (Duration 2 yrs)
19. Master of Science in Medical Microbiology (Duration 2 yrs)
20. Master of Science in Pharmacology (Duration 2 yrs)
21. Master of Science in Physiology (Duration 2 yrs)
22. Master of Pharmacy in Clinical Pharmacy (Duration 2 yrs)
23. Master of Science in Pharmacognosy & Natural Medicine Sciences (Duration 2 yrs)
24. Master of Science in Pharmaceutical Analysis (Duration 2 yrs)
25. Master of Nursing Science in Critical Care (Duration 2 yrs)
26 Master of Science – Community Midiwifery & Reproductive Health (Duration 2 yrs)
27. Master of Science – Mental Health Nursing (Duration 2 yrs)
28. Master of Science – Pediatric Clinical Nursing (Duration 2 yrs)

Faculty of Science

1. Master of Education in Curriculum, Instruction and Media Studies (Duration 2 yrs)
2. Master of Education in Educational Administration and Planning (Duration 2 yrs)
3. Master of Education in Educational Psychology (Duration 2 yrs)
4. Master of Science in Biology (Duration 2 yrs)
5. Master of Science in Chemistry (Duration 2 yrs)
6. Master of Science in Mathematics (Duration 2 yrs)
7. Master of Science in Physics (Duration 2 yrs)

Doctor of Philosophy (Duration 3 yrs)

In various Programs: Biomedical Engineering, Computing, Development Studies, Education, Management, Medine and Scinence.

2.0 DOCTOR OF PHILOSOPHY PROGRAMS

2.1 FACULTY OF APPLIED SCIENCES & TECHNOLOGY

2.1.1 A Dictionary Learning Approach for Image Reconstruction in Low Field Magnetic Resonance Imaging

Emmanuel Ahishakiye, Jones Obungoloch, Julius Tumwiine, Martin Bastiaan Van Gijzen

Magnetic resonance imaging (MRI) is a safe medical imaging technology that provides a non-invasive way to view the structure of human anatomy. However, conventional (high-field) MRI scanners are very expensive to purchase, operate, and maintain in developing countries. Due to these limitations, many people in developing countries do not have access to MRI technology. To address this challenge, teams from Mbarara University of Science and Technology (MUST) in Uganda, Leiden University Medical Centre (LUMC) in the Netherlands, Delft University of Technology (TU Delft) in the Netherlands and Pennsylvania State University (PSU) in the USA are working on developing affordable, portable and low-field MRI scanners, aiming to diagnose children in developing countries with hydrocephalus. The low field MRI systems currently under development are characterized by the low signal-to-noise ratio and this result in noisy images. To alleviate the drawbacks of low field MRI scanners, this study embarked on developing image reconstruction algorithms based on a dictionary learning approach that is capable of improving image quality. The study was guided by three objectives, these are: (i) To determine the extent to which machine learning methods have been used in MRI image reconstruction (ii) To develop image reconstruction algorithms suitable for improvement of image quality in low field MRI, and (iii) To test and validate the developed algorithms. To achieve the first objective, a systematic literature survey was done. Results revealed that dictionary learning methods are very fast and less computationally expensive and may therefore be suitable for resource-constrained environments when compared to deep learning methods. To achieve the second objective, three algorithms based on the dictionary learning approach were developed during this study. For the first algorithm, an adaptive-size dictionary learning algorithm for MRI reconstruction (AS-DLMRI) was developed. For the second algorithm, a hybrid algorithm for joint image reconstruction and denoising in low field MRI was developed. Finally, for the third algorithm, a hybrid algorithm that integrates the Two-level Bregman method for image reconstruction and the image denoising step uses simultaneous codeword optimization (SimCO) for dictionary updating and orthogonal matching pursuit (OMP) for sparse coding was developed. To achieve the third objective, experimental results with the developed algorithms on the peak signal-to-noise ratio (PSNR), signal-to-noise (SNR), reconstruction time (in seconds), and high-frequency error norm (HFEN) revealed better image reconstruction results when compared to the current state-of-art dictionary learning algorithms.

2.2 FACULTY OF BUSINESS AND MANAGEMENT SCIENCES

2.2.1 The effect of world oil price shocks on Uganda's Economy

Ogwang Geoffrey, Dick Nuwamanya Kamuganga, Tomson Odong

This study investigated the effect of World oil price shocks on Uganda's economy. Specifically, the study investigated: (i) the determinants of Oil Imports for Uganda; (ii) the pass-through effect of World Oil Price shocks to Domestic Pump Prices for petrol; and (iii) the pass-through effect of World Oil Price shocks to the Official Development Assistance received by Uganda. The study used quantitative secondary data spanning from 1993 to 2016. The Vector Error Correction model was used to investigate the determinants of Oil Imports for Uganda while Structural Vector Autoregressive model was adopted to investigate and assess the pass-through effects of World Oil Price shocks to the Domestic Pump Prices for petrol and Uganda's Official Development Assistance. The findings revealed that in both short-run and long-run, World Oil Price, Real Effective Exchange Rate and Household Final Consumption Expenditure negatively determine Oil Imports. However, GDP had a positive effect and therefore do promote Oil imports for Uganda. In respect to pass-through effect of World Oil Price shocks on Domestic Pump Price, the results obtained revealed an insignificant pass-through effect of World Oil Price Shocks to the Domestic Pump Price for petrol in the period under the review. Finally, in respect to pass-through effect of World Oil Price shocks to the Uganda's Official Development Assistance, the study findings revealed that there is an insignificant pass-through effect of World Oil Price shocks to Official Development Assistance received by Uganda. The policy recommendation for this study is that there should be a deliberate move to increase household incomes as well as spending pattern such that household consumption positively affect the consumption of oil and the country's economic growth. Besides, the study also recommends establishing a body like Petroleum Regulatory Authority to monitor the pricing of domestic petroleum products in order to eliminate unfair pricing by oil retailing firms in Uganda. Finally, alternative sources of funding should be sought to encourage the growth of the economy other than borrowing from external countries including oil exporting countries. The alternative sources of funding can be from domestic sources like National Social Security Fund (NSSF) and local banks.

2.2.2 Capital Structure, Credit Risk Management and Loan Portfolio Quality of Microfinance Institutions in Uganda

Agasha Ester, Nixon Kamukama, Arthur Sserwanga

The purpose of this study was to establish the relationship between capital structure, credit risk management, and loan portfolio quality in Ugandan Microfinance Institutions (MFIs). The study also examined a) the mediating role of cost of capital on the relationship between capital structure and loan portfolio quality and; b) the mediating role of quality of clientele base on the relationship between capital structure and loan portfolio quality. A multi-theoretical approach (MM theory of Capital structure, Transaction Cost Theory, Stewardship Theory, and Modern Portfolio theory) was applied. In addition, a sequential mixed-method (Quantitative supported by Qualitative) was adopted. Using Krejcie and Morgan (1970), a sample of 82 Microfinance Institutions was drawn from a population of 90 registered institutions. Purposive and simple random sampling techniques were used to select

respondents. The study respondents included senior managers, credit managers, and loan officers from each sampled Microfinance Institution. A 5-point Likert scale structured questionnaire was used to collect quantitative data and a semi-structured interview guide was used to collect qualitative data. Data were analyzed using SPSS/23, PLS-SEM/3.0, and NVivo version 12. The study tested eight (8) relational hypotheses (6 direct and 2 indirect relationships). All the 6 direct relationships and their tested hypothesis were supported. Further, the study established a partial mediation for the two (2) indirect relationships. Hence, MFI Managers should take advantage of less costly financing alternatives such as the government-aided PROFILLA program that gives MFIs support of up to 70% of capital. The government should improve the current Microfinance and Money Lenders Act to include the aspect of credit risk management and proper assessment of MFIs loan book. There could be further needed research on issues concerning (i) the client base and its needs; (ii) client satisfaction; and (iii) the networks of clients and community groups to obtain more hands-on knowledge of the market and how it reacts.

2.2.3 Ethical behaviour, managerial competencies, and supply chain performance of relief aid organizations in western Uganda

Aryatwijuka Wilbroad, Nixon Kamukama, Frederick NsambuKijjambu, Aloysius Rukundo

The world has in the last decade witnessed both natural and man-made disasters displacing millions of people who end up as refugees, the majority of which are settled in Uganda. These refugees are under the care of relief aid organizations who continue to experience operational challenges with relief supplies not reaching the intended beneficiaries in the right time, condition, quantity, and at the right cost. In an attempt to improve supply chain efficiency, this study examined the relationship between ethical behaviour, managerial competencies, accountability, and supply chain performance of relief aid organizations in Western Uganda. The study used a cross-sectional sequential mixed methods approach (QUAN-Qual). The study population was 150 relief aid organizations based in western Uganda from which a sample of 105 organizations was taken and the respondents were the staff of these organizations and beneficiary representatives. Structured questionnaires and interview guides were used to collect data and it was analyzed using SPSSv22 and Atlastti.v7.57 respectively. Structural equation modelling aided by Analysis of moment structures (AMOS v22) was used to test mediation. The study findings indicate that managerial competencies, ethical behavior, and accountability are positively and significantly associated with the supply chain performance of relief aid organizations in Uganda. The findings further show that accountability partially mediates the relationship between managerial competencies and supply chain performance. Besides, accountability has a full mediation effect on the relationship between ethical behavior and supply chain performance. The study findings are in support of existing literature and theories related to the current study. Accordingly, the study concludes ethical behavior, managerial competencies, and accountability are strong predictors of supply chain performance. Additionally, the study concludes that staff with professional, social and personal competencies can improve transparency, compliance, and effectiveness and hence supply chain performance. It is further concluded that without downward accountability, ethical behavior alone cannot lead to the desired supply chain performance. From the results, discussion and conclusions, it is recommended that for relief aid organizations to realize efficient delivery of relief supplies, they put in place robust recruitment policies that will attract staff with professional, social,

and personal competencies. Relief aid organizations should also develop strong ethical cultures built through ethical education and hence improve the moral character of relief aid organizations' staff; this will lead to transparency, effectiveness, and compliance. With increased downward accountability, relief supplies will reach the intended beneficiaries.

2.2.4 Corporate governance practices and performance of cities: the comparative case of Kampala capital city authority and the city of Kigali

Asiimwe Frank, Roberts Kabeba Muriisa, Tumuhimbise Manasseh

In order to effectively meet performance goals, Kampala Capital City Authority (KCCA) and the City of Kigali (CoK) adopted corporate governance practices. Despite this move, the two citieshad reached different performance levels and still had challenges in achieving their goals. This study examined the contribution of governing rules, accountability and leadership collaboration to better understand policy implementation, infrastructure development and service delivery in the two cities. A mixed methods research design was used to undertake the research. A quantitative dominant comparative paradigm was used, employing descriptive, correlational and content analysis methods. Structured questionnaires, interviews and document review guides were used to collect data. From a quantitative sample of 492(Kampala = 250; Kigali = 242) city management employees and a purposive sample of 49 (Kampala = 26; Kigali = 23) city managers and council members and 51(Kampala = 27; Kigali = 24) city residents. The study findings revealed differences in the contribution to city performance. Enforcement of city governing rules (KCCA adr^2=0.168, CoK adr^2= 0.220), accountability of leaders (KCCA adr^2=0.052, CoK adr^2= 0.130) and leadership collaboration (KCCA adr^2=0.036, CoK adr^2= 0.102). The City of Kigali exercised more autonomy with the enforcement of city governing rules and infrastructure development, owing to the fact that the city council had the autonomy to initiate and formulate city management and infrastructure development policies, and to set and monitor service delivery in line with the performance goals in the city development plan. In CoK collaboration among city leadership also supported infrastructure development and service delivery. In KCCA, partisan politics and central government interference reduced the enforcement and monitoring of city management policies and infrastructure development. City leadership in KCCA was not empowered to ensure that the city performance goals were reached. KCCA and CoK faced challenges in being fully accountable to the city citizens. The two city authorities did not effectively use the available processes to enable them to be responsive to the needs of the people and use approaches that produce better performance outcomes to enhance the livelihood of city dwellers. The city councils were not empowered enough to ensure that the city managers pursued the goals and objectives of the stakeholders. The level of empowerment by city residents to demand accountability from city leaders was insufficient and various city groups were not able to effectively participate in city operations.The study recommends that for KCCA and CoK to have better policy implementation, infrastructure development and service delivery, they need more responsive city governance (RCG) that promotes responsiveness, participation of city residents and effectiveness in all city operations. Implementing RCG will enable the two cities to avoid unnecessary central government interference, promote responsibility and accountability among city governing agencies and develop a culture of good collaboration, which will enable them to achieve their performance goals and enhance the wellbeing of city dwellers.

2.2.5 Control environment, Credit Management Systems and Financial Performance of Savings and Credit Cooperatives in Mid-Western Uganda

Baguma John Muhunga Kule, Nixon Kamukama, Frederick Nsambu Kijjambu

The formal financial institutions' banking system considers majority of the population in developing economies as unbankable. To bridge the financing gap in the banking system, SACCOs are considered as engines for increased access to affordable credit by the economically active poor. The study aimed at examining the link between control environment, credit management systems, and financial performance of SACCOs in Mid-Western Uganda. The study determined mediating role of accountability in the association between control environment and financial performance.

The study adopted a cross-sectional research design. In addition, the positivism paradigm was used. The study undertook the multi-theoretical approach, and considered the Resourced-based view, Modern portfolio, Stewardship, Agency, and the Systems theories. The study population was 122 SACCOs, and a sample size of 93 SACCOs was chosen using Simple random sampling technique. The targeted number of respondents was 03 per SACCO. The study used open-ended questionnaires. Data was reduced to manageable level by conducting exploratory factor analysis, and both descriptive and inferential statistics analyses were conducted.

The study findings reveal a strong positive and significant relationship between control environment and financial performance of SACCOs in Mid-Western Uganda ($r = 0.55$, $p<0.01$). Additionally, the results indicate a moderate positive and significant relationship between credit management systems and financial performance ($r = 0.48$, $p<0.01$). The results indicated that accountability plays a partial mediation in the association between control environment and financial performance (Ratio index = 24%). Also, accountability is positively linked to financial performance ($r = 0.47$, $p<0.01$). Of all the study dimensions, integrity and ethical values, credit terms, and client appraisal depict strong positive and significant links with financial performance.

The study recommends that managers of SACCOs should further the design and implementation of an effective control environment by ensuring that integrity and ethical values are upheld. The results indicate that accountability is a key driver of financial performance. Management should therefore embrace accountability in the SACCOs' operations. Besides, managers should pay greater attention to putting into place mechanisms geared towards the formulation and implementation of favourable credit terms, and ensuring that an adequate appraisal process is in place.

2.2.6 Corporate Governance and Financial Performance of Private Limited Companies in Central and Western Uganda

Rwakihembo John, Nixon Kamukama, Nsambu Frederrick Kijjambu

Corporate governance has attracted enormous attention globally for many years, and issues of good governance in business have become matters of public and academic debate. The study aimed at establishing the relationship between corporate governance and the financial

performance of private limited companies in Uganda. It examined the mediating role of managerial competences and the moderating effect of firm characteristics on the association between corporate governance and financial performance. The study applied a multi-theoretical approach considering agency, stakeholder, and upper echelons theories. A positivist paradigm and a cross-sectional design were adopted. Data were obtained from a sample of 394private companies drawn from central and western Uganda. Companies were stratified by region, sectors, and subsectors; and then selected using simple random sampling from each stratum. Board members, Chief Executive Officers, accountants, Internal Auditors and managers were chosen purposively.

A questionnaire survey was used to collect data, while Principal Component Analysis and varimax rotation were employed for data extraction and reduction. Pearson correlation and hierarchical regression techniques were employed for data analysis. The study revealed a positive relationship between corporate governance and financial performance. Managerial competences were confirmed to be a mediator, while firm characteristics moderated the relationship between corporate governance and financial performance. The interaction term was found to be enhancing, with the moderator strengthening the effect of corporate governance on financial performance. Firm characteristics were positively related to financial performance. The study recommends for revision of the corporate governance code to cater for an increase in board size, separate leadership, and non-executive directors on the boards of private companies for effectiveness. The study also recommends firms to be more accountable to all stakeholders rather than only shareholders, improve their attributes such as reputation, and invest more in physical assets for sustainability. Private companies are encouraged to prioritize managerial competences in their recruitment processes and training programs to enhance their financial performance.

2.3 FACULTY OF COMPUTING & INFORMATICS

2.3.1 Application of Machine Learning in Tracking Food Insecurity

Andrew Lukyamuzi, John Ngubiri, Washington Okori

Machine Learning allows development of models capable of learning from datasets and this offers benefits such as flexibility, creativity, extraction of complexity patterns, and high performance. Consequently, Machine Learning has been applied to predicting, tracking, and monitoring food insecurity. The research was on enhancing application of Machine Learning in tracking food insecurity focusing on four knowledge gaps.

While phone datasets such as Call Detail Records (CDRs), airtime credit purchases, and mobile transactions have been applied to gain some information on food insecurity, limited attention has been given on the use of phone conversations and phone messages for similar purpose. A Machine Learning strategy was proposed to similarly harness these unexplored datasets. Future work points at subjecting the strategy with relevant datasets, an opportunity missed due to complication in accessing relevant datasets from telecommunication companies.

A second knowledge gap was on a challenging situation. While tweets from a community have been applied to gain insights on food insecurity, this strategy hits a snag for a low

tweeting community. This study explored use of relevant tweets from both internal and external communities as an alternative for a low tweeting community. From the four classifiers (KNN, SVM, D-TREES, and N-BAYES) explored, D-TREES generated a superior performance with ROC-AUC measure of 0.84. Food insecurity trends based on D-TREES resulted into a correlation of 0.57 compared with ground truth data. This was comparable with correlation of 0.4 from previous related work. The strategy can be applied in studying other disasters in a low tweeting community.

A third knowledge gap was on limited application of both similarity and polarity features in tracking food insecurity. This was explored in a context applying Machine Learning to classify whether a news article is on food insecurity or not. Findings were promising; with N-BAYES and KNN generating ROC-AUC measures of 0.927 and 0.931 respectively better than random classifier performance of 0.91. Future work points at exploring the concept with deep learning as a sophisticated environment to enhance performance.

A strategy mimicking human cognition was modelled and blended with standard classifiers to enhance performance in classification and time complexity in a context of tracking food insecurity from news feed. KNN, SVM, N-BAYES, and D-TREES generated improvement in AUC-ROC measures ranging from 0.3\% to 3\% while in CNN and LSTM the measures retarded. On overall, CNN generated highest performance of ROC-AUC of 0.804 though without the strategy. The time complexities for all the six classifiers improved two-fold. Food insecurity trends generated with CNN were comparable with ground truth trends based on food prices at a correlation of 0.45. This was comparable with 0.4 correlation obtained with similar previous studies. Future work can consider venturing into: (1) examining any un-explored aspect(s) of the news feed, (2) alternatives options of modelling human cognition, and (3) un-explored algorithms.

Research findings apply to ministry of Relief, Disaster Preparedness, and Refugees in Uganda. While the policy document from the ministry embraces IT application to enhance ministry's activities, it is silent on harnessing Machine Learning. Due to its benefits described, we advocate the ministry to embrace Machine Learning as a computational technique that can enhance tracking of food insecurity as illustrated.

Keywords: Food Insecurity, Predicting Food Insecurity, Machine Learning, Ensemble Learning.

2.3.2 Enhancing adoption of a unified identification system in Ugandan Ministries, Departments and Agencies

Mpangwire Violah, Annabella Habinka Basaza- Ejiri, Fred Kaggwa

A shift from the use of manual systems of data processing to computerised information management systems has yielded greater opportunities for entities by enabling them to manage huge volumes of data at a relatively low cost. This study set out to examine the Technological, Organisational and environmental factors that influence the adoption of Unified Identification System (UIDS) among government Ministries, Department and Agencies (MDAs) in Uganda. The study applied a multi-theoretical approach considering Diffusion of Innovation (DOI) theory, Dynamic capability theory (DCT) and the Technological-organisational and environmental (TOE) framework. A critical realism paradigm and a cross-sectional design were adopted. Data were obtained from a sample of 97

MDAs drawn from 130 MDAs in Uganda. MDAs were stratified by their administrative levels, and then selected using simple random sampling from each stratum. Heads of departments, CEOs/ Permanent Secretaries and system implementers were chosen purposively for the study.

A closed-ended questionnaire survey and structured interviews were used to collect data. Exploratory factor analysis through Principle Component Analysis (PCA) and varimax rotation were employed for data extraction and reduction. Pearson correlation and hierarchical multiple regression techniques were employed for quantitative data analysis while thematic analysis was conducted for qualitative data. Results indicate a significant positive relationship between technological, organisational and environmental factors and a 36% contribution to the adoption of the UIDS. All dimensions of technological factors (except complexity that had a negative effect), organisational factors and environmental factors were significantly positively related with the adoption of the UIDS. Specifically, this study makes a contribution to the body of knowledge on identification systems adoption by proposing a framework for enhancing adoption of UIDS. The proposed framework was evaluated by an online survey of 22 respondents.
The study concludes that for a successful and sustainable implementation of the UIDS among MDAs in Uganda, special attention should be focused on addressing the technological, organisational and environmental factors. The study recommends MDAs to define a clear vision and priorities for the UIDS, develop modules that are compatible with the country's telecommunication infrastructure, and streamline the legal status for electronic transactions. In terms of policy, the government of Uganda through the line MDAs should disseminate information urgently about acts and policies concerning identification of systems through multi-channels. This study further advised MDAs to standardise government systems to attain compatibility and offer continuous training to MDA employees on computerised Information management systems, specifically the UIDS.
Keywords: Unified Identification systems, Ministries Departments and Agencies, Technological, Organisational and Environmental factors

2.3.3 A Framework and Algorithms for an Electronic Examination Process with Free Handwriting

Deborah Natumanya, Evarist Nabaasa, Pius Ariho

Electronic examinations are a core component in academic institutions where electronic learning is implemented. As the common form of student evaluations, different forms of examinations are conducted i.e. progressive / formative assessments and summative assessment. The aim of this research was to attain a secure and robust electronic examinations process for a university student. Currently used electronic examinations frameworks were found to have challenges with limited question types that can be set in a particular examination paper, computation of marks and lack of the electronic handwriting component among others. To better approach the aforementioned challenges, this research sought to understand the challenges with the currently used modes of assessment, the implemented frameworks and how algorithms can be design to solve the issues identified in the existing frameworks. A cross sectional survey was conducted where quantitative method through a questionnaire tool was deployed to acquire responses from respondents who included students and lecturers. Unified modelling language was also used to design the electronic examinations assessment framework with free handwriting and different algorithm

design techniques like dynamic programming, divide and conquer, and brute force helped in the design of the algorithms implemented in the framework. The results obtained from the survey indicated that electronic examinations offer more usage features with a score of 68.76%compared to oral at a score of 60.28%and paper based examinations at a score of 63.68%. Electronic examinations were also found to be more secure than paper and oral examinations with a score of 67.72% for electronic assessment, 63.0% for paper based assessment and62.32% for oral assessment. The developed electronic examinations framework incorporates features of electronic free handwriting, electronic computation of marks and supports various question types thus having an advantage over most of the existing examination assessment frameworks. Eleven algorithms were designed i.e. Electronic question algorithm, Electronic question paper generation algorithm, Electronic free handwriting algorithm, Mpath algorithm, Computation of Marks algorithm, Electronic answer booklet algorithms that contained: Cover page algorithm, Empty page algorithm, Addition of page algorithm, Watermark addition algorithm, and Authentication algorithms which included Students, Lecturer/Administrator authentication. The designed algorithms were analyzed basing on the worst case complexity which helped to determine the total amount of work done by each algorithm at its worst case scenario thus detecting the behavior of the algorithms when supplied with large inputs. The significance of this research is that it contributes to the theoretical understanding of electronic learning and electronic examinations by providing an electronic examinations framework with free handwriting and its algorithms.

2.4 FACULTY OF INTERDISCIPLINARY STUDIES

2.4.1 Leadership competences and sustainable funding of local non-governmental organizations in Uganda

Paul Kyalimpa, F. G. Netswera, E. M. Rankhumise

Non-profit-making organizations, commonly known as Non-Governmental Organizations (NGOs) play an important and growing role within the global economy and are increasingly recognized by governments as important players in a country's social, economic, political and intellectual development. Local NGOs (LNGOs) in Uganda play a pivotal in national development as they extend services to the underprivileged and poor communities that are not reached by government and private sector programs. Despite their contribution to national development, LNGOs in Uganda suffer from unsustainable funding caused by dependence on external funding and leadership competences to mobilize and manage financial resources. The study adopted mixed methods research utilizing both qualitative and quantitative methods and applying a convergent parallel mixed method design on a sample of 103 LNGOs to examine the competence of LNGO leaders, financial sustainability of LGOs and the extent to which leadership competencies influence sustainable funding of LNGOs in Uganda.
The study revealed that LNGO leaders in Uganda LNGO leaders were found only to be competent in looking out for funding partners which is a salient parameter of external donor dependence; for LNGOs leaders did not provide effective leadership for undertaking internal income generating activities, effectively and efficiently managing meagre resources for survival and mission attainment. This is manifested in the finding of high donor dependency of 80.54%and inability of NGOs to operate beyond 71 days if external funding ceased.

Finally, the study revealed that the ability of the LNGO leader to effectively utilize and manage whatever resources that are available and spearheading the implementation of major investment and alternative income generating ventures significantly contributes to financial sustainability of LNGOs.

The study recommends capacity building for LNGOs in setting up of investments for income generation and efficient and effective resource management. This calls for favourable government policy on tax exemption exemptions for businesses that contribute to LNGOs beyond the current 5 per cent and complete tax exemption on LNGO income generating activities to create fertile local income generation and fundraising environment. Besides the literature, the contribution of the study was establishment of leadership competence frameworks and tools that will be used for recruitment and performance evaluation of NGO leaders to foster sustainable funding. The main limitations of the study were limited literature on NGO leadership competences and lack of centralized data about NGO operation in Uganda.

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2.5 FACULTY OF MEDICINE

2.5.1 Development of Pharmacopoeial Standards for Azadirachtaindica, Cymbopogoncitratus, Moringaoleifera, Tithoniadiversifolia and Vernoniaamygdalina Antimalarial Plants in Uganda

Ajayi Clement Olusoji, Ogwang Patrick Engeu, Anthony Adebolu Elujoba

The absence of official recognition of the use of antimalarial plant remedies in the health care delivery system in Uganda and other African nations has been partly attributed to the lack of quality and safety standards, despite the wide use of these plants. Therefore, this work involved carrying out several standardization experiments and provided botanical and chemical parameters, antimalarial potencies, toxicity profiles, and other useful standards for *Azadirachtaindica* A. Juss. (Meliaceae), *Cymbopogoncitratus* (DC.) Stapf. (Poaceae), *Moringaoleifera* Lam. (Moringaceae), *Tithoniadiversifolia* (Hemsl) A. Gray and *Vernoniaamygdalina* Del. (Asteraceae), constituting the five Ugandan antimalarial plants studied.

Each of the plants was collected from 4 different geographical regions in Uganda following proper identification. They were authenticated and their voucher specimens were deposited at Makerere University National Herbarium. Some leaves were oven-dried at 40 ºC while others were air-dried, pulverized mechanically, and studied for pharmacognostical characteristics while extracts thereof were studied for chemical, biological and toxicological properties using standard methods. In the biological studies, the acute and sub-acute toxicity were determined using OECD 'up and down' and other standard methods. The *in vivo* antimalarial activity experiment was carried out using a 4-day chemo-suppressive test model. The variation observed in a set of data was analyzed through one-way analysis of variance, and the mean differences were considered significant at 95% confidence level. Phytochemical analysis of the plant extracts and quantitative estimation of the reported antimalarial constituents such askaempferol, tagitinin C, etc. were carried out using High-Pressure Liquid chromatography (HPLC) methods.

The pharmacognostical results showed the presence of anomocytic with parasitic stomata and many other diagnostic features in the plants while all their extracts produced antimalarial responses in mice with *V. amygdalina* extracts showing the highest activity (75%) while *C. citratus*gave the lowest (55%). Extracts of *T. diversifolia* at medium dose, *A. indica*at highest dose and *V. amygdalina*at highest dose were found to produce adverse effects in the liver indicated by inflammation of the hepatocytes. The total ash value of *A. indica*, *C. citratus*, *M. oleifera*, *T. diversifolia* and *V. amygdalina* leaves were 10.7, 8.2, 13.9, 14.4 and 11.4% with acid-insoluble ash of 0.7, 2.0, 0.6, 1.3 and 1.5%, respectively. The water-soluble extractives of *A. indica*, *C. citratus*, *M. oleifera*, *T. diversifolia* and *V. amygdalina* leaves were 19.9, 17.8, 21.8, 28.7 and 27.5%, respectively. The azadirachtin, vernodanol and tagitinin C in diethyl ether extracts of *A. indica*, *V. amygdalina* and *T. diversifolia* leaves showed concentrations of 51.8, 11.8 and 16 µg/g, respectively. The HPLC fingerprints of *A. indica*, *C. citratus*, *M. oleifera*, *T. diversifolia* and *V. amygdalina* aqueous extracts showed 41, 40, 38, 42 and 40 signals, respectively.

This study confirmed the pharmacognostical parameters for the first time, phytochemical and biological parameters of these plants in Uganda for the development of monographs which then qualify for incorporation into the first edition of Ugandan Herbal Pharmacopoeia.

2.5.2 Herbal Formulation using Momordica charantia and Abelmoschus esculentus for Glycemic Control

Emanuel Peter, Crispin Duncan Sesaazi, Prakash B. Nagendrappa

Background: Fruits of *Momordica charantia* L. (Cucurbitaceae) and *Abelmoschus esculentus* (L.) Moench (Malvaceae) have adequate scientific evidence of their antidiabetic efficacy but remain underutilized due to insufficient standardization. In light of this problem, this thesis developed a standardized solid dosage form containing *M. charantia* and *A. esculentus* for glycemic control.

Methods: Evidence of local use of *M. charantia* and *A. esculentus* was documented through a review of ethnomedical reports in Tanzania. Then, fruits obtained from the vegetable garden at 0°34'53.0"S, 30°39'30.0"E, Mbarara were extracted by maceration using water and ethanol. Standard methods determined the extracts' organoleptic and physicochemical profiles. Subsequently, a five-level two-factor full factorial design optimized the dose of a binary mixture of the two extracts in the prediabetes model. The prediabetes was induced in male Wistar rats by a high-fat diet (HFD) fed for eight weeks. The optimal dose ratio was mixed with excipients in a D-optimal mixture design to develop and optimize capsule dosage form. The optimized herbal capsules were evaluated in physical, chemical, and stability aspects. Moreover, acute oral toxicity was determined in female Wistar rats per OECD 425 limit test method. The antidiabetic activity was tested in HFD-streptozotocin male Wistar rats at oral doses of 200, 400, and 600 mg/kg, along with diabetic control (DC), standard (glibenclamide 5 mg/kg) control, and normal control (NC) groups (n = 6). Histopathological examinations of the pancreas were also performed.

Results: Local Tanzanian communities used *M. charantia* and *A. esculentus* to manage DM and other ailments. The *M. charantia* and *A. esculentus* at a dose ratio of 1.75: 2.81 were selected. This dose ratio formulated to 600 mg capsules of size 00. The standardized capsules (DM083) contained total polyphenols (40.4 mg GAE/cap.), 12 peaks HPLC chromatogram, 25 min disintegration time, moisture content of 4.5%, and an acceptable limit of other quality parameters. The capsules were practically stable under normal storage conditions for six months and had an LD50 > 2000 mg/kg; thus, classified under category 5 (non-toxic) based on the globally harmonized system of classification and labeling of chemicals. At the end of 28-days, there was a statistically significant reduction in mean FPG levels in G200 (9.8 ±0.77), G400 (7.4 ± 0.87), G600 (5.5 ± 0.22), glibenclamide (8.8 ± 0.94) mmol/L compared to DC (18 ± 2.28) and NC (4.7 ± 0.16) mmol/L (p <0.001). The reduction of FPG levels was dose-dependent. Furthermore, the three doses and glibenclamide significantly increased the mean plasma insulin levels compared to DC (p < 0.05). The histological examinations identified the regeneration of β-cells at a dose of 600 mg/kg.

Conclusion and recommendations: A binary mixture of *M. charantia* and *A. esculentus* fruit extract resulted in a stable, safe, and efficacious herbal capsule dosage form. Long-term studies are needed to estimate the minimum starting dose for human use and additional

toxicity data. Local communities and policymakers could utilize our study findings to promote these plant species' production and utilization as adjunct preparations for type 2 diabetes mellitus.

2.5.3 Pelvic organ prolapse in Southwestern Uganda: Magnitude, Trends, Effect on Quality of Life, and Risk Factors for Recurrence after Surgery at Mbarara Regional Referral Hospital

Musa Kayondo, Dan Kaye Kabonge, Verena Alice Geissbühler

Background: Pelvic Organ Prolapse (POP) is one of the Pelvic floor Disorders (PFDs) that negatively affects the Quality of Life (QOL) of women. About 20% of women will undergo surgery for POP over their lifetime. However, less has been documented on the magnitude of POP, QOL of the affected women, and the adverse surgical outcomes in resource-limited settings.
Study objectives: The objectives were: I)to determine the magnitude and trends of POP at Mbarara Regional Referral Hospital (MRRH) over a five-year period; II) to assess the QOL before and after surgery among women with symptomatic POP at MRRH; and III) to determine the recurrence rate of, and risk factors for the recurrence of POP at one year post vaginal reconstructive surgery at MRRH.
Methods: For Objective I, a retrospective review of files of all women managed for PFDs from January 1, 2014 to December 31, 2018 was conducted. For objective II and III, a prospective cohort study was conducted among women with POP scheduled for surgery at the urogynecology unit. We recruited 120and 140 participants for objective II and III respectively. The QOL at baseline and at 1 year after surgery was determined using the King's Quality of Life questionnaire. A paired *t*- test was used to compare the differences in mean scores at baseline and at 1-year post-surgery. Similarly, pelvic examinations under maximum strain were serially done within one-year post-surgery to assess for recurrence using the Pelvic Organ Prolapse Quantification (POP-Q) system. Recurrence was defined as a prolapse of ≥ POP-Q stage II. Multivariable log binomial regression was performed to determine risk factors for recurrence.
Results: The overall proportion of POP was 31.2% (210/674). The annual number of cases of POP gradually increased during the 5 years to become the commonest PFD. The baseline QOL was poor. The domains with the poorest QOL were physical, social, sexual, emotional and sleep quality. The mean QOL scores in all the domains and the overall QOL significantly improved 1 year after surgery ($p<0.001$).The recurrence rate one year after surgery was 25.2% (32/127). Women aged <60 years (RR=2.34; 95%CI: 1.16-4.72; $P=0.018$) and those who had postoperative vaginal cuff infection (RR=2.54; 95%CI: 1.5-4.3; $P=0.001$) were at risk of recurrence.

Conclusions and recommendations: This study shows that the magnitude of POP is high and it has gradually increased over the years to become the commonest PFD. Women with POP have a poor QOL and surgery improves the QOL. Younger women, and those with postoperative vaginal cuff infection were more likely to experience recurrent prolapse after vaginal repair. We recommend that surgery should be scaled up to improve the QOL. Surgeons should put in place measures that minimize the risk of postoperative cuff infection in order to reduce the risk of POP recurrence.

2.5.4 Phylogeography, Transmission Dynamics and Drug Susceptibility patterns of Mycobacterium tuberculosis isolated from persons with Pulmonary Tuberculosis in Southwestern Uganda

Micheni Lisa Nkatha, Joel Bazira

Introduction: The predominance of certain *Mycobacterium tuberculosis* genotypes in various geographical locations of the world is now recognized. It is also believed that strain-to-strain diversity can have phenotypic implications such as transmissibility and treatment effectiveness. It is also now recognized **that** infections with MTBC multiple strains are a common occurrence and their detection is essential in clinical practice, public health, and molecular epidemiology. This study gives insight into the genetic diversity of MTBC strains circulating in Southwestern Uganda, their transmission patterns and drug susceptibility patterns.

Methods: To achieve this, 283 sputum samples from patients diagnosed with pulmonary tuberculosis were analyzed. MTBC was confirmed in the extracted DNA by screening for the presence of the IS*6110* gene. The samples were genotyped using Lineages 3 and 4specific Single Nucleotide Polymorphism (SNP) markers and 24 loci MIRU-VNTR analysis to determine the MTBC diversity. High-resolution melting analysis was used to assess for drug resistance towards rifampicin (RIF) and isoniazid (INH) while 24 loci MIRU-VNTR analysis was used to access for multiple strains.

Results: SNP typing revealed that Lineage 4 was the most predominant (74.2%) lineage, with the Ugandan family being most prevalent (59.7%). MIRU typing of 78 samples revealed 58 distinct MIRU patterns with a clustering rate of 28.2%. The rate of MTB multiple strains was 6.4%, of which all the cases were the newly diagnosed patients. Monoresistance to INH and RIF was at 8.5% and 11% respectively whereas multi-drug resistance was at 6.7%. Logistic regression analysis showed no statistical association between the patient's demographic characteristics and the MTBC lineages, multiple strains infections and drug resistance.

Conclusion: There is a high genetic diversity of MTBC strains circulating in SWU with the Ugandan genotypes accounting for the larger proportion of the cases. Majority of PTB cases are due to reactivation and infections with multiple MTBC strains are more prevalent among the newly diagnosed patients while multidrug resistance is significantly more among the relapsed patients.

2.5.5 Biopharmaceutical evaluation of Bidens pilosa L., Ageratum conyzoides L. and Ocimum suave Willd. Leaves in management of oral lesions of HIV/AIDS patients.

Joseph Obiezu Chukwujekwu Ezeonwumelu, Frederick Byarugaba, Muhammad Ntale, Ogbonnia Steve Okwudili .

Background: Many plant parts are used in treating various disorders including oral lesions in HIV/AIDS because of global public health burden of resistance, scarcity and high cost of antibacterial in resource poor countries. Herb-drug interactions due to concomitant use of herbs and antibacterial are possible among HIV/AIDS patients.

Objective: Objective of the study was to evaluate traditional uses of *Bidens pilosa* L., *Ageratum conyzoides* L. and *Ocimum suave* Willd extracts in treating oral lesions of HIV/AIDS patients in Southwestern Uganda using *in vitro* and *in vivo* animal models.

Methods: This experimental study used various species of oral bacterial (100) and yeast (50) isolates from HIV/AIDS patients; BP, AC and OS from Bushenyi District. Analgesic, antipyretic and anti-inflammatory tests were done with 25 Wistar rats, antidiarrhoeal tests with 30 rats and co-trimoxazole-extracts interaction studies with 40 rats for each extract. The plant leaf extracts were made with hot water and cold absolute ethanol and yields calculated. The phytochemical, acute toxicity, susceptibility, MIC, MBC and MFC of bacteria and yeasts, analgesic, antipyretic, anti-inflammatory, antidiarrhoeal and co-trimoxazole-extracts interaction tests were done with standard procedures.

Results: Extracts yielded 0.70-9.85%. Extracts contained safe saponins, flavonoids, terpenoids, alkaloids, tannins, steroids, cardiac glycosides and phenolic compounds. The tested bacteria and yeasts were significantly ($p<0.05$) resistant to antibacterial discs (64.8-100.0%) and commercially available antibacterial agents (50.0-100.0%). The extracts were marginally effective but hugely resisted by the organisms (6.6-69.7%). The extracts possessed significant ($p<0.05$) analgesic, antipyretic, anti-inflammatory, antidiarrhoeal and Tmax, Cmax, Vd, CL, Ke, $t_{1/2}$ and AUC_{0-72} interactive effects with co-trimoxazole in rats.

Conclusions and Recommendations: It can be concluded that oral bacteria and yeasts are resistant to antibacterial and antifungal; the extracts possess safe phytochemicals, antibacterial, antifungal, analgesic, antipyretic, anti-inflammatory, antidiarrhoeal and interactive effects with co-trimoxazole in rats. Further studies should be conducted on the plants and microorganisms.

2.5.6 The Metabolic Syndrome in Rwandan Patients with Epilepsy: Epidemiology and Risk Factors

Ndayambaje François Xavier, Bernard Natukunda, Jean Bosco Gahutu

Background & objectives: Cardiovascular mortality and morbidity are more frequent in people with epilepsy than in the general population. The explanation of this is the change in biochemical components due to anti-epileptic drugs. We conducted this study to determine the prevalence and incidence of the metabolic syndrome and risk factors in adults with epilepsy emphasizing on their respective anti-epileptic drug therapies.

Method: Over a period of 12 months, 1076 adult patients with epilepsy aged 18-60 years old and who had been on anti-epileptic drugs for at least two years were selected to participate in the study. There were two sub-studies including a cross-sectional to determine and a cohort prospective study. Participants were anthropometrically examined (weight, height) and fasting blood glucose as well as serum lipids levels (total cholesterol, high & low density lipoproteins and triglycerides) were assayed. High blood pressure (diastole and systoles) were also measured.

Results: For the cross-sectional study, there were 1076 participants, of whom 629 (58.5%) were males and 447 (41.5%) were females. The age range of the participants was 42 years old

while the mean age (± standard deviation) was 40.22±10.37. Using ATP III criteria, the prevalence of metabolic syndrome among individuals with epilepsy was 30.6%. Use of valproic acid (p=0.007), sedentary lifestyle (p=0.025), waist circumference>102cm (p=0.001), and a fasting blood glucose >6.1mmol (p=0.001) were significantly associated with the occurrence of the metabolic syndrome. After one year follow-up, results from the cohort study of 322 participants (161 in patients group and 161 in control group) showed that the annual cumulative incidence rate of metabolic syndrome was 2.5% or 25 per 1,000 person-years.

Conclusion and recommendation*:* The prevalence and incidence of the metabolic syndrome is high among Rwandan patients with epilepsy. Therefore, physicians are advised to carefully select the type of anti-epileptic drugs administered and request regular anthropometric as well as laboratory checkups for patients with epilepsy who are on medications in order to predict a diagnosis of the metabolic syndrome and the complications thereof.

2.5.7 Safety Profiling of Traditional Antimalaria Plant, AristolochiaBracteolata Lam. Commonly Used Among Communities of Jubek State, South Sudan

Lina Sara Mathew Alonga, Patrick Ogwang Engeu, Arop Leek Deng

Background: The use of plants with anti-malarial properties is high in South Sudan. *Aristolochiabracteolata*Lam. is one of the most used antimalarial plants, especially in Jubek State. Although this plant has been scientifically demonstrated to have antimalarial activity, its safety is not yet scientifically validated. The validation of the toxicity and safety of *Aristolochiabracteolata* is essential considering that *Aristolochiaelegans* of the same genus are nephrotoxic mainly due to aristolochic acids (AAs) in them. Therefore, this study was aimed to establish ethnobotanical use, presence and quantities of AAs and the safety profile of *A. bracteolata*speciesfound in South Sudan.
Methods: Cross-sectional survey was conducted to evaluate the ethnobotanical use of *A. bracteolata* among the local community of Jubek state of South Sudan. Thin-layer chromatography (TLC) and high-performance liquid chromatography (HPLC) technique were used to identify and quantify the content of aristolochic acid I and II (AA I and AA II) in the aqueous (community preparation) and methanol extracts of *Aristolochiabracteolata*. Equally, TLC and the HPLC methods were used to identify and quantify the level of (AA I and AA II) respectively in plants from the selected four (4) agro-ecological zones (AEZs) of South Sudan and were compared. The acute and sub-acute toxicity of the plant extracts on healthy Adult Wistar albino rats with a focus on nephrotoxicity using experimental models was also conducted.
Results: From a Cross-sectional survey, the study confirmed use of the plant in South Sudan, 400 participants were interviewed. Furthermore, about 63 (15.9%) of the participants reported experiencing side effects, including early abortions, heartburns, sweating, and stomach discomforts. Conversely, 96.0% reported getting cured of malaria. Generally, the quantity of medicine taken per day differs by parts of the plant, with leaves ranging from 1 to 10 pieces, roots at 0.4–1 g, and seeds at 0.1–0.5 g.
The results showed that AAs were present in all 16 sample extracts except absence of AAII in one oven dried sample. The R_f values of AAI were 0.56, and AA II was 0.69. The aqueous extract of *A. bracteolata* leaf from Yambio State (2.65µg/g) showed a significantly high content of AAI compared to other extracts. And the aqueous extract of *A. bracteolata* leaf from Wau State (2.88 µg/g) showed a significantly high content of AAII compared to the other extracts. Methanol leaf extract from Wau State air-dried (0.76 µg/g) showed the lowest

content of AA I. Interestingly, the aqueous leaf extract from Yambio State oven-dried (0.00 ± 0.00 ^{d}**)** showed no AA II yet the air-dried of the same extracts showed the presence of AA II with (1.77 µg/g**).**

The acute toxicity test of *A. bracteolata* aqueous and methanol extract of leaf and roots has recorded no motility up to the dose of 5000 mg/kg bwt. At the dose of 250, 500, and 1000 mg/kg bwt., the sub-acute toxicity test of the same extract had mild adverse effects on the liver function in some of the few groups of the study animals compared to NC group and no adverse effect occurred on the Kidney function in all the groups. The histopathological examination of the kidney, liver, spleen, brain, testes, and ovary exhibited no significant lesions at all dose levels.

Conclusion and Recommendation: Although most of the *A. bracteolata* users reported getting cured of malaria, a notable proportion of them experienced side effects, including early-stage abortion and stomach discomforts. The plant contains both AAI and AAII. The LD50 was above 5000mg/kg bwt, which is considered safe. The plant caused mild adverse effects on the liver function and there was no significant adverse effect on kidney function tests. The histopathological examination of all the harvested organs exhibited no significant lesions. Therefore, just like it is with all drugs, the toxic effects of *A. bracteolata* extracts could be dosed dependent or when the AAs are in their isolated form. These results explain the popular ethnomedicinal use of the plant as an antimalarial by the local communities of Jubek State. This plant could be a good option for malaria treatment if supported with further clinical trial and product development studies.

2.5.8 Phytochemical and Pharmacological Study of Chenopodiumambrosioides L. and Physalisperuviana L., herbs used to treat diabetes in Congolese Traditional Medicine

Mushagalusa Kasali Félicien, Amon Ganafa Agaba, Léonard Justin Ntokamunda Kadima, Jonans Tusiimire

Background: Diabetes mellitus remains a public health problem in many developing countries**.** Herbal remedies are gaining popularity because of several advantages. Increased prevalence and incidence, limited access to conventional medicine coupled with various undesirable side effects of existing modern hypoglycaemic medications necessitate considering the use of improved herbal remedies. In DRC, different plant species have been considered potential antidiabetic remedies sources. This research aims to contribute to the scientific study of antidiabetic medicinal plants, including *C. ambrosioides* and *P. peruviana*, to develop improved herbal remedies with high efficacy and low side effects acceptable cost-effectiveness.

Methods: Data related to ethnopharmacology and bioactivity of antidiabetic plants were extracted from Google Scholar, Medline/PubMed, Scopus, ScienceDirect, the Wiley Online Library, Web of Science, and other documents. CG-FID and GC-MS techniques analyzed phytochemical profiling of hexane fractions. Isolation, Characterization, and structure elucidation were carried out by chromatographic (Column, Thin Layer, and Vacuum liquid chromatography) and spectroscopic techniques (Mass spectroscopy and Nuclear Magnetic Resonance). *In vitro* antidiabetic activity was assessed on α-glucosidase inhibition and 2,2-diphenyl-1-picrylhydrazyl models. Acute antidiabetic studies of the aqueous and methanolic extracts were investigated in normoglycemic and intraperitoneal-glucose-loaded rats.

However, subchronic evaluation for 28 days was carried out in streptozotocin-Nicotinamide-induced diabetic rats. Different doses (100, 200, and 400 mg/kg body weight) were used.
Results: 213 plant species from different flora belonging to 72 botanical families are used to manage diabetes in DRC. Alongside the treatment of diabetes, almost 78.13% of plants have several therapeutic indications. The phytochemical analysis detected 88constituents, manly heptacosane aliphatic hydrocarbons, and esters as the main secondary metabolites classes. From 33 isolated and characterized phytoconstituents, 16 compounds have been elucidated. Eventually, a novel flavonoid (flavone) was isolated from *C. ambrosioides*. Antioxidant activity is significantly noble in methanol and methanol-water fractions compared to the standard (butylated hydroxyanisole). Interestingly**,** the compound identified as *sitosterol produced the* best α-glucosidase (IC_{50} of 5.60 ± 0.76 µg/mL) and antioxidant inhibition activities (IC_{50} = 13.4 ± 0.55 µg/mL). Acute toxicity test showed the mean lethal dose (LD_{50}) for both aqueous and methanol extracts of *C. ambrosioides* and *P. peruviana* to be more than 2,000 mg/kg. In acute conditions, aqueous extract (200 mg/kg) of *C. ambrosioides* lowered significant ($p< 0.05$) fasting blood glucose (FBG) level in rats. However, in hypoglycemic evaluation, 100 mg/kg of *P. peruviana* showed a significant decrease ($p< 0.05$) in FBG level. Furthermore, except for the treated groups with 200 mg/kg, all groups in the glucose tolerance test decreased significantly ($p< 0.05$) in FBG level. In STZ-NA induced rats, methanolic extract of C. ambrosioides at the dose of 400 presented the most reduction in FBG (73.19%) compared to all treated groups. Nonetheless, after treatment for 28 days, the maximal percentage of reduction in FBG (66.46%) was obtained with an aqueous extract (200 mg/kg) of *P. peruviana*. Overall, there was no significant variation in body and organ relative weights, food intake, biochemical markers, lipid profile, and hematological parameters. However, water consumption was high in diabetic and glibenclamide-treated groups.
Conclusion: Hundreds of plants are used to treat diabetes by traditional healers in DRC. Almost 77.96% and t 82.75% of phytoconstituents are recognized for the first time in the leaf hexane fractions *C. ambrosioides*and *P. peruviana*, respectively. Furthermore, 81.25% of phytoconstituents are isolated for the first time in those plants. The antioxidant activity of fractions was more pronounced than α-glucosidase inhibition. However, compounds from *C. ambrosioides*presented good α-glucosidase inhibition and those from *P. peruviana*, more substantial antioxidant property. Those plants demonstrated the antidiabetic potential in rats, explaining their use as an antidiabetic remedy locally.

2.5.9 Standardization of Dracaena SteudneriEngl., as a Remedy for Pain Relief during Childbirth

Mercy Gladys Tenywa, Amon G. Agaba, Esther M. Katuura

Background: Distress and pain, among other gynecological challenges mothers go through during childbirth, is associated with physiological adverse and increased sympathetic nervous system effects leading to hypertension, tachycardia and potential placental hyper-fusion. Currently, conventional drugs such as Pethidine, Diclofenac, and Ibuprofen (analgesics and anti-inflammatory drugs) are used for pain relief during child birth. Due to several side effects and the unaffordability of the conventional drugs, coupled with cultural and traditional beliefs, most people in Uganda depend on medicinal plants for their health care needs including pain relief. These medicinal plants have to be standardized for safety, efficacy and quality for them to be acceptable, and made accessible for primary health care. In this study

therefore, *D. steudneri* Engl., has been standardized for its analgesic, anti-inflammatory and oxytocic activities in animals based on its folkloric use for painless childbirth.

Methods: Dracaena steudneri stem bark was collected, authenticated, dried, pulverized and extracted by decoction. The extract was thereafter concentrated in vacuo using rotary evaporator and lyophilised. The extract was later reconstituted with water, tested for acute and sub-acute toxicity, analgesic, anti-inflammatory and oxytocic activity. The organoleptic and physicochemical parameters of the plant were also determined. This study therefore evaluated the pharmacognostic, physicochemical and phytochemical standards. The physicochemical analysis was done with reference to WHO recommended parameters such as moisture content, ash values (total ash, water soluble ash, acid insoluble ash) and extractive values. Phytochemical screening was done by methods described by Trease and Evans, 2002; Prashant et al., (2011). The morphological studies exhibited the macroscopic characteristics while the microscopic study showed the presence of vascular bundles, calcium oxalate crystals and paracytic stomata. Physicochemical evaluation indicated 9.13% moisture content, 0.17% Ash value water soluble, 0.17% Ash value acid insoluble, 0.84% acid insoluble ash. The qualitative phytochemical screening revealed the presence of Alkaloids, Flavonoids, Terpenoids, Saponins, Tannins, Glycosides and Phenols in the extract. To ensure quality and reproducibility of the study, HPLC fingerprint of the extract was done. The acute toxicity test was done using Lorke's (1983) method, in Wistar rats at 10 – 5000 mg/kg and observed for adverse effects like weight loss, scratching, calmness, loss of appetite and the lethal dose (LD50) determined. In sub-acute toxicity test, 24 Wistar rats of both sexes were separately caged and orally administered with *D. steudneri* extract at 12.1- 48.2 mg/kg. The administration was repeated for 28 days before the sacrifice of the animals. Blood of each animal was collected for hematological and biochemical examination while the organs including brain, liver, kidney, testis, spleen and ovary were harvested for histopathological study. The results showed that LD50 for acute test was greater than 5000mg/kg. The analgesic effect was determined using the acetic acid writhing test by Borgi (2007) and observed for stretching of the abdomen with simultaneous stretches of at least one hind limb, while Aspirin was used as a reference drug.

Results: The results of the analgesic study showed that the extract reduced the number of abdominal writhing between 53.51% and 92.40% at 6.02 and 48.2 mg/kg, at the respective doses while the standard drug showed a reduction of 36.58 % at 10 mg/kg. For the anti-inflammatory test, 30 rats were randomly selected from their cages and orally administered with the *D. steudneri* aqueous extract at doses of 12.1, 24.1 and 48.2mg/kg. Using the paw edema technique, the aqueous extract produced percentage inhibition of 18.6% at 2 hours, 22% at 2 hours and 18.9% at 6 hours at the respective doses above. The in vivo oxytocic activity of *D. steudneri* stem bark aqueous extract was determined by a method described by Nworu et al., (2007). The average time taken for the rats to delivery was between 20.6 hours at lowest dose and 8 hours at highest dose of *D. steudneri* extract, while oxytocin, the reference drug, exhibited 22 hours as the average time taken for the Wistar rats to deliver after drug administration.

Conclusions: This study has therefore evaluated the pharmacognostic parameters, physicochemical and phytochemical analysis of *D. steudneri* stem bark that are helpful in the authentication and can be used as a reference standard in the preparation of a monograph. The study has also established the anti-inflammatory, analgesic and oxytocic activities of *D. steudneri* stem bark aqueous extract in the Wistar rats and has validated the folkloric claims of this plant in the treatment of pain, inflammatory and labour induction.

2.6 FACULTY OF SCIENCE

2.6.1 Assessing the impact of Eqautorial Plasma Bubbles on the performance of GNSS Applications

Abiriga Faustine, Emirant Bertillas Amabayo, Edward Jurua, Pierre J. Cilliers

Equatorial Plasma Bubbles (EPBs) impact trans-ionospheric radio signals that pass through them. This compromises the quality, accuracy and reliability of information obtained from Global Navigation Satellite System (GNSS) applications that rely on such signals. In this study, the data used were obtained from International GNSS Service (IGS) and SCIntillation Network and Decision Aid (SCINDA) receiver stations located within the East African region, which is bounded by geographic latitudes $\pm 7^{o}$N and geographic longitudes (+29 to +41)^{o}E. The slant Total Electron Content (sTEC) data was derived from Global Navigation Satellite (GPS) signals and used to identify and characterize EPBs. While, the data from GPS Ionospheric Scintillation and TEC Monitors (GISTM) that are part of the SCINDA network were used to statistically analyse the effects of ionospheric scintillation events on satellite-based navigation over the East African region. Identification of the EPBs was based on the de-trended curve of the sTEC-time series. Their characterization was based on the standard deviation of their depletion depths from their calculated mean plasma depletion depth. On this basis, three categories of EPBs were obtained, namely; Mild, Moderate and Severe EPBs. Results obtained show that the occurrence of the different categories of EPBs and the patterns of signal scintillation events over this region follow a diurnal and seasonal pattern. The occurrence of the EPBs was also seen to be dependent on solar activity. A model was developed to predict the probability of occurrence of the EPBs based on the following input parameters: local time, month of year and solar flux F10.7 indices. The model results showed a positive correlation between the observed and the predicted probabilities of occurrence of EPBs. It was also observed that the East African region experienced a higher percentage occurrence of amplitude scintillation events compared to phase scintillation events. Using the method of phase combinations, cycle slips were identified on the L-band of the GPS signals. It was observed that the frequency of occurrence of the cycle slips was higher on the L2-frequency than on the L1-frequency of the L-band. Furthermore, the results showed that the presence of signal scintillation events increased the margins of receiver position estimation errors by upto about 10 m, which can compromise the reliability and accuracy of GPS applications in navigation

Keywords: Equatorial Plasma Bubbles, Global Navigation Satellite Systems, Scintillation Events, Cycle Slips, Global Positioning System, Receiver Position Estimation Error.

2.6.2 Occupational Stress, Hope, and Alcohol Use among Secondary School Teachers in Greater Bushenyi, Uganda

Bashaija Athanansio, Aloysius Rukundo, Dennis Zami Atibuni

Alcohol use among secondary school teachers is progressively becoming a subject of concern. Yet, teaching is characterised by varying levels of occupation stress and hope despite their associations being unknown in various contexts. This study examined

associations in the levels of occupational stress, hope, and alcohol use across teachers' socio-demographic characteristics. It further explores the moderating effect of hope on the relationship between occupational stress and alcohol use among secondary school teachers in Greater Bushenyi. A cross sectional study employing quantitative approach was conducted. Data were obtained from 266 secondary schoolteachers using self-administered questionnaires. Independent samples *t* test, one-way ANOVA, regressions and structural equation modeling were done. Males (M = 106.6, SD =15.6) compared to females (M = 101.7, SD =15.6) demonstrated higher occupational stress (t *(264)* = 2.57, p = 0.011). Occupational stress decreased from teachers with master's degree (M = 109.2, SD = 17.0) to Bachelor's degree (M = 106.6, SD = 15.2) and then Diploma (M = 102.3, SD = 16.3). Hope was highest among master's degree holders (M = 43.17, SD = 8.94) to Diploma (M= 39.31, SD = 11.05) and then Bachelor's degree (M = 34.43, SD = 12.24). Teachers with 6-10years of experience were more hopeful compared to those with 11-15 years. Alcohol use was more likely among males compared to females (AOR: 2.2, 95% CI: 1.22-3.80, p = 0.008). Catholics had a three-fold involvement in alcohol use compared to Muslims (AOR: 3.1, 95% CI:0.98-9.10, p = 0.054). Occupational stress positively related to alcohol use (β = .25, p =.0.01). Hope negatively moderated the relationship between occupational stress and alcohol use (Overallhope; $\beta = -.0.14$, p = .0.039). Gender and education qualification, years of teaching and education qualification, gender and religious affiliation influenced the levels of occupational stress, hope and alcohol use respectively and hope negatively moderates the relationship between occupational stress and alcohol use among secondary school teachers in Greater Bushenyi. Therefore, the school management should devise means or strategies that t enhance hope, minimize occupational stress and alcohol use among secondary school teachers in GreaterBushenyi.

2.6.3 Diversity, Phytochemical Profile and Micropropagation of Anantifertility Medicinal Plant (Dioscorea Bulbifera Linn) in Uganda

Ikiriza Hilda, Casim Umba Tolo, Abubaker Muwonge, Mai Abdalla Ali Abdalla

Dioscorea *bulbifera* Linn. is an important medicinal plant which grows in the wildforests of Uganda. *Dioscorea bulbifera*, is at a high risk of extinction due to the high demand of diosgenin, a steroidal saponin which is a main precursor for production of synthetic steroidal hormones. Despite its vastmedicinal importance, little is known about its accessions,diversity, the content of diosgenin in these accessionsand how these genotypes can be propagated. Therefore, this studywas conducted to determine the morphological and molecular diversity of *Dioscorea bulbifera,* the phytochemistry, theaccessions with highest diosgenin contentas well as optimizing protocol for propagation of this plant.Forty-one leaf samples with their respective bulbils were purposively collected from six Ugandan forests (Mabira central forest reserve, Bwindi impenetrable Forest, Bugoma forest reserve, Mt Elgon forest reserve, Aburu-buru forest reserve and Kasyoha Kitomi forest reserve).
Morphological data was obtained using seven qualitative traits from 41plants samplesbased on a list of descriptors developed by International Plant Genetic Resource Institute (IPGRI) 1997. Genetic diversity analysis on 41 leafsamples was obtainedusing Genotyping by sequencing while diosgenin quantification was done using High performance Liquid chromatography (HPLC).
Morphological trait analysis revealed that *D. bulbifera*accessions in Uganda were heterogenous with the exception of populationaccessions from Aburu-buru, in the North east

and Bwindi, in south western Uganda which were homogenous.On the other hand, molecular data depicted a heterogenous mixture of accessions with in populations of *D. bulbifera* in Uganda with exception of population accessions from Mabira and Aburu-buru that stood out as the most homogenous.The resultsfrom the phytochemical screening of tubers showed the presences of various phytochemicals prepared in ethanol extract including flavonoids, terpenoids, saponins, steroids, glycosides, anthraquinones, phenolic, and tannins.HPLC analysis revealed that the concentration of diosgenin from different forest locations were significantly different ($p = 0.05$), with the highest diosgenin concentration obtained from bulbils from Mabira central forest reserve (0.996 ± 0.014^{a} mg/g) and the least from bulbils fromBwindi Impenetrable Forest (0.360 ± 0.004^{e}mg/g). *D. bulbifera* germplasm from Mabira contained the highest quantities of diosgenin and harbored unique alleles that can be utilized for future improvement of this plant. During micropropagation protocol optimization, all treatments induced shoot formation at different levels of concentration with the highest percentage response observed at hormonal combination of 1.75 mg/l Kinetin +1.00 mg/l 6-benzylaminopurine + 0.51 mg/l naphthaleneacetic acid.In rootingoptimization, all treatments induced roots with the highest percentage response observed at a concentration of 2.5 mg/l naphthaleneacetic acid.The optimization protocolfor micropropagation uses few quantities of plant growth regulators that is cost effective compared to other protocols already developed.

Keywords: *Dioscorea bulbifera*, morphological and genetic diversity, Diosgenin quantification, Micropropagation

2.6.4 Mathematical Models for the Dynamics of Banana Xanthomonas Wilt and the Banana Weevil, Cosmopolites Sordidus (Germar), and Control Interventions

Kweyunga Eliab Horub, Julius Tumwiine, Eldad B. Karamura

The production and yield of banana, particularly in the Eastern, Central and Southern Africa region are constrained by a number of biotic and abiotic factors of which pests and diseases play a dominant role. In combination, the banana weevil, *Cosmopolites sordidus* (Germar), and banana *Xanthomonas* wilt pose the greatest threat and have serious implications for food security and poverty at household, regional and global scales. In this study, mathematical models have been developed and analysed to provide insights into spread/infestation and control dynamics of both banana *Xanthomonas* wilt and the banana weevil and suggest effective management options.

The model for the dynamics of banana *Xanthomonas* wilt incorporates infectious force in both the symptomatic and asymptomatic banana plants to quantify the role of asymptomatic plants in the resurgence and persistence of the disease. As well, harvested single species and coupled models for the population dynamics of the banana weevil incorporating key management options of trapping and use of natural enemies are also designed and analysed to among others: evaluate the effectiveness of trapping and biological control using ants and beetles; draw insights on the interaction between the banana weevil and its host; and study the effect of an alternative food source and optimal foraging on the infestation and control of the banana weevil. Inferences for management are drawn.

Analysis of the model for the dynamics of the banana *xanthomonas* wilt with infectious force in both symptomatic and asymptomatic stages suggests that the global dynamics of the model are completely determined by the basic reproduction number, R0, with the disease free equilibrium globally asymptotically stable whenever $R0 < 1$ while the endemic equilibrium point is globally asymptotically stable whenever $R0 > 1$. Numerical simulations are performed for some realistic parameter values obtained from literature to illustrate the

analytical results. Sensitivity analysis suggests that R0: is most sensitive to the contact rate and rouging rate of asymptomatic plants; moderately sensitive to the contact rate and rouging rate of symptomatic plants; and less sensitive to the vertical transmission parameters Ø and δ. In the analysis of the model for the population dynamics of the banana weevil with predation by *Plaesius Javanus* it was found out that the key parameters that govern the predation are the weevil intrinsic growth rate and the predator maximal growth rate. Further, the model incorporating trapping suggests that the periodic outbreaks of the banana weevil can possibly be explained by the relaxation in trapping at low banana weevil densities. The model for the population dynamics of the banana weevil incorporating time delay in the recruitment term revealed that the recruitment parameters namely the egg production rate and the egg-to-adult survival rate were the most sensitive. Furthermore, it was established that the interaction between the banana weevil and its host is largely driven by the number of adults emerging from each infested banana plant and the influx of banana weevil from adjacent farms or through infested suckers used as planting materials. Lastly, it was established that the predation of the banana weevil by myrmicine ants is largely influenced by encounter, and that nutritional values and handling times only have marginal effect.
Thus, management of both the banana *xanthomonas* wilt and the banana weevil should target the parameters to which the models are most sensitive namely: the contact and rouging rates of asymptomatic plants; the predator maximal growth rate; the weevil intrinsic growth rate; the trapping rate; the egg production and egg-to-adult survival rates; the number of adult banana weevil emerging from each parasitized plants and the influx of banana weevil from adjacent farms.

2.6.5 Spectrophotometric Method Development for Orthophosphate Anion Quantification in Water Systems

Nalumansi Irene, Emmanuel Tebandeke, Grace Birungi

There are several methods of orthophosphate anion ($PO4^{3}$) determination in water systems and these are both spectrophotometric and non spectrophotometric. The spectrophotometric methods are the most widely used. Among these methods, the phosphomolybdenum blue method is the commonly used method. The method works on the principle that molybdenum (VI) condenses with phosphate in an aqueous acid medium to form 12- molybdophosphoric acid which is successively reduced to molybdenum blue. The intensity of the molybdenum blue formed is proportional to the amount of phosphate present in the sample. However, some of the reductants used are expensive and not readily available. Therefore, new methods of $PO4^{3-}$ determination in water systems were developed using sodium thiosulphate ($Na2S2O3$) and ammonium ferrous sulphate ($(NH4)2Fe(SO4)2.6H2O$, AFS) to effect the reduction of 12-molybdophosphoric acid ($H3PMo12O40$). Ultra Violet-visible spectrophotometric analysis of aqueous solutions in the range 1000 – 500 cm^{-1} of the $Na2S2O3$ reduced phosphomolybdenum blue (PMB) showed two absorption peaks at 700 – 712 and 832– 876 nm. The AFS reduced PMB showed one peak at 756 – 778 nm. The absorptions lie in the range of absorbances of molybdenum blues as applied in spectrophotometric methodology for phosphate determination. Oxidimetric titration of the reduced PMBs with potassium manganate(VII) ($KMnO4$) revealed that reduction with $Na2S2O3$ follows a two-electron process and one electron process with AFS. The reduced molybdenum blue complexes $H17Mo5Na3O32P2S$ (B20) and $Mo36O168$ (D11) were synthesized and characterized by

ultraviolet-visible spectroscopy, fourier transform infrared (FTIR) spectroscopy, scanning electron microscopy (SEM), Raman spectroscopy, and X-ray diffraction methods. The unique structural feature of D11 is the self-assembly of $Mo_{18}O_{84}$ moieties into hollow spherical rings. B20 consists of Strandberg heteropoly anions, $[P_2Mo_5O_{23}]^{6-}$ with water molecules linked together by hydrogen bonds. The SEM micrographs revealed that B20 is a heteropolymolybdate. On this basis, the reduction of heteropolymolybdates by $Na_2S_2O_3$ and AFS was employed to develop spectrophotometric methods of orthophosphate determination in water systems. With $Na_2S_2O_3$ as the reductant in 5.5 M sulphuric acid (H_2SO_4) medium, the resulting molybdenum blue exhibited maximum absorption at 880 nm in the 0.005 – 0.06 mg PmL^{-1} phosphate concentration range. The molar absorptivity, Sandell's sensitivity, and correlation coefficient values for the determination were 57526 L mol^{-1} cm^{-1}, 0.2835 µg cm^{-2}, and 0.9948 respectively. The limit of detection (LoD) was 2.213 x 10^{-3} mg P mL^{-1}. The molybdenum blue produced on reduction with AFS in 0.5 M ethanoic acid (CH_3COOH), exhibited maximum absorption at 720 nm. The LoD was 6.5901 x 10^{-3} mg P mL^{-1}. The molar absorptivity, Sandell's sensitivity, and correlation coefficient were 1552.4 L mol^{-1} cm^{-1}, 0.1355 µg cm^{-2}, and 0.965 respectively. The results of PO_4^{3-} determination in water samples obtained using the spectrophotometric methods developed in this study, compare favourably with those generated using the Murphy and Riley method which is commonly used for this analysis. The characteristics of both methods render them applicable to PO_4^{3-} determination in environmental water samples.

2.6.6Propagation and Growth Performance of Schkuhria Pinnata L., for Optimal Phytochemical Contents and Antimalarial Activity in Western Uganda

Nuwagira Catherine, Casim Umba Tolo, Eunice A. Olet, Grace Kagoro, John Adriko

Schkuhria pinnata (Lam.) Kuntze ex Thell (Asteraceae) is an antimalarial herb that is traditionally used in Uganda. However, it is threatened by destructive harvesting methods-uprooting the whole plant and at any developmental stage. The present study reports on agronomical soil nutrient status and how it relates to agro-morphological traits of *S. pinnata.* This is a strategy to establish the best growth requirements for promotion of its *ex-situ* conservation. An *in vitro* propagation protocol for mass production of the *S. pinnata* plants was developed. Influence of developmental stages on potential antimalarial phytochemicals and *in vivo* antimalarial activity was investigated at four developmental stages to ensure standardization of phytochemicals. The study was conducted from two agro-ecological zones of South Western Uganda. Soil physicochemical characteristics were analyzed following standard procedures for soil analyses. Agro-morphological traits were physically measured. *In vitro* propagation of *S. pinnata* was conducted using direct organogenesis of nodal segments and plant growth hormones. Potential antimalarial phytochemicals were quantified using ultraviolet/visible spectrophotometer and high-performance liquid chromatography (HPLC). The antimalarial activity was evaluated using chloroquine-sensitive *Plasmodium berghei* on Swiss albino mice, in a Chemosuppressive test.

Results revealed that *S. pinnata* performed best in slightly acidic to sightly neutral soils in Kasese (pH 6.5-7.5). *S. pinnata* grown in Kasese had the largest total leaf area (31.43 ±

2.41cm^2) and the highest plant biomass (7.65 ± 0.64 g). Best shoot proliferation was achieved with1.50 mg/L BAP, applied singly. The highest percentage of shooting response was 96.67 ±3.33 %, maximum rate of shoot multiplication was 5.00 ± 1.15 shoots per explants, micro- shoots were 3.23 ± 0.38 cm long. The best rooting occurred in half-strength culture medium supplemented with 1.5 mg/L (IBA). The highest percentage root induction was 90.00 ± 5.67%, maximum mean root number was 5.40 ± 0.94 roots, and the roots 3.90 ± 0.06 cm long. The flowering stage had the highest phenols (43.88 ± 0.30 mg GAE/g DW) and flavonoids were maximum at budding (6.50 ± 0.09 mg QE/g DW), (p = 0.001). Flowering stage extract had a maximum suppression of parasitemia at 700 mg/kg (68.83 ± 4.49 %).

It is concluded that *S. pinnata* grows best in slightly acidic to neutral, sandy loam, non-saline soils of Kasese in Western Medium-High Farmland. The first-time viable *in vitro* propagation protocol was developed. For maximum phytochemicals and better antimalarial activity, local communities could consider harvesting *S. pinnata* at the flowering stage.

2.6.7 Evaluation of Variations in Ambient Particulate Matter (PM10) at Selected Sites in Uganda: A Case of Rubindi, Mbarara, and Kyebando.

Onyango Silver, Simon K. Anguma, and Beth Parks

In this study, long-term PM_{10} measurements were conducted at three sites in Uganda (Kyebando, Mbarara, and Rubindi) representing a wide range of urbanization. Particulate matter (PM_{10}) sample were collected using the gravimetric MS Personal Environmental Monitor (PEM) and a photometric sampler (TSI AM510 SidePak). Gravimetric filters were analyzed for mass gain and chemical composition. Additional data included the Moderate resolution spectroradiometer (MODIS) atmospheric profiles and radiosonde profiles. The spatiotemporal variation in PM_{10} mass concentration, relationship between the atmospheric boundary layer height (ABLH) and PM_{10}, and variations in the composition and sources of PM_{10} were evaluated. The mean PM_{10} concentrations at Mbarara, Rubindi, and Kyebando were 5.26, 5.95, and 7.85 times higher than the WHO annual air quality guideline while the 24-hour mean PM_{10} guideline exceeded 70%, 85.7%, and 93.1% of the sampling days. There was higher dry season than wet season PM_{10} concentrations. Bimodal peaks were observed in the diurnal analysis with higher morning peaks at Mbarara and Kyebando and a higher evening peak at Rubindi which point to differences in particle sources. Differences between the mean ABLH estimated using the radiosonde methods and MODIS were not statistically significant. However, correlations between ABLH estimated using different methods were weak. An inverse ABLH-PM_{10} relationship was observed consistent with expectation. The mean ABLH values were significantly lower during wet seasons than dry seasons. The concentrations of BC and components of mineral dust such as Si, Al, Ca, and K were high at all sites. There were significant spatial differences in the concentration of some components. Higher concentrations of components of mineral dust and BC were observed during the dry season than the wet season. Three major sources were identified including mineral dust, a mixture of traffic and industry, and biomass combustion with some spatial variations. Long term measurement showed unhealthy ambient air in all three locations tested in Uganda, with significant spatial and seasonal differences in concentration, composition, and sources.

2.6.8. Evaluating the Origin of Chemical Anomalies in Am Stars with ``Hump and Spike'' Features in their Frequency Spectra

Trust Otto, Edward Jurua, Joshi Santosh, De Cat Peter[3]

Using the high-precision *Kepler* data, interesting phenomena such as spots, and ``hump and spike'' features were observed in the light curves of some normal A and metallic lined A stars (Am stars). However, the connection between such phenomena and the chemical peculiarity of the Am stars is still unclear. In order to make progress on these issues, its important to: determine spot and rotational properties of such stars, collect high-resolution spectroscopic data to determine their fundamental parameters and individual chemical abundances, and compare the results with the theory. A total of 170 ``hump and spike'' stars are being studied, with 131 reported as normal A stars and 39 as Am stars. Using the ``hump and spike'' features, spot and rotational properties were determined. In comparison with G, K, and M stars, spots in normal A and Am/Fm stars are weak, which may indicate the presence of a weak magnetic field. Of the 170 stars, those with $V \leq 10.5$ mag and not previously reported as binary stars formed a subsample for spectroscopic analysis. Using data collected with the High Efficiency and Resolution Mercator Echelle Spectrograph (HERMES), the spectral type and the atmospheric stellar parameters such as effective temperatures, surface gravities, and projected rotational, microturbulent, and radial velocities of a subsample of stars were determined. A detailed individual chemical abundance analysis for each target in the subsample was also performed. KIC 3459226 and KIC 6266219 were classified as classical Am stars, KIC 9349245 as a marginal Am star, while KIC 4567097, KIC 4818496, KIC 5524045, KIC 5650229, KIC 7667560, and KIC 9272082 are non-Am stars. Based on their spectral classification and chemical abundance pattern, KIC 6266219 (previously treated as chemically normal) was reclassified as an Am star (kA3hA7mF1) and KIC 9272082 (previously treated as Am) as non-Am star. Using the MESA evolution code and the Am stars (KIC 3459226, KIC 6266219, and KIC 9349245) classified in this study, the evaluation of the transport processes indicates that radiative diffusion, combined with turbulent mixing, thermohaline convection, and slow to moderate rotation can account for most of the chemical peculiarities found in Am stars. However, discrepancies in abundances also imply that there are other processes, currently unknown, which contribute to the observed chemical peculiarities in Am stars.

2.6.9 Ecology, Phytochemical Variability and Bioactivity of Citropsis Articulata, a threatened Medicinal Plant: Implications for Ex-Situ Conservation in Uganda

Wangalwa Rapheal**,** Eunice A. Olet, Casim Umba Tolo, Grace Kagoro

Despite the enormous conservation efforts and campaigns by various conservation bodies around the globe, the number of medicinal plants joining the threatened plant red list of the IUCN keeps growing by the year. In Uganda, various reports have emerged regarding the vulnerability of Citropsis articulata, a potent medicinal plant well known for its aphrodisiac and other medicinal properties. There is limited empirical data regarding the ecology and medicinal potential of the plant in most countries, including Uganda, where it is endemic. Therefore, this study aimed at investigating the geospatial determinants of occurrence, phytochemical variability and bioactivity of Citropsis articulata in three forest reserves in

Uganda (i.e. Mabira, Budongo, and Kibale) in addition to depicting suitable conditions for its potential ex-situ propagation. The study was carried out in 15 compartmental sites in each forest reserve. In each compartmental site, 4 plots of 60 m X 60 m were systematically established, and within each plot, 4 subplots each of size 20 m X 20 m were randomly established. A total of 240 subplots were assessed for the occurrence of Citropsis articulata in each forest. Key leaf morphometric parameters of individual Citropsis articulata plants collected from three tropical forests in Uganda were assessed using both traditional and geometric morphometrics. Additionally, phytochemical components from leaves of the geographical populations of Citropsis articulata were extracted with water and methanol using infusion and maceration methods, respectively, and quantities of secondary metabolites were established using Ultraviolet-visible (UV-vis) spectrophotometric based methods and high-performance liquid chromatography. In vitro antimicrobial activities of the samples were examined against standard strains of common pathogenic microbes, including Escherichia coli, Pseudomonas aeruginosa, Staphylococcus aureus, and Candida albicans using agar well diffusion and microtitre plate-based assays while antioxidant activity was assessed using 2,2-diphenyl-1-picrylhydrazyl (DPPH) free radical scavenging assay. An integrated GIS-based multi-criteria evaluation approach was used to depict suitable areas for the production of Citropsis articulata based on key factors of; climate, soil, and topography. Results indicated a significant ($p < 0.05$) variation in the density of Citropsis articulata, with the highest plant density recorded in Kibale National Park. Citropsis articulata generally occurred in moderate altitudinal landscapes (overall elevation = 1200.0± 20.73 m) with moderately acidic soils (overall pH = 5.7±0.10), low in salinity (overall salinity = 84.0± 3.84mg/l), and having moderate levels of macro and micronutrients. Citropsis articulata was generally associated with plant communities dominated by canopy tree species of genera such as Chrosphyllum, Celtis, Markhamia, Cynometra, Lasiodiscus, Trilepisium, Funtumia, and Diospyros. Considerable overlap was found in the individuals of Citropsis articulata from Budongo and Kibale while demonstrating some degree of variability of these individuals from their Mabira counterparts, based on the morphology of terminal leaflets. Results also showed a significant ($p<0.05$) effect of both the location and extraction solvent on the variation of secondary metabolites of Citropsis articulata leaf extractives. The extracts also demonstrated bactericidal and fungicidal potency against the test microorganisms in the order; of E coli>S. aureus > P. aeruginosa > Candida albicans. Only a small portion of the country (13.0%) is very suitable for supporting the natural propagation of Citropsis articulata, and this area is majorly situated in the western and central parts of the country. Such findings thus have implications regarding the occurrence, phytochemical variability, and bioactivity of Citropsis articulata that should be consideredwhen carrying out any ex-situ conservation efforts, especially commercial cultivation of Citropsis articulata. The study further demonstrated that Citropsis articulata leaves have potentially potent bioactive compounds that could be explored for future antimicrobial drug development.

Keywords: Ecology, Phytochemical variability, Bioactivity, Citropsis articulata, Uganda

3.0 MASTERS PROGRAMS

3.1 FACULTY OF MEDICINE

3.1.1 MASTER OF MEDICINE IN ANAESTHESIA

3.1.1.1 Using Reduced Doses of Intravenous Neostigmine/Glycopyrrolate to reduce its Side Effects in the Management of Post-Dural Puncture Headache at Mbarara Regional Referral Hospital: A Single-Blind Randomized Dose-Finding Study

Obed Mugisha, Andrew Kwikiriza, Joseph Ngonzi

Background: Post-dural puncture headache (PDPH) is a common complication of diagnostic, therapeutic and inadvertent dural puncture that commonly resolves spontaneously but has a potential of causing significant morbidity in post operative patients. Neostigmine, in addition to its cost and ease of administration has showed good pain outcomes in the management of PDPH previously but also has various related side effects. We focused on reducing the dose of Neostigmine in the PDPH treatment to find out how it affects the PDPH pain outcomes and the incidence of the Neostigmine related side effects.
Methods: We conducted a dose finding; single blinded clinical trial of three doses of Neostigmine. We randomized 23 post caesarean section mothers who received a spinal block and had PDPH into each of the three arms (20μg/kg, 10μg/kg, and 5μg/kg). Baseline weight, PDPH severity and time-to-onset of the headache were recorded. Patients were then treated with Neostigmine 8 hourly with an initial bolus of Glycopyrrolate 0.5mg followed by a slow bolus of Neostigmine diluted in 20mls of Saline. Treatment was stopped when the headache severity as ≤2 on the Numerical Rating Scale. When the PDPH severity that was ≥5 after 24hrs of treatment, supplementation with 8 hourly 0.5mg/kg Pethidine was added to the treatment regimen for the next 24 hours. Side Effects including nausea, vomiting, dizziness, abdominal muscle cramps, joint pain, increased bowel and urinary frequency, and pruritus were recorded every 8 hours.
Results: A total of 69 participants were enrolled in the study. Average age of patients was 26.35±5.6 years, average time to onset 10 hours. There was no difference in the average PDPH NRS scores between the three treatment arms at 0(7,7,7), 8(3,3,4) ,16(1,1,1) and 24(0,0,0) hours with p values 0.769, 0.382, 0.208 and 0.118 for 20, 10, and 5μg/kg respectively. We found a significant reduction in dizziness, nausea and joint pain with P values 0.018, 0.027 and 0.020 respectively. There was no difference regarding abdominal muscle cramps and pruritus.
Conclusion: Reducing the Neostigmine dose for PDPH treatment from 20μg/kg to 5μg/kg reduces the incidence of associated side effects with similar efficacy in reduction of PDPH pain.

3.1.1.2 Mortality and associated factors among Critically Ill Patients admitted at Intensive and Non-Intensive Care Units at Mbarara Regional Referral Hospital

Ocaya Benedict**,** Kateregga George, Emmanuel Munyarugero

Introduction: There is limited space and infrastructures for providing critical care management and this has led to increase in morbidity and mortality among critically ill patients. There should be more effort to improve infrastructure needed in management of the critically ill patients especially in the low- and middle-income countries where capacity is still low. Though research to evaluate critical care capacity in Uganda is now available, there is insufficient data on the mortality and associated factors among the critically ill patients in Uganda. This study aimed to determine the mortality and its associated factors among

critically ill patients admitted in ICU and non-ICU wards at Mbarara Regional Referral Hospital.

Methods: In a retrospective design, medical files of 569 critically ill patients admitted to the ICU and non-ICU wards between January 2017 and April 2019 were retrieved and analysed.

Results: The mortality at the ICU and non-ICU were 52.4% (98/187) and 34.8% (133/382) respectively. Not being seen by a physician (RR = 1.5, 95% CI [1.28- 1.92], being older than 50 years (RR = 2.0, 95% CI [1.0- 3.98]) and oxygen therapy requirement (RR=1.5,95%CI; (0.92-2.31) were predictive of mortality in the ICU while not being reviewed by a physician (RR = 1.29, 95% CI [1.02- 1.63]), being a male patients(RR=2.0, 95%CI;(1.50-2.67) and being 50 years and above (RR=2.2, 95%CI [0.98-4.72] were predictive of mortality in the non-ICU wards.

Conclusion: Mortality of critically ill patients admitted to the ICU is high and associated with not being seen by a physician and being older than 50 years and above. Factors associated with mortality in the non-ICU were being male patients and being 50 years and older. The hospital management should ensure that all patients in the ICU and non-ICU are reviewed by the physicians. The Hospital management should plan for more ICU space so that the critically ill who are being managed from non-ICU wards get access to ICU for treatment. Further research with higher level of evidence on facts and figures on mortality and its associated factors should be done to establish the reasons for the high ICU mortality.

3.1.1.3 Proportion, Reasons for and Outcomes of Cancellation of Elective Surgeries in the Teaching Hospitals of Southwestern Uganda

Najjuma Lazia, Kateregga George, Ttendo Stephen

Introduction; cancellation of elective surgery is a major problem causing significant drain on the health resources like drugs, theatre space, water and electricity used to sterilize equipment met for these surgeries. It causes frustration of the surgeons, anesthesia providers and nurses. It causes emotional trauma to the patients and their attendants, loss of income and exposes patient to disease progression. There is loss of opportunities to impart knowledge to medical trainees which can impact their practice of medicine in the future. This study was carried out to determine the proportion of cancellation of elective surgeries and describe the reasons for and outcomes of this cancellation in the teaching hospitals of south western Uganda.

Methods: A multi-center cross sectional study with a nested prospective descriptive cohort was done between 1st January and 30th April 2021. Six hundred ninety two (692) elective surgery cases were recruited at Mbarara regional referral hospital (MRRH), Kabale regional referral hospital (KRRH) and Kampala international university teaching hospital (KIU-TH). Data was collected on the reasons for cancellation of elective surgery. The three tertiary hospitals were selected because their catchment areas are representative of the south western Uganda and had the highest surgical volume in the region. The cancelled elective surgeries were followed up for duration of 14 days for the outcomes of interest i.e. self discharge, surgery done and surgery not done.

Results: The proportion of cancellation of elective surgeries was 4.2%. Mbarara regional referral had the highest proportion of cancellation (5.3%) among the study sites. Neurosurgery had the highest share of total cancellation at 27.6%, followed by general

surgery (24.1%), pediatric surgery (24.1%) and orthopedics (17.2%). Most cancellations were in the age category of 18 to 49 years. The most common individual reasons for surgery cancellation were lack of theatre space and lack of surgical linen. Of the cancelled surgeries, 48.3% were rescheduled and surgery done, 24.1% self-discharged and 27.6% were not operated at end of follow up period.

Conclusions; we found that elective surgery case cancellation was low. Majority of the cancelled surgeries were rescheduled and done with 14 days. Efforts should be developed to tackle avoidable causes of surgery cancellation e.g. adequate preoperative preparation, availing equipment a day prior to surgery and having a separate theatre/ room dedicated to emergency surgery would reduce on the cancellation of elective surgeries.

3.1.1.4 Thirty Day Outcomes of Patients Discharged from the Intensive Care Unit in Mbarara Regional and Mulago National Referral Hospitals in Uganda

Nanimambi Juliana, Joseph Kiwanuka, Emmanuel Munyarugero

Background: Patients discharged from the Intensive Care Unit (ICU) are still at high risk of mortality and readmission due to the complexity and multiplicity of their clinical status. The factors associated with outcomes, especially the in-hospital mortality rate of patients discharged from the ICUs in public hospitals in Uganda are not well documented. We focused on determining the outcomes and factors associated with in-hospital mortality of patients discharged from ICUs in public hospitals in Uganda within thirty days of discharge from ICU.

Method: We conducted a prospective hospital-based cohort study where patients were enrolled at discharge from ICU. Baseline vital signs including pulse rate, blood pressure, respiratory rate, oxygen saturation (SPO_2), Glasgow Coma Scale (GCS) among others together with laboratory tests for a Complete Blood Count (CBC) and Renal Function Tests (RFTs) were recorded. Patients were then followed up for the first 3 days while taking vital signs and on days 7, 14, 21, and 30 for outcomes of interest.

Results: 93 participants were enrolled in the study, mean age was 33 and the majority were females. 7.5% (n=7) of study participants died in hospital. Having a tracheostomy at discharge (RR 13.5, 95% CI 1.80-101.2) and being female (RR 1.35, 95% CI 1.35-1.35) were independent predictors of in-hospital mortality and after discharge from ICU.

Conclusion: Patients discharged from ICUs need close follow up especially those discharged with tracheostomies to reduce on in-hospital mortality after discharge. There's need to improve ward care of patient's discharged from ICU by either setting up step-down units or developing an ICU outreach program.

Keywords: Intensive care Unit, Critical Care, Discharge, Mortality, Low-income countries.

3.1.2 MASTER OF MEDICINE IN COMMUNITY PRACTICE & FAMILY MEDICINE

3.1.2.1 Sexual and Reproductive Health knowledge and practices among youth with and without mental illness: A comparative study in Mbarara RRH, Southwestern Uganda

Emily Tumwakire, Scholastica Ashaba, Vincent Mubangizi

Background: Sexual and reproductive health challenges among youth in low-income countries have persistently remained a public health challenge. In addition to these challenges, approximately 25% of youth experience a mental health illness, a situation anticipated to steeply increase especially in sub-Saharan Africa. Having mental illness has been shown to increase the likelihood of having low sexual and reproductive knowledge, engaging in risky sexual behaviour and experiencing more sexual and reproductive health challenges. Despite these increasing public health challenges, there is still scarcity of knowledge on the sexual and reproductive health of youth with mental illness in comparison to youth without mental illness in low-income countries.

Objective: To compare the sexual and reproductive health knowledge and practices among youth with mental illness and without mental illness at Mbarara RRH, South Western Uganda.

Methods: Using a cross-sectional comparative study design, 104 youth with mental illness and 101 youth without mental illness were recruited as they sought medical health care services at Mbarara regional referral hospital. Structured interviews were conducted and they covered sexual and reproductive health knowledge on puberty, HIV, STI, contraceptives and sexual practices. Practices such as being in a relationship, being sexually active, age at sexual debut, one-night stands, concurrent sexual partners, use of condoms and contraceptives were investigated.

Results: Overall, more youth without mental Illness (61.7%) had more knowledge compared to youth with mental illness (38.3%) with a prevalence odds ratio of 0.29 (CI, 0.16 – 0.52) and p-value of 0.001. The biggest difference was found in knowledge of puberty, with a majority of the youth having limited knowledge in this area. All youth were knowledgeable about contraceptive methods. Youth with MI engaged more in risky sexual practices such as having multiple sexual partners, inconsistent condom use, sex trade and one night stands, however, this difference wasn't statistically significant with a p value more than 0.05.

Conclusion: Youth generally have low sexual and reproductive health knowledge compared to the rest of the population. The Youth generally, tend to engage in risky sexual behaviour and our study found this to be more so among those with mental illness. Incorporation of SRH services among mainstream general youth health care and mental health care services is critical to reduce sexual and reproductive health challenges among youth. More studies among the youth with mental illness are needed to determine the influencing factors and how best to address them.

3.1.3 MASTER OF MEDICINE IN DERMATOLOGY

3.1.3.1 Pruritus: Prevalence, Characteristics and Quality of Life among Patients with Papulosquamous Conditions attending Skin Clinic at Mbarara Regional Referral Hospital, Southwestern Uganda

Aisha Ahmed Hassan, Mirembe Stephen, Mulyowa Grace

Background: Pruritus also known as itch, is an unpleasant sensation on the skin eliciting the need to scratch. Its global prevalence ranges between 8 and 38% and often associated with papulosquamous conditions. We aimed to establish the prevalence and characteristics of pruritus and the quality of life among patients with Papulosquamous conditions.

Methods: In this descriptive cross-sectional study, we consecutively enrolled 122 adult patients 18years and above who had papulosquamous conditions. Data on characteristics of pruritus was collected including its previous history, duration, frequency, location and associated symptoms using the web-based itch characteristics questionnaire and the quality of life was assessed using the 12-Item Pruritis Severity Scale(12PSS). Pruritus prevalence was determined and compared across age and gender using the Pearson's chi-square in STATA 15.0 software. The quality of life was expressed as percentages of pruritus patients with mild, moderate or severe quality of life scores on the 12PSS.

Results: Majority patients (78%) were younger than 50 years and males constituted 62 of 122. The prevalence of pruritus was 81.2%. The prominent pruritus characteristics were; a duration of up to 4 months with a frequency of up to 4 times daily, commonly associated with heat, sweating and pain, and described as burning or tingling with mild to moderate intensity in 77.8% of patients. Quality life was significantly affected, 64% reported pruritus to occur throughout the day. One third reported impeded simple activities like television watching while anxiety and depression were reported among63% and 43% of patients respectively.

Conclusion: The prevalence of pruritus among patients with papulosquamous conditions is high and presents with varied clinical characteristics. The quality of life of pruritus patients is also greatly affected. There is need to develop local guidelines for diagnosis and management of pruritus and to sensitize health care workers to explore its psychological effects on the patients in order to ensure that they receive holistic treatment. There is also need to intergrate counselling and psychotherapy in the management of patients with itch in papulosquamous conditions.
Keywords: Pruritus, Itch, prevalence, Characteristics, Quality of life

3.1.3.2 Acne: Prevalence, Etiological Variants and Quality of Life among Secondary School Adolescents in Mbarara, Western Uganda

Faigah Abdulgawi Mbarak, Mulyowa Grace, Stephen Kizito Mirembe

Background*:* Acne is a common dermatosis in adolescents and is associated with a significant disease burden

Aim*:* To determine the prevalence, etiological variants and quality of life of secondary school adolescents with acne in Mbarara, Western Uganda.

Methods*:* This was a cross-sectional study conducted in six governmental aided secondary schools which were selected using a stratified random sampling method in Mbarara district, south western Uganda. In each stratum, the students were selected using convenience sampling strategy until sample size of 380 students was reached based on the eligibility criteria. Approval was taken from the research ethics committee of Mbarara University of Science and Technology (MUST), Uganda National Council for Science and Technology (UNCST) and also from the head teachers of the schools. Informed consent and assent were sought from selected students and their head teachers. History taking and physical examination was done on the students to identify those with acne. A questionnaire was administered to establish the demographics as well as etiological variants of acne. Assessment of the effect of acne on their quality of life was also carried out using a self-reported validated specific questionnaire, the Cardiff Acne Disability Index (CADI).Data was analyzed using Stata 15.0 software. Statistical analysis was done using chi-square test and significance was based on a 5% cut-off ($p<0.05$).
Results*:* This study included 380 secondary school adolescents, 204 being males and 176 being females. The overall prevalence of acne was 30.8% with no gender disparities. All students were within the 15-19 years age range, with mean age being 17.4 ±1.04 years. The most common etiological variant of acne was acne vulgaris 90.6%, followed by drug induced acne 6.8%. Majority of the secondary school adolescents had acne on their faces 94.9%.Overall, 76.1% of adolescents with acne had mild to moderate effects on QOL while 23.9% had severe effects on QOL. Adolescents affected in terms of social interactions were 72.7%, on emotions 67.6%, on body exposure 41.9%, on skin appearance 89.7%and on perception of severity of the condition 89.7%.
Conclusion*:* Acne is a common skin disease with different etiological variants and has effects on quality of life among adolescents attending secondary schools in Mbarara, Western Uganda.

3.1.3.3 Clinical characteristics and Histological profile of pustular dermatoses among patients attending skin clinic at Mbarara Regional Referral Hospital, Uganda

Nguma Joan, Mirembe Stephen

Background: Pustular dermatoses may develop directly, as in the primary pustules or secondary pustules via changes in the primary serous contents. The presence of pustules does not necessarily imply an infectious process. Even though studies elsewhere have been conducted, few are in Uganda on the histopathology findings and clinical description of pustular dermatoses.

Material and methods: This was a descriptive hospital- based cross sectional study conducted from May –June 2021.It aimed at describing the histology findings and clinical characteristics of pustular dermatoses among patients attending the skin clinic at Mbarara Regional Referral Hospital. Participants were enrolled using consecutive sampling and the diagnoses of pustular dermatoses were made based on the histological findings using Hematoxylin/Eosin staining (H&E), Periodic Acid Schiff (PAS) and Gram stain.

Results: The commonest pustular dermatosis was Acne vulgaris (16.7%); clinically pustules were localized on the face and upper chest (figure 5A), histologically it showed neutrophils,

dilated hair follicle and infundibular hyperkeratosis within the upper epidermis and superficial dermis (figure 5B).

Conclusion: The commonest conditions presenting with pustular dermatoses range from infectious to noninfectious. Relating between the histopathology findings and clinical characteristics is helpful in the diagnosis of pustular dermatoses.

3.1.3.4 Etiology, clinical variants and factors associated with Tinea Corporis among patients attending Skin Clinic at Mbarara Regional Referral Hospital, Uganda

Nasra Mohamed, Grace Kitunzi Mulyowa, MirembeKizito

Background: Tinea corporis is one of the most common fungal skin infections worldwide. However, its aetiology has varied in recent years. Unreliable diagnosis and inappropriate treatment of Tinea corporis frequently result into complications. These complications can be prevented if diagnosis and appropriate management are performed in a timely manner. There are limited data on the aetiology, clinical variants and factors associated with *Tinea corporis* in Uganda. This study determined the aetiology, clinical variants and factors associated with Tinea corporis among patients attending Mbarara Regional Referral Hospital (MRRH).

Methods: A cross-sectional study among patients with skin lesions suggestive of Tinea corporis at MRRH was conducted from April to June 2021. Participants were enrolled through consecutive sampling. Those with lesions that were potassium hydroxide (KOH) negative, mixed dermatoses and a recent history of antifungal treatment were excluded. Structured questionnaires were administered. Physical examination was performed to identify clinical variants of Tinea corporis. Skin scrapings from suspicious lesions were collected and sent to the mycology laboratory.

Results: The study enrolled178 participants; 51% were female. All the 178 (100%) participants were diagnosed by microscopy as Tinea corporis; of these, 129(73%) were confirmed culture positive. Of the 129 confirmed cases of tinea corporis, 71(55.0%) had Papulosquamous variant, while 56(43.4%) had tinea incognito. Among the 129 culture-confirmed cases, the commonest etiology was *T. interdigitale formerly known as T. mentagrophytes (*64%) followed by *T. rubrum (*25%) and *M. canis* (11%). Male sex (OR=3.0; 95%CI: 1.40–6.27, *P*=0.004) and being a peasant farmer (OR=3.0; 95%CI: 1.14–8.11, *P*=0.026) were the key factors associated with Tinea corporis infection.
Conclusion: This study identified Papulosquamous tinea corporis as the most common clinical variant of Tinea corporis, and *Trichophytoninterdigitale* as the most common causative dermatophyte among patients attending the Skin Clinic at MRRH. Factors associated with Tinea corporis are being male and peasant farmer in our study.

Keywords: Skin lesion, dermatophytes, teneacinea corporis, papulosqoamous tinea, trichphton interdigitale

3.1.3.5 Prevalence, clinical manifestations, relationship with viral load of cutaneous disorders among children and adolescents living with HIV on antiretroviral therapy attending Mbarara regional referral hospital, Uganda

Deodatus Shani, Mulyowa Grace

Background: Cutaneous disorders are common among people living with HIV and their manifestations are known to be affected by the HIV viral load and CD4 counts. In Uganda their prevalence, clinical manifestations and relationship with viral load and CD4 counts in children and adolescents living with HIV has not been well documented.

Material and Methods: This was an analytical hospital-based cross-sectional study conducted from March - May 2021. It aimed at determining the prevalence; describe the clinical manifestations and relationship of cutaneous disorders with viral load and CD4 count among children and adolescents living with HIV (1 to 19 years) in care at Mbarara Regional Referral Hospital. Participants were enrolled using systematic sampling and the diagnosis of cutaneous disorders was made clinically basing on the history and physical examinations. The data was analysed using Stata version 13.0.

Results: 218 participants were enrolled of which 122 (56%) had cutaneous disorders. Cutaneous disorders were more prevalent among participants with a non suppressed viral load (*P* value, 0.000) and/or with severe immunosuppression (*P* value, 0.031) who manifested in severe form, atypical distributions and recurrent. The commonest cutaneous disorders included tinea capitis (34%), xerosis (13.11%) and acne form disorders (10.65%). Infective and inflammatory cutaneous disorders were significantly associated with suppressed viral load.

Conclusion: In the era of wide spread use of ART, cutaneous disorders are common among children and adolescents living with HIV with a non-suppressed viral load and severe immunosuppression.

3.1.4 MASTER OF MEDICINE IN EAR, NOSE AND THROAT

3.1.4.1 Prevalence of Allergic Rhinitis, associated factors and common allergens among patients with Nasal Symptoms attending the ENT Clinic at Mbarara Regional Referral Hospital.

Omar Aboud Salmin, Victoria Nyaiteera, Grace K. Mulyowa

Introduction: Allergic rhinitis (AR) has varying prevalence worldwide and studies in Africa have reported different views on the magnitude. The burden of AR in Uganda especially in South-western is yet to be documented. Despite globally known associations between AR and various factors, the associated factors of AR are largely neither unknown nor quantified in South Western part of Uganda. Allergen avoidance as a management strategy of AR has proved to be most successful option among other modalities. However, this has not been fully explored in southwestern Uganda, partly because allergy testing is not routine for our clinic due to the cost implications, but also because we do not have knowledge of the common allergens affecting patients with AR in this region. This study set out only to determine the prevalence of AR among ENT patients at MRRH, but also to establish factors associated with AR and identify the common allergens among patients with AR.

Methods: A descriptive, cross-sectional study was conducted at the MRRH ENT clinic, from March 2021 to August 2021. Data were collected from 142 consecutively recruited

patients with nasal symptoms at the ENT clinic using structured questionnaires. Patients with a clinical diagnosis of AR were sent to the Dermatology clinic for Skin Prick Test.
Results: The proportion of AR at MRRH is 32.4% . Among the factors found to be associated with AR at MRRH include Age categories < 18years (p value=0.0001 and 50 and Above (p value=0.02), tribe (p value=0.008), house paint (p value=0.03), eating fast foods (p value=0.045) and alcohol (p value=0.02). Asthma was found to be biologically significant with 9.2 higher odds of developing allergic rhinitis. Allergens that were found to be common include; House Dust Mites (HDMs), Tree pollen mixture and Herb pollen mixture were the commonest allergens with 13 (28.3%),11 (24.0%) and 10 (21.7%) respectively. The least common was found to be Dog hair and Ragweed with 5 (10.9%) each.
Conclusion: AR has a high proportion in patients presenting at the ENT clinic with nasal symptoms and has a significant relation with various sociodemographic, environmental and behavioral factors.

3.1.4.2 Common Oropharyngeal Lesions and their Association with HIV and other factors among adult patients attending Mbarara Regional Referral Hospital

Abubakar Ali Mohamed, Jamilah Nabukenya, Doreen Nakku

Background: Oropharyngeal lesions are reported among the earliest indicators of HIV infection and at times they may be premalignant lesions. Cardinal oropharyngeal lesions in HIV include : oral candidiasis, leukoplakia, erythroplakia, aphthous stomatitis, Kaposi sarcoma, tonsillitis and squamous cell carcinoma. Lugol's Iodine as a screening test can be used to raise suspicion of malignant oropharyngeal lesions by observing the stain changes of the site.

Some of the predisposing factors include HIV infection, Human Papillomavirus (HPV) infection, xerostomia, poor oral hygiene and smoking among others. We set out to determine the common oropharyngeal lesions, association with HIV and other factors among patients attending Mbarara Regional Referral Hospital (MRRH).

Methods: A comparative cross – sectional study design was used. 240 adult patients attending ISS and ENT clinic (120 vs. 120) were recruited using consecutive sampling from the ISS and ENT clinics at MRRH. Semi structured questionnaire administered, medical records were reviewed and oropharyngeal examination conducted.

Results: The common oropharyngeal lesions (OPL) were Pharyngitis 76 (31.7%) and Tonsillitis 64 (26.7%) and were more common among the HIV negative participants. Oral candidias is 23 (9.6%), Aphthous ulcer 13 (5.4%), oral leukoplakia 12 (5.0%) and Kaposi sarcoma 3 (1.3%) were common among HIV positive participants. SCC had equal occurrence among HIV positive and HIV negative. Use of lugols iodine increased the index of suspicion in identifying malignancies and determining the precise margins of the lesions. HIV positive patients had a 4.1times higher risk of developing oropharyngeal tumour-like lesions with 95% CI (1.5 – 11.1) and statistically significant (p-value 0.005). Smoking was significantly associated with tumour-like lesions with a 9.4 times higher risk than non-smokers and 95% CI (3.47 – 25.1). Participants with HPV infection had a 24.8 times higher risk of developing tumour-like lesions with 95% CI (1.5-216.7).

Conclusion: The commonest OPL among HIV positive patients is oral candidiasis. Comparing with histological diagnosis, Lugol's iodine screening test has a sensitivity of 80%

and specificity of 100% in detecting cellular changes in OPL. There are increased odds of developing oropharyngeal tumor-like lesions if a patient has HIV, HPV infection and a history of smoking.

3.1.4.3 Indications and Factors associated with Complications of Adenotonsillectomy among Paediatric Patients at Mbarara Regional Referral Hospital and Holy Innocent Children's Hospital

Mumbere Janvier Musayirwa, Doreen Nakku

Background: Adenotonsillectomy surgery (ATS) is a common paediatric procedure in Otolaryngology with various indications. The surgery is also associated with certain complications; patient, surgical and system factors influence the frequency of which. We set out to describe the indications of adenotonsillectomy, complications and their associated factors following adenotonsillectomy among paediatric patients attending Mbarara Regional Referral Hospital (MRRH) and Holy Innocent Children's Hospital (HICH).
Methods: We carried out a prospective cohort study at two hospitals; MRRH which is a regional referral and medical training hospital and HICH which is a paediatric private not for profit hospital. We recruited a total of 60 children (20 MRRH and 40 HICH) that were followed up for 24hours following ATS. A questionnaire was used to collect data including Socio-demographics, clinical and non-clinical characteristics of the patients and intraoperative and immediate postoperative complications within 24 hours. Chi square tests and logistic regression were created to explore relationships between variables.
Results: Of the 60 patients, 48(80%) presented with adenotonsillar hypertrophy, 30(50%) recurrent adenotonsillitis and 1(1.67%) Peritonsillar Abscess as indicator for ATS. Overall, 26(43.33%) had surgery related complications, predominated by palatal oedema intraoperatively 11(18.33%) and odynophagia postoperatively, 13(21.67%). Most complications were recorded at MRRH 14(70.00%). The independent factors associated with complications after ATS were type of surgery done, the occupation of the patient's parent and cadre of the surgeon that performed the operation at $p<0.05$. The risk of surgery related complication was increased among children of peasant farmers (aRR =8.8, 95%: 1.12-69.09, p=0.039), patients operated at MRRH (aRR=5.3, 95%: 1.50-18.70, p=0.01) and patient who underwent adenotonsillectomy compared to those of tonsillectomy surgery only (aRR=8.2, 95%: 1.82-37.06, p=0.006). On the other hand, being operated by a senior surgeon was found protective from complications (aRR=0.1, 95%: 1.50-0.98, p=0.48).
Conclusion: The commonest indication for ATS in our setting is adenotonsillar hypertrophy. Complications following ATS were high particularly at the public teaching hospital with odynophagia as the commonest complication closely followed by palatal oedema. Having a lower socioeconomical status caregiver, receiving ATS at MRRH, specifically performed by a junior resident and the surgical type of ATS used were significantly associated with complications.
Key words: Indications, Complications, Adenotonsillectomy, Paediatric Patients, Mbarara Regional Referral Hospital, Holy Innocent Children's Hospital

3.1.4.4 Prevalence and factors associated with Noise Induced Hearing Loss among Metal Fabricators in Mbarara City

Agaba Brian, Doreen Nakku, Esther Nakasagga, Daniel Atwine

Background and objectives: Noise induced hearing loss (NIHL) is a relatively common permanent health condition and yet preventable. Individuals that work in noisy environments such as metal fabricators are at an especially higher risk of NIHL. We set out therefore to assess the knowledge levels and identify factors associated with NIHL among metal fabricators in Mbarara city (Uganda).

Methods: We conducted a descriptive cross-sectional study in Mbarara city among metal fabricators. Data was collected using questionnaires, workshop noise levels measured using a hand-held sound level meter and hearing threshold tests by a pure tone audiometer.

Results:178 adult participants were recruited; majority were young that is 18-24 years and male (96.1%). The prevalence of NIHL was 19.7% and was noted to increase with age and also with work experience in the metal fabrication industry. Only 23.2% of metal fabricators had adequate knowledge levels about NIHL. After adjusting for confounding, we found that only 'history of previous employment in a noisy environment' truly increased the odds (OR - 3.3 95% CI 1.1-9.0 and a p-Value of 0.028) of developing NIHL in this population. Advancing age, having a 'relative with hearing loss', increasing work experience in metal fabrication (>1 year), a positive history of smoking and recent use of ototoxic drugs; all demonstrated increased odds of association with NIHL, that is 3.4 (0.7-16.8, 0.132), 2.0 (0.8-5.1, 0.137), 9.9 (1.0-16.8, 0.055), 3.4 (0.5-24.2, 0.061), 1.7 (0.6-4.9, 0.310) respectively with their corresponding 95% confidence intervals and p-Values, though they were not statistically significant.
Conclusion: The prevalence of NIHL among metal fabricators in Mbarara city is relatively low. Knowledge about NIHL was also inadequate among most of the fabricators. NIHL prevalence was associated with advancing age and work experience, more so among those with a history of previous work in a noisy environment. Others factors that were associated with its development were; smoking and recent use of ototoxic drugs.

3.1.5 MASTER OF MEDICINE IN EMERGENCY MEDICINE

3.1.5.1 Effectiveness of Improvised Cardboard Splints as an Alternative to Plaster of Paris in the Emergency Treatment of Leg Fractures

Romeo Wahome Gichohi, Derek Harborne, Randall Ellis

Background: Trauma accounts for a large percentage of admission to a majority of East African hospitals. At Mbarara Regional Referral Hospital Uganda, this accounts for 60% of all emergency department admissions. A large proportion (30-35%) of these are due to leg tibia and fibular fractures. Emergency treatment of these fractures can be life-saving and includes using a temporary immobilizing splint until definitive management is sought. Ideally, Plaster of Paris is the gold standard, but this is usually unavailable or unattainable to many hospitals and patients. Improvised cardboard splints took the place of Plaster of Paris in

this regard since they were more readily available and thought to be cheaper to apply while being equally as effective for immobilization of these leg fractures. This has led to the widespread use of these splints both pre-hospital and intra-hospital in the management of leg fractures. While anecdotal evidence exists, and multiple experts agree in the use of cardboard as a splint for leg fractures, scarce published works exist in measuring the effectiveness of cardboard splints in comparison to Plaster of Paris. Given that their use is widespread there is concern for patient safety and possible adverse outcomes. The aim of this study was to find out if cardboard can be a safe and effective alternative to Plaster of Paris, for the splinting of tibia-fibula fractures, and whether it was also the more cost-effective option.
Methods: A cadaveric study was done where multiple open tibia-fibular fractures were splinted with both cardboard and Plaster of Paris in a prospective, experimental study design. The use of 5 angular, 9 linear measurements and cost comparisons of the splint was done. Linear and angular measures determined the effectiveness while material and labor costs determined the cheaper modality. All these were compared using t-tests, confidence intervals and means for statistical significance.
Results: 44 cadaveric legs were splinted with both Plaster of Paris and cardboard. Cardboard proved to be the more effective splint in 9 of the 14 measures of effectiveness and was not inferior to Plaster of Paris. In the other 4 measures, no statistically significant differences were seen in comparison of Plaster of Paris to cardboard, while Plaster was superior in 1 measurement. As for cost, cardboard proved to be significantly cheaper than Plaster of Paris in the splinting of open tibia and fibula fractures costing approximately 19,000 UGX less per splint.
Conclusion: Cardboard is a cheap alternative to Plaster of Paris for the temporary splinting of tibia-fibular fractures in low resource environments.

3.1.6 MASTER OF MEDICINE IN GENERAL SURGERY

3.1.6.1 One Year Overall Survival of Wilms' Tumor Cases and its predictors, among Children Diagnosed at Mbarara Regional Referral Hospital: a Retrospective Study

Ekuk Eddymond, Situma Martin

Background: Wilms' tumor (WT) is the second most common solid tumor in Africa, with one of the worse overall survival rates. However, no known factors are predicting this poor overall survival.

Objective: This study set out to determine the one-year overall survival of WT cases and its predictors among children diagnosed in the pediatric oncology and surgical units of Mbarara regional referral hospital, in western Uganda.

Methodology: This was a descriptive retrospective study of records of 41 children diagnosed with WT between January 2017 and January 2021. Charts with the histologically confirmed diagnoses were reviewed for demographics, clinical and histological characteristics, as well as treatment options.

Results: One-year overall survival was found to be 59.3% (95%CI: 40.7-73.3), with tumor size greater than 15 cm (p 0.021) and unfavourable WT type (p 0.012) as its significant predictors. **Conclusion:** Overall survival of WT at MRRH was found to be 59.3%, and

predictive significant factors noted were unfavourable histology and tumor size greater than 115 cm.

3.1.6.2 Patterns and Short-Term Treatment Outcomes of Paediatric Inguinal Hernias at Mbarara Regional Referral Hospital

Eric Mungai, Martin Situma, Felix Oyania

Background: An inguinal hernia is a common childhood surgical condition and represents a significant public health burden in Africa. Without early surgical intervention, inguinal hernias are at risk of undergoing incarceration or irreducibility which could result in obstruction or strangulation and death.

Objectives: To determine the clinical presentation, short-term treatment outcomes, and their predictors among children undergoing inguinal hernias repair at MRRH.

Methods: This was a prospective cohort study.

Results: A total of 81 patients with inguinal hernia that fulfilled eligibility criteria were consented and enrolled in the study. The majority of participants were males (95.1%), born at health centres (81.5%), and their birth attended to by healthcare workers (87.7). They were born majorly at full-term gestation (93.8%), had a right-sided inguinal hernia (71.6%), which were predominantly indirect (97.5%) and reducible (93.8%). The urgency of surgical interventions carried out were mainly as elective operations (95.1%) with the majority being uncomplicated inguinal hernias (93.8%). Overall, the majority of the participants had a favourable outcome (85.2%) whereas 14.8% of patients had an unfavourable outcome. In multivariate analysis, the only factors that showed a statistically significant independent association with poor outcomes among children undergoing surgical management were; patients undergoing emergency surgeries ($p=0.016$), those with sliding or incarcerated hernia ($p<0.001$), caregivers aged 18-29 years ($p<0.001$), and having an irreducible or recurrent hernia ($p<0.001$).

Conclusion: Paediatric inguinal hernias are common among male children and the majority have symptoms for more than two years prior to admission at MRRH. Most of these are right-sided indirect hernias and uncomplicated hernias and have good outcomes following surgery However, patients with young maternal caregivers and those with complicated hernias which were associated with increased risk of poor postoperative outcomes.

3.1.6.3 Short Term Outcomes and Predictors of Mortality among Surgical Neonates at Mbarara Regional Referral Hospital

Mohamed Khalif Hassan, Martin Situma, Felix Oyania

Background: There is an obvious disparity between High Income Countries(HICs) and Low-Middle Income Countries (LMICs) with regards to Surgical Neonates in general and disease specific mortality rates. Mortality from surgical conditions among neonates has steadily

reduced over the last five decades especially in the western world but the contribution of neonatal surgical conditions to the overall neonatal mortality is not well known.

Methodology: This was a retrospective cohort study of neonates admitted and managed for surgical conditions at MRRH, Paediatric Surgical Unit during the study period, January 2016-December 2020.

Aim: To determine the Short-term outcome and predictors of mortality among surgical neonates at MRRH.

Results: Male predominance with F:M ratio of 1:1.6, 80% were term neonates and were admitted with birth weight > 2500gm, 86% of the neonates were referred to our facility and 72.3% admitted within the first week of life, of those admitted 86.4% were operated. Commonest cases at our facility were Anterior Abdominal Wall Defects(AWD), Anorectal Malformation(ARM), Intestinal Atresia (IA) and Hirschsprung's Diseases(HD), and Gastroschisis whose neonates ended up staying longer in hospital.Mortality rate among the surgical neonates at our facility was 28% with Gastroschisis contributing the most. Post-operative complications occurred in 18% of the neonates. Gastroschisis, development of post-operative complications and age at admission of <7 days were important predictors of mortality.

Conclusion: Majority of the neonates managed as an emergency are referred from the neighbouring health facilities. The bulk of the conditions seen include, AWD, ARM, TOF, HD and IA. Gastroschisis is the leading cause of mortality among neonates especially those less than 7 days and those who developed complication had a higher likelihood of death.

Recommendation: Enhanced monitoring and care to neonates who present within the first week of life and those with Gastroschisis, as well as improved postoperative care of the neonates to mitigate the contribution of sepsis to the mortality rate.

Key words: Short term outcomes, predictors of mortality and Surgical neonates.

3.1.6.4 Patterns, short-term treatment outcome of patients with Undescended Testis at Mbarara Regional Referral Hospital

Hussein Iman Sigat, Martin Situma, Marvin Mwesigwa Felix Oyania

Background: Undescended testis is one of the most common congenital malformations of a male child. It is much more common in low birth weight infants and is diagnosed even in 1/3 of extremely low birth weight infants. It is commonly improperly considered as mild congenital malformation. In developing countries like Nigeria, many children present either following an accidental discovery by health workers, parents/caregivers, or after complications have taken place. The diagnosis of children in developing countries is mainly through accidental discovery through health workers.
Objective: Undescended testes (UDT) are prone to a lot of complications but early detection and correction give good results. There is a paucity of published data on UDT in our setting. Our aim was to describe the patterns and short-term outcomes of patients with undescended testis treated in Mbarara regional referral hospital

Methods: A hospital-based prospective cohort, consecutive sampling procedure was used, whereby all patients with evidence of undescended testis were examined and those fit for inclusion were included in the study. A total of 96 patients with UDT were recruited during the study period. Of these, 33% attended to were between the ages of 7 years to 12 years,
Results: The median age at surgery was 7 years (range 0– below 18 years), 15 patients, 15.7% had surgical intervention below 18 months of age, 28 (29.2%) between the ages of 19 months to 6 years, 32 patients (33.3%) between 7 – 12years and 21(21.9%) patients above 13 years
The UDT was on the right side in 33%, on the left side in 36%, bilateral in 31% .80 participants had palpable UDT of which 76.25% (61) were located in the canal and 23.75% (19) were found at the superficial inguinal ring. 16 participants had nonpalpable UDT of which 81.75% (13) were intrabdominal and the rest were found in the canal.
The majority of the participants (60.4%) recruited to the study were first diagnosed with undescended testis above the age of 2 years. Only 18.8% of cases of undescended testis were first diagnosed at birth. Only 15.6% of all participants diagnosed below the age of 2 years were operated on. The majority of the patients (84.4%) were operated on above the age of two years. A total of 15.7% were operated below the age of 18 months. This points to the delays in either seeking health or delay at the hospital among other factors.
Parents were first to notice the UDT (50%), participants themselves (28.1%), health care workers (18.8%), and teachers (3.1%). Majority of the patients who noticed the condition were mostly school-going age, above 7 years of age.
The pattern of referring the participant to the hospital has parents at 53.1%, healthcare workers at 37.5%, participants themselves in 6.3%, and teachers in 3.1%
Complications as short-term outcomes were observed in 27.2% of patients during the follow-up period. 84.4% had undergone a single staged surgery and 15.6% were done staged surgery. Associated anomalies were identified in 26.09% of the study participants and the most common was a hernia, found in 16.7% followed by hydrocele in 6.25%, hypospadias in 2.1%, and ambiguous genitalia/DSD 1.04%.
Conclusion: Late diagnosis is common in our setting. Associated anomalies are common and thorough evaluation for such is important. Inguinal hernia is the most common associated anomaly in our setting. Severe short-term postoperative complications are not common.

3.1.6.5 Prevalence and Histological Patterns of Prostate Cancer among Patients Presenting with Obstructive Lower Urinary Tract Symptoms at Mbarara Regional Referral Hospital

Kyegombe Willy, Marvin Mutakooha Mwesigwa, Epodoi Joseph

Background: Prostate cancer is currently the second commonest male cancer in Uganda. Despite this, men are more likely to be tested for prostate cancer only after presenting with obstructive Lower urinary tract symptoms since these are a common presenting complaint among elderly males. However, there is still a lack of published local information on the clinical and biochemical patterns of prostate cancer among patients with lower urinary tract symptoms in Uganda which can negatively affects the equitable distribution of resources for cancer care.

Aims: To determine the Patterns of PSA, DRE, histological findings, and prevalence of prostate cancer among patients presenting to Mbarara regional referral hospital with obstructive lower urinary tract symptoms.

Methods: A cross-sectional study of 154 patients with obstructive LUTS. Demographics, presenting symptoms were collected using a structured questionnaire and IPSS index, followed by total serum prostate specific antigen level estimation and Digital rectal examination. Patients who either had a total serum Prostate Specific Antigen level above 4ng or an abnormal DRE underwent digitally guided transrectal prostate biopsy.

Results: Majority had severe LUTS,73.57(103/140) with a median PSA of 14.4 ng/ml and met the criteria for the digitally guided transrectal trucut prostate biopsy70.71% (99/140). DRE abnormalities were found in 57.14%(80/140) of the participants. The commonest abnormalities were prostatic enlargement 54.29% (76/140), hard prostatic consistency 29.2% (41/140), loss of the median groove 35.71% (50/140) and nodular prostate 42.86% (60/140).The prevalence of prostate cancer was high at52.21% (59/113) 95% C.I:30.1-46.3, all of these had prostate adenocarcinoma and none of the other variants were detected. The mean Gleason score was 8 (±1.148) and the majority of the adenocarcinomas had a Gleason score of 8 and above. (77.78%, n=35).

Conclusion: The prevalence of prostate cancer among men presenting to Mbarara Regional referral hospital with obstructive LUTS was high and majority of these had poorly differentiated prostate adenocarcinoma.

3.1.6.6 Prevalence, etiology, patterns and factors associated with hand injuries among patients at Mbarara Regional Referral Hospital

Lenny Kamau Gitundu, Martin Tungotyo, Kisitu Dan Kyengera

Introduction: The hand plays a central role in man's daily activities and injuries to it may result in disability and affect productivity. They are becoming common, yet the patterns and prevalence in our setting has not been established. Hence we sought out to find the prevalence, etiology, patterns and factors associated with hand injuries in MRRH.

Material and Methods: This was a descriptive cross sectional study of patients presenting with hand injuries to the accident and emergency department over a 7 month period.

Results: A total of 69 patients predominantly males, in the 20 – 29 age range presented with hand injuries. These majorly involved the dominant hand, with road traffic crash and assaults being the major causes. A third of the injuries occurred in the work place with 5% reporting use of hand safety equipment and safety training at work. Tendon injuries were 14.5%, majorly involving flexors, fractures in 10% and nerve injury in 7.25% of the patients.

Conclusion and Recommendations: Understanding these patterns of injuries will enable clinicians better manage them and give solid advice on prevention.

Keywords: Hand Injury, Patterns of hand trauma, Etiology of hand trauma, Factors associated with hand injuries.

3.1.6.7 Functional Outcome of Hirschsprung's after Definitive Surgery at Mbarara Regional Referral Hospital

Mahat Abdi Dadai, Martin Situma, Felix Oyania

Background: Hirschsprung's disease is one of the commonest causes of functional bowel obstruction in neonates and infants. The surgical management has evolved to the current two or one-staged procedure (Bradnock and Walker, 2011, Mabula et al., 2014). Despite this, there are still many challenges faced by these patients regarding their functional outcomes. No study has been done to determine the functional outcome of these patients at our institution.

Methods: A cross-sectional study was conducted using records of all patients with a histologically confirmed diagnosis of HD who had completed definitive surgery at MRRH from 2015 to 2020. Parents or legal guardians were contacted by phone and called for review at our routine OPD clinic. The patients/caregivers were given interviewer-administered questionnaires to assess the functional outcome and children were reviewed. Those with complications were referred to the pediatric surgeons for further assessment. Data was entered in Microsoft Excel version 13, double entered into Ms Word, cleaned, and then imported into Stata version15foranalysis. Descriptive statistics and Fisher's exact tests were performed.

Results: 80 patients were retrieved from the database, 20 had no contacts, 9 were found to have died while 5 their contacts were not going through and could not be traced by any other means. Of the 46 remaining patients, 41 ((89.13%)) were male and 5 (10.8) were female. The majority of the patients were aged < 5 years (73.91%) with a mean age of 4.37 (*SD* = 2.36). Only 4 syndromic patients were seen. These all clinically had trisomy 21 and one had a significant cardiac lesion that required cardiac surgery before definitive surgery. Most patients had colostomy formation (97.83%) and subsequent pull-through (91.3%) below the age of 5 years. Most of the patients underwent a 2-stage operation (80.43%). The main surgical technique used was the Swenson procedure. Voluntary bowel movement (VBM) was achieved in 63.04% while soling and constipation rates were 28.26% and 8.70% respectively.

Trisomy 21 and body mass index were significantly associated with functional outcome, with ($p< 0.05$.

Conclusion: Functional outcome of HD in our study is comparable to other centers with more than sixty percent of the patients showing VBM. A significant number of patients also have soiling compared to other centers and this needs to be investigated further.

3.1.6.8 Diabetic Foot Ulcers: Surgical Characteristics, Treatment Modalities and Short-Term Treatment Outcomes at Mbarara Regional Referral Hospital

Mvuyo Maqhawesikhondze, Carlos Manuel Cabrera Dreque, Deus Twesigye

Background: Diabetic foot ulcers (DFUs) are one of the most prevalent and serious consequences in people who have poorly controlled diabetes. Those who have them frequently require hospitalization and are at risk of lower extremity amputations (LEA). In

Uganda, only a few studies have detailed foot disorders among diabetic patients and how they are managed.

Objectives: The purpose of this study was to describe the surgical characteristics, treatment modalities and short-term treatment outcomes of diabetic foot ulcers at Mbarara Regional Referral Hospital (MRRH), a secondary referral hospital in south-western Uganda.

Methods: A prospective cohort study involving 62 patients admitted with DFUs at MRRH was conducted from February 2021 to September 2021. An interviewer-administered structured questionnaire was used to capture socio-demographic data, surgical characteristics of the ulcers, treatments used and treatment outcomes over a 5-week follow-up period. Data were entered into REDCap and exported to STATA version 15 software for analysis. Descriptive statistics were used at analysis.

Results: There were 35 females (56.5%). The mean age of study participants was 57.0 ± 12.27 years. Majority had diabetes mellitus (DM) for more than 10 years, and type 2 DM predominated (93.5%). Twenty-one participants (33.9%) had very poor glycaemic (HBA1c>9.5%). Most participants had DFUs involving the toes (27.4), while 80.7% had large ulcers (>3 cm^2). Most patients had severe forms of DFUs (Wagner grade 3-5) seen in 66.2% of patients. *Pseudomonas spp* was the most commonly identified organism among clinically infected ulcers. There were 22 (35.5%) participants whose lower extremity doppler ultrasonography (dUSG) detected arterial lumen occlusion. Thirty-one cases (50.0%) underwent surgical debridement, while 29 (46.8%) had LEA performed as the initial surgical intervention. Eight (42.1%) of the patients experienced surgical site infection, while recurrent gangrene occurred in 5 (26.3%) after the initial surgery. Revision surgery was performed in 25.8% of the participants. Mortality rate was 1.6%, and the mean length of hospital stay was 17.0 ± 11.1 days.

Conclusions: More than half of patients have advanced stages of diabetic foot ulcers (Wagner grades 3-5). Lower extremity amputation is a common initial surgical treatment among DFU patients. Doppler ultrasonography should be performed routinely in the assessment of occlusive peripheral vascular disease for all DFU patients. Wound swabbing for culture and sensitivity testing is encouraged for appropriate antibiotic coverage.

3.1.6.9 Incidence and factors associated with abdominal wound dehiscence among post laparotomy surgical patients at Mbarara Regional Referral Hospital

Ssembuusi John, Mutiibwa David, Tungotyo Martin

Background: Wound dehiscenceis defined as disruption of any or all of the layers in a wound. Abdominal wound dehiscence following laparotomy is a common post-operative complication. It is linked to a high rate of morbidity and mortality. At Mbarara Regional Referral Hospital, wound dehiscence was accountable for 13% of re-laparotomies. Abdominal wound dehiscence leads to prolonged duration of hospitalization and increased hospital costs.

Objective: The main objective of this study was to establish the incidence and factors associated with abdominal wound dehiscence among post laparotomy surgical patients at MRRH

Methods: A prospective cohort study was conducted on the surgical wards of MRRH for a period of six months. Participants' social-demographic characteristics; pre-operative, surgery related and post-operative factors were recorded. The incidence of abdominal wound dehiscence was calculated as the proportion of patients who developed wound dehiscence in a period of fourteen days. Logistic regression was done to evaluate the factors independently associated with wound dehiscence.

Results: 126 participants were enrolled for the study. The incidence of abdominal wound dehiscence was 11.1%. At multivariate regression, pre-operative anemia (aRR=1.37; 95%CI: 0.36-2.38; p value=0.008), surgical site infection (aRR=5.52; 95%CI: 2.93-8.10; p value=0.001) and increased duration of surgery (aRR=3.09; 95%CI: 0.52-5.66; p value=0.018) were independently associated with abdominal wound dehiscence.

Conclusion: The incidence of abdominal wound dehiscence following laparotomy is high. Pre-operative anaemia, prolonged duration of surgery and surgical site infection are independently associated with abdominal wound dehiscence.

3.1.6.10 Prevalence of Gastric Cancer among Patients Presenting with Dyspepsia at Mbarara Regional Referral Hospital

Tuhumwire Caleb, David Mutiibwa, Samson Okello

Background: Cancer of the stomach is the fourth leading cause of cancer- related deaths in the world. The notion that cancer is rare in Africa no longer holds true. In Uganda, most gastric cancer cases (49%) were found to arise from southwestern Uganda. Late presentation has also remained a big challenge, and the cancer is diagnosed when already advanced. Despite surgery being the only treatment modality that offers long time survival for gastric cancer patients, it unfortunately remains majorly palliative in Uganda.The study aimed to determine the prevalence of gastric cancer among patients with ≥ 40 years of age presenting with dyspepsia at MRRH. It was also to determine the resectability rate of gastric cancer at laparotomy.

Methods: It was a cross sectional study at MRRH. A total of 120 participants was recruited but 5 were unfit for endoscopy. Endoscopies were done in 107, and 8 had surgery without prior endoscopy. Biopsies were taken where appropriate and histological diagnosis was established in 91 participants. The prevalence of gastric cancer and premalignant lesions calculated as a proportion of the total participants. Patients with gastric cancer were prepared for surgery and were operated if fit. At laparotomy, staging was done and the surgical procedure done was documented. The resectability rate was calculated as a proportion of surgically removed gastric cancer in the total gastric cancers that were meant to be operated.

Results: The commonest endoscopic diagnoses were gastritis and gastric tumors. The prevalence of gastric cancer was 27.8%. Premalignant lesions included atrophic gastritis, metaplasia and dysplasia. At laparotomy, all were advanced cancers and 62.5% of the gastric tumors were metastatic (stage 4) and 90% of the metastases were in the liver. The resectability rate of gastric cancer was 19.0% but 75% of the gastrectomies were palliative. Of the laparotomies done for gastric cancer, 92.9% were palliative procedures.

Conclusion: More than a quarter of patients with ≥ 40 years of age referred to MRRH with dyspepsia have gastric cancer. Most are stage 4 cancers and more than 90% of the surgery is

palliative. Awareness about gastric cancer and the role of early diagnostic endoscopy should be increased in peripheral health units to stimulate early referral of patients with dyspepsia. More studies should be done even in lower health units and the community to assess the role of early and screening endoscopy in the possibility of early diagnosis of gastric cancer in Southwestern Uganda.

3.1.6.11 Etiology, Patterns and Treatment Outcomes for Patients Presenting with Urethral Strictures at Mbarara Regional Referral Hospital

Tumubugane Gotharido, Mwesigwa Mutakooha Marvin, Epodoi Joseph

Background: Urethral stricture disease is a common urological problem and a common cause of obstructive uropathy among young men. Etiology has changed globally with trauma replacing urethritis as the leading cause. MRRH handles a significant number of patients with urethral strictures and on a monthly basis approximately 8 patients are managed at the facility. The patients present late with a complicated disease and mostly present with urine retention.
Objective: Describe the etiology, patterns and short-term treatment outcomes of patients presenting with urethral strictures at MRRH

Methods: A prospective cohort study was conducted on the department of surgery at MRRH from April 2021 to November 2021. A structured questionnaire was used to collect information on patient demographics, etiology, patterns and short-term treatment outcomes. Only patients with a confirmed stricture on urethrogram were enrolled for the study and followed up for three weeks post-operatively. Percentages, pie charts and tables were used to describe the etiology, patterns, treatment and short-term treatment outcomes.

Results: A total of 52 patients with urethral strictures were consecutively enrolled for the study. Most patients were young adults with an average age of 40.2 years, majority presented late in the disease process with complications (61%). Urethritis was the leading cause of strictures (75%), bulbar was the commonest stricture site (68%), most patients had supra pubic catheterization as the initial management (92.4%) and EPA was the most commonly used definitive method of treatment. There was general good outcome with scrotal edema as the most common complication.

Conclusion: Urethritis still the commonest cause of urethral strictures at MRRH. Patients report late with complicated disease. Bulbar is the commonest site of stricture and most are single and incomplete. EPA was the commonest mode of definitive treatment with a good short-term treatment outcome, and scrotal edema was the commonest complication reported.

3.1.7 MASTER OF MEDICINE IN INTERNAL MEDICINE

3.1.7.1 Prevalence of Carotid Atherosclerosis and its correlation with Apob/Apoa1 Ratio and Ten-Year Predicted Atherosclerotic Cardiovascular Disease Risk among patients with Type 2 Diabetes in Southwestern Uganda

Patrick Kambale Saasita, Anthony Muyingo, Moses Acan

Background: Diabetes Mellitus is one of the principal cardiovascular disease (CVD) risk factors. Among patients with type 2 diabetes mellitus (T2DM), CVD affects 32.2% overall; 29.1% have atherosclerosis, 21.2% coronary heart disease, 14.9% heart failure, and 7.6% stroke.
Objectives: The main objective of the study was to determine the prevalence of carotid atherosclerosis, its correlation with apolipoprotein B/apolipoprotein A1 ratio (apoB/apoA1) and 10-year predicted atherosclerotic cardiovascular disease (ASCVD) risk among patients with T2DM in Southwestern Uganda.
Methods: We conducted a cross-sectional study at the Diabetes Clinic of MRRH from April to August 2021. Carotid atherosclerosis (CA) was defined by a mean carotid intima-media thickness (CIMT) of at least 1mm on B-mode ultrasound imaging, or by the presence of a focal carotid plaque. The 10-year predicted ASCVD risk was estimated by using the pooled cohort equation (PCE) online calculator. In total, 212 participants with T2DM were included in this study. Excel software was used for data entry and Stata version 14 for data analysis. Bivariate and multivariate logistic regressions were used to determine the factors associated with CA. Pearson's correlation was performed for assessing the correlation between apoB/apoA1 ratio and 10-year predicted ASCVD risk with CIMT.
Results: The prevalence of CA among T2DM patients in Southwestern Uganda was 35.85%. Age ≥55 years had 3.12 times higher odds of CA (95% CI 1.36 - 7.14; p-value = 0.007), being HIV positive on ART had 3.78 times higher odds (95%CI 1.14 - 12.49, p-value = 0.030), high waist circumference (≥88cm for females and ≥102cm for males) had 2.74 times higher odds (95%CI 1.15 - 6.52, p-value = 0.022) and Non-HDL-c/HDL-c ratio≥4 had 2.95 times higher odds of developing CA (95%CI 1.02 - 8.52, p = 0.045). There was no correlation between apoB/apoA1 ratio and CIMT (r=0.08, p-value=0.291). However, total cholesterol/HDL-c and Non-HDL-c/HDL-c were positively correlated with CIMT (r=0.18, p-value=0.009). Almost half of our patients had a high ten-year ASCVD risk (risk ≥20%). Ten-year predicted ASCVD risk correlated positively with CIMT (r=0.30, p-value < 0.001).
Conclusion: The prevalence of CA among patients with T2DM in Southwestern Uganda is high. Age ≥55 years, being HIV positive on ART, high waist circumference and high non-HDL-c/HDL-c were associated with CA. We failed to reject our first null hypothesis that there was no correlation between apoB/apoA1 ratio and CIMT. However, our alternative hypothesis about correlation between 10-year predicted ASCVD risk and CIMT was confirmed.

3.1.7.2 Prevalence and factors associated with Renal Tubular Dysfunction among HIV Patients on Tenofovir Disoproxil Fumarate attending ISS Clinic at Mbarara Regional Referral Hospital

John Phillip Ng'umbi, Rose Muhindo**,** Winnie Muyindike

Background: Tenofovir Disoproxil Fumarate (TDF), the most commonly prescribed antiretroviral drug globally is associated with renal tubular dysfunction (RTD) whose magnitude is poorly understood in resource-limited settings. Our goal was to describe the prevalence and factors associated with renal tubular dysfunction in Uganda's people living with HIV(PLHIV) taking TDF-containing regimens.

Methods: We enrolled adult PLHIV receiving TDF-containing antiretroviral regimens from the HIV clinic at Mbarara Regional Referral Hospital. Socio-demographic, clinical and laboratory data were collected from each participant. Chronic Kidney Disease Epidemiology Collaboration (CKD-Epi) formula was used to estimate glomerular filtration rate (eGFR) and participants who had any two of, raised urinary excretion of phosphate, uric acid and glycosuria in non-diabetic normal glycemic were said to have renal tubular dysfunction. Logistic regression analysis was done to identify the factors that were independently associated with renal tubular dysfunction.

Results: Of the 145 participants enrolled, 84 (57.9%) were female, and the mean age was 46 (± 9) years. The mean serum creatinine was 0.77 (± 0.12) mg/dl and the mean eGFR of 112 (±24) mL/min/1.73m2. A total of 116/145 (80%) participants had at least one abnormality in parameters of tubular dysfunction; 26 (17.9%) and 3 (2.1%) of the participants had a combination of two or more parameters, respectively. In our study, the prevalence of renal tubular dysfunction was 20% (29/145) (95% CI 14.2-27.3). Female gender was statistically significantly associated with tubular dysfunction, adjusted odds ratio (AOR): 2.75, 95% (CI. 1.05-7.19), p=0.03.

Conclusion: The prevalence of renal tubular dysfunction is high and can occur in patients receiving TDF despite normal serum creatinine. We recommend using urinary abnormalities other than isolated serum creatinine in the detection of renal tubular dysfunction.

Keywords: Renal Tubular Dysfunction, Tenofovir Disoproxil Fumarate, TDF, HIV, Uganda, Sub-Saharan Africa

3.1.7.3 Prevalence and factors associated with Delayed Sputum Culture Conversion among Patients with Drug Resistant Tuberculosis in South Western Uganda

Mwanahamisi Suleiman Bwika, Conrad Muzoora, Edwin Nuwagira

Background: Drug-resistant tuberculosis (DR-TB) is the leading contributor to antimicrobial resistance-related death globally, with only a 55% treatment success rate reported globally. Sputum culture conversion is a surrogate marker for treatment success. With little to no data in our setting, we sought to establish the prevalence of delayed sputum culture conversion and factors associated with it among DR-TB patients in southwestern Uganda.
Methods: We reviewed data from three DR-TB treatment sites in western Uganda and included all patients aged above 15 years and above who had a positive baseline sputum culture. We collected socio-demographic, clinical, and laboratory data using a standardized data extraction tool. Delayed sputum culture conversion was defined as conversion beyond 120 days. Logistic regression analysis was used to describe the factors that were independently associated with delayed sputum culture conversion.
Results: We reviewed data from 385, but included 177 participants, of whom 122(69%) were men with a median age of 35 years (IQR; 30, 45) years. The prevalence of delayed sputum culture conversion was 18% (32/177) [95% CI;13-24]. Previous history of tuberculosis was the only factor found to be associated with delayed sputum conversion(Odds Ratio=4.4, 95% CI: 1.4-13.7, p= 0.01).

Conclusion: The prevalence of delayed sputum culture conversion in South western Uganda is high with previous history of tuberculosis was associated delayed conversion. We recommend a review of nationwide data to correlate with our findings.

3.1.7.4 Prevalence and factors associated with Silent Myocardial Damage among HIV positive matched with HIV Negative Individuals in South Western Uganda

Jacob Nkwanga, Boniface Lumori, Okello Samson

Background: Cardiovascular disease (CVD) is a common human immunodeficiency virus (HIV) related complication, it is more pronounced in the presence of HAART. There is an increased burden of ischemic heart disease with most of these events going undiagnosed. Silent myocardial damage (SMD) depicted by ischemic ECG changes predicts mortality and presents missed opportunities for secondary cardiovascular protection. We hoped to use the cardiac Injury Infraction Score (CIIS)(a score with a sensitivity of 85% and specificity of 95%) to determine the prevalence and factors associated with silent myocardial damage among the HIV positive matched with HIV negative individuals.

Methods: we analysed baseline electrocardiograms of 296 participants in the UGANDAC cohort using the CIIS (a score of greater than or equal to 15 suggests silent myocardial damage), determined prevalence of silent myocardial damage among HIV positive and negative individuals and compared it using the standard test. We did a bivariate and multivariate conditional regression to determine factors associated with SMD

Results: We analysed data from 148 HIV positives matched with 148 HIV negatives .Most had normal body mass index, hs-CRP was higher among the HIV positive 2.64(±3.74) versus 1.34(± 1.98). Q waves were commonest ECG finding at 80(54.05%) and 82(55.41%) in the positives and negatives respectively. The prevalence of silent myocardial damage was 62(41.89%) and 44(29.73%), in the HIV positive and negative respectively with significant statistical difference (*p-value=0.029*). Of the HIV participants with SMD, 30(20%) had injury (CIIS, 15 to 19) and 32(22%) had infarction (CIIS≥ 20) had infarction whereas of the HIV negative controls 19(13%) had injury and 25(17%) had infarction. There were no identifiable factors independently associated with SMD.

Conclusion: The prevalence of silent myocardial damage was higher among the HIV positives but was as well high in the HIV negatives. There were no identifiable associated factors for silent myocardial damage among the HIV positive.

Keywords: Prevalence, factors associated, Silent Myocardial Damage, HIV, and Cardiac Injury Infarction Score (CIIS).

3.1.7.5 Prevalence and factors associated with Echocardiographic Left Ventricular Hypertrophy in Hypertensive Patients at a Primary Health Care Facility in South Western Uganda

Elijah Rutahaba, Anthony Muyingo, Peter Kangwagye, Bruce Twinamasiko

Background: The rising burden of hypertension sets precedence for development of left ventricular hypertrophy (LVH) in part due to undiagnosed, untreated or inadequately treated

hypertension. Pathological LVH is known to independently predict cardiovascular adverse events. Rural South Western Uganda has a high prevalence of hypertension however, echocardiographic LVH in this population is not studied.

Methods: Using systematic sampling, one hundred and thirty six (136) individuals with hypertension were recruited in a cross-sectional and descriptive study conducted in the hypertensive clinic of Kinoni Health Centre IV. A pretested structured questionnaire was used to extract baseline socio-demographic and clinical characteristics from the participants and their clinical records. Left ventricularmass index, geometry and diastolic function were then measured by transthoracic m-mode and tissue doppler echocardiography.

Results: The median age of the participants was 61(IQR: 52-70) years with majority, 86.8%(118) being female. Having a calcium channel blocker or a diuretic among the medications used to treat hypertension was found in 84.6% (115) and 77.9%(106) of the prescriptions respectively. We found uncontrolled hypertension in 64%(87) of the participants. The prevalence of echocardiographic LVH indexed to height$^{2.7}$ and body surface area was 15.4% and 14.7% respectively with eccentric hypertrophy 10.3%(14) as the dominant geometric abnormality. Overall diastolic dysfunction was observed in 57.3%(78) of the participants. Echocardiographic characteristics demonstrated transmitral passive velocity (e), mitral annular lateral passive tissue doppler (e') and average e/e' by t-test independently identifying concentric remodelling, concentric hypertrophy and eccentric hypertrophy respectively with a significant p-value of <0.050. Age of ≥70 years was associated with increased odds of having LVH with a p-value of 0.020.

Conclusion: A high prevalence of echocardiographic LVH was found in patients with hypertension in rural South Western Uganda with the majority having diastolic dysfunction. Abnormal left ventricular geometry was found in a quarter of the patients and tissue doppler assessment demonstrated associations in the different geometric patterns. Age above 70 years was strongly associated with increased odds of having LVH. We recommend a longitudinal study to demonstrate prognostic value of LVH.

3.1.8 MASTER OF MEDICINE IN OBSTETRICS/GYNAECOLOGY

3.1.8.1 Abnormal Vaginal Discharge Among Women Attending The Gynaecology Clinic At Mbarara Regional Referral Hospital: Bacterial Isolates And Their Antibiotic Susceptibility

Ahabwe Onesmus Magezi, Lenard Abesiga, Julius Mugisha, Taseera Kabanda

Background: Abnormal vaginal discharge refers to an unexpected increase in the amount of vaginal secretions, associated with a change in colour, unpleasant odor, vulval or vaginal itching, dysuria, dyspareunia, genital swelling, and lower abdominal/back pain.

It is a common presenting complaint among women of reproductive age, affecting about a third of all women. Its etiology is from both infectious (bacterial/fungal) and non-infectious agents with some of the infectious causes being sexually transmitted, and varies widely in different settings and keeps changing from time to time. The vaginal microbiome is an active habitat with a predominance of Lactobacilli that limits the proliferation of other microorganisms. In vaginal dysbiosis, Lactobacilli counts are reduced with overgrowth of pathogenic microorganisms, which may present as abnormal vaginal discharge. Treatment is usually syndromic especially in resource-limited settings resulting in over-treatment with more side effects of the drugs, ineffective treatment with a potential of developing antibiotic

resistance, high recurrence rates, preterm births, pelvic inflammatory disease, infertility, and increased HIV acquisition. This study was undertaken to determine the bacterial isolates from abnormal vaginal discharge, their antibiotic susceptibility among women of reproductive age, attending the Gynaecology clinic at Mbarara Regional Referral Hospital.
Methods: We enrolled 361 nonpregnant women aged 15-49 years, with abnormal vaginal discharge. Sterile cervical and vaginal swabs were taken and subjected to; wet preparation, gram stain, and/or culture and sensitivity (for those in which bacteria were isolated) tests, as per standard laboratory procedures for identification of microorganisms. Susceptibility testing was performed using the disc diffusion method, on the commonly prescribed antibiotics that included Amoxicillin, Amoxicillin/clavulanate, Ceftriaxone, Cefixime, Ciprofloxacin, Doxycycline, and Azithromycin. Data was entered into REDCap and analyzed using Stata version 15. The bacterial isolates and antibiotic susceptibility patterns were summarized as frequencies and percentages.
Results: Bacteria were isolated in 107 of the women and the isolates were; *Staphylococcus aureus* 52 (48.6%), *Klebsiella pneumoniae* 32 (29.9%), *Enterococcus fecalis* 16(15%),

Escherichia coli 4 (3.7%), and *Streptococcus agalactieae* 3 (2.8%). The majority (89.7%) of the bacterial isolates were resistant to one or more of; cefixime, ciprofloxacin, and doxycycline. Of the commonly used antibiotics, Ciprofloxacin had the highest sensitivity across all the bacterial isolates
Conclusion: The bacterial isolates were *Staphylococcus aureus, Klebsiella pneumoniae, Enterococcus fecalis, Escherichia coli,* and *Streptococcus agalactieae.* The bacterial isolates were sensitive to cefuroxime andciprofloxacin.

Recommendations: We recommend the use of culture and sensitivity results in the treatment of patients with abnormal vaginal discharge since the majority of bacterial isolates were resistant to commonly prescribed antibiotics. If culture and sensitivity are not available, then consider using cefuroxime or ciprofloxacin in syndromic treatment.

There is a need for use of molecular techniques as they get more available for isolation of pathogens in women with abnormal vaginal discharge since these are more sensitive methods.

Limitation: We used culture to identify the bacterial isolates in abnormal vaginal discharge. We could have underreported the bacterial isolates since some microorganisms are not cultivable in our laboratory.

3.1.8.2 Cervical Amniotic Fluid Bacterial Colonization: Associated Factors and Antibiotic Susceptibility among Women with Premature Rupture of Membranes at Mbarara Regional Referral Hospital

Ainomugisha Brenda, Joseph Ngonzi, Joy Muhumuza, Joel Bazira

Background: Premature rupture of membranes (PROM) complicates 10% of pregnancies globally andcervical amniotic fluidbacterial colonizationis crucial in causation of PROM. Bacterial isolates and their antibiotic susceptibility patternsare dynamic and are associated with increasing resistance to clinical guidelines-recommended antibiotics. Molecular techniques have the potential to identify bacteria in culture negative samplesand certain women are at an increased risk for cervical amniotic bacterial colonization.

Objective: To determine the prevalence and factors associated with cervical amniotic fluid bacterial colonization, bacterial isolates and antibiotic susceptibility patterns among women with PROM at Mbarara Regional Referral Hospital.

Methods: From January to June 2021, we consecutivelyenrolled 144 women with PROM in a cross-sectional study.An interviewer administered questionnaire was administered, sterile endocervical swabs taken for culture and antibiotic susceptibility test and polymerase chain reaction (PCR) was done for culture negative samples.We performed regression analysis to determine associated factors.
Results: Prevalence of cervical amniotic bacterial colonisation was 51/144 (35.4%), 95% C.I: (28.0-43.7).Six different bacteria were isolated; *Klebsiella pneumoniae* 15(34.1%), *Staphylococcus aureus* 11(25.0%), *Enterobacter agglomerans* 10(22.7%), *Escherichia coli*3(6.8%), *Streptococcus spp* (6.8%) and *Enterococcus faecalis* (4.6%). Eighty-eight per cent (88.6%) of the isolates were sensitive to Ciprofloxacin and 75% to Cefuroxime. All isolated bacteria were resistant to Ampicillin. The factors independently associated with cervical amniotic fluid bacterial colonisation were primigravidity (aOR: 2.69, 95% C.I: (1.07-6.71), *p*=0.035), obesity (aOR: 3.15, 95% C.I: (1.10-9.11), *p*=0.024) and being referred-in (aOR: 2.37, 95% C.I: (1.04-5.3), *p*=0.038).

Conclusion: Prevalence of cervical amniotic fluid bacterial colonization is high and *Klebsiella pneumonia* was the commonest bacterial isolate. Resistance to Ampicillin was universal but most isolates were sensitive to Cefuroxime and Ciprofloxacin. Cervical amniotic fluid bacterial colonisation was more likely in primigravidae, obese women and those who were referred-in.There is need to review our prophylactic antibiotic therapy in PROM and Cefuroxime can potentially be used. We recommend a longitudinal study on women with cervical amniotic fluid bacterial colonisation to determine maternal and perinatal outcomes.

3.1.8.3 Diagnostic accuracy of ultrasonography and adverse neonatal outcomes among women with a diagnosis of nuchal cord delivering at Mbarara Regional Referral Hospital

Asiimwe Fiona, Rogers Kajabwangu, Kato Paul Kalyebara, Julius Mugisha

Background: Ultrasound detection of a nuchal cord creates anxiety among pregnant women and healthcare professionals due to fear of occurrence of adverse neonatal outcomes following labour. There are however differing reports concerning the effect of nuchal cord on neonatal outcomes at delivery.

Objectives: We determined the diagnostic accuracy of ultrasound in diagnosing nuchal cord and compared the difference in the proportion of adverse neonatal outcomes between women with and without a diagnosis of nuchal cord delivering at Mbarara Regional Referral Hospital (MRRH)

Methods: This was a prospective cohort study carried out from February 2021 to April 2021 at MRRH on 246 women in early labour with singleton cephalic pregnancies at term (82 with a diagnosis of nuchal cord and 164 without the diagnosis on ultrasound assessment using both 2D and color Doppler imaging).We followed up the women until delivery to obtain baseline data, intrapartum data, visual nuchal cord characteristics and neonatal outcomes. The diagnostic accuracy of ultrasound was assessed using the area under the receiver operating

characteristic curve. The difference in the proportion of the adverse neonatal outcomes between the two groups of women was compared using the chi-square statistic.

Results: At delivery, 88 women had neonates with nuchal cord while 158 women had neonates without the nuchal cord**.** The mean age of the women was 25.5 (±5.9) years.The diagnostic accuracy of ultrasonography in detecting nuchal cord was 91.3%, with a sensitivity, specificity, positive predictive value and negative predictive value of 86.4%, 96.2%, 92.7% and 92.7% respectively. The proportion of adverse neonatal outcomes in the nuchal cord group was 20.5% compared to 5.1% in the no nuchal cord group (p=0.0002). Neonatal resuscitation and admission to NICU was significantly higher in the nuchal cord group than in the no nuchal cord group (p=<0.001 and p= 0.001 respectively).

Conclusion: The diagnostic accuracy of ultrasound in diagnosing nuchal cord is high. A higher proportion of adverse neonatal outcomes occur in women with a diagnosis of nuchal cord. Need for neonatal resuscitation and admission to NICU occur more commonly among women with a diagnosis of nuchal cord in comparison to those without the diagnosis. Routine ultrasound assessment of nuchal cord for women in early labour is recommended such that preparation for adverse neonatal outcomes is done when a nuchal cord is present.

3.1.8.4 Prevalence and factors associated with Short Interdelivery Interval among Women with Antecedent Cesarean Delivery at Mbarara Regional Referral Hospital

Byamukama Onesmus, Hamson Kanyesigye, Wasswa George.M, Joy Muhumuza

Background: World Health Organization recommends a birth-to-pregnancy interval of at least 24 months and a minimum interdelivery interval (IDI) of 33 months. Short IDI are associated with severe adverse maternal and perinatal outcomes which increase by 2-to 3-fold in women with a previous cesarean delivery. Despite having child spacing programs, we still admit mothers for delivery with short IDIs. However, the number and those likely to present with a short IDI after a cesarean delivery are not known.
Objectives: The main objective of the study was to determine the prevalence and factors associated with a short IDI after an antecedent cesarean delivery among women delivering at MRRH.
Methods: A cross-sectional study was conducted on post-natal ward of MRRH from November 2020 to February 2021. A total of 440 women who had antecedent cesarean delivery were consecutively enrolled. Participant's socio-demographic and obstetric characteristics were recorded. The prevalence of short IDI was calculated as the proportion of women with an IDI of less than 33 months. Logistic regression was done to evaluate the factors independently associated with short IDI.
Results: The prevalence of short IDI was 33.4% (95% C.I;29.1-38.0). Non-use of postpartum family planning (PPFP) (aOR=5.82, 95% CI;3.39-10.0; p<0.001), delivery of a still birth (aOR=7.43, 95% CI:1.89-29.2; p=0.004), unplanned pregnancy (aOR=7.98, 95% CI;4.69-13.57; p<0.001) and maternal age < 25 years (aOR=3.11, 95% CI; 1.41-4.52; p<0.002) were independently associated with short IDI.
Conclusion: The prevalence of short IDI among women with an antecedent cesarean delivery at MRRH is high. Delivering a still birth at antecedent pregnancy, non-use of a PPFP, maternal age less 25 years and having an unplanned pregnancy were independently associated with a short IDI.

Recommendations: We recommend that family planning services be strengthened to all women who deliver by caesarean section especially those aged less than 25 years and those who delivery still births**.** We also recommend a qualitative study to have an in-depth analysis as to why mothers come with short interdelivery intervals.

3.1.8.5 Prevalence and factors associated with Inappropriate Blood Transfusion among Women Transfused on Postnatal Ward at Mbarara Regional Referral Hospital

Cherop Moses, Godfrey Mugyenyi R

Background: Although blood transfusion is a lifesaving intervention, there are a number of patients who are inappropriately transfused. Unnecessary transfusion causes shortage of blood, increases the economic burden, exposes patients to preventable transfusions reactions and infection, prolongs hospital for those in need of blood and denies those in real need.However, there is a paucity of information on prevalence, indications for blood transfusion and factors associated with inappropriate blood transfusion among the obstetric population in our resource-limited settings.

Objectives: The aim of this study was to determine the prevalence and factors associated with inappropriate blood transfusion in obstetric patients.

Methods: A cross-sectional study of transfused obstetric patients admitted from January to April 2021 on postnatal ward at Mbarara Regional Referral Hospital was conducted. Relevant clinical and laboratory data were recorded. Inappropriate blood transfusion was assessed using the Uganda National Clinical Guidelines and modified American College of Surgeons Trauma Manual for Haemorrhage as adopted by the American College of Obstetricians and Gynaecologists. Continuous and categorical variables were expressed as means ± standard deviations and percentages respectively. Age differences were compared using student t-test for continuous variables and chi-square test for categorical variables. Bivariate and Multivariable logistic regression analysis was used to identify factors independently associated with inappropriate blood transfusion. p value < 0.05 was considered statistically significant.

Results: One hundred twenty-nine (129) transfused postpartum women were consecutively enrolled. The overall prevalence of inappropriate blood transfusion was 50.4% (65/129). The indications for blood transfusion were postpartum hemorrhage (PPH) 65.8%, antepartum hemorrhage (APH) 23.1%, and peripartumanaemia16.3%. Women aged >34 (aOR2.8, 95%: CI: 1.26-6.19), not referred in (aOR, 3.33, 95% CI: 1.40-7.94) and actively bleeding (aOR: 5.48, 95% CI: 1.81-16.60) were more likely to be inappropriately transfused.

Conclusions: The prevalence of inappropriate blood transfusion among postpartum women admitted on postnatal ward at MRRH was high. The indications for blood transfusion were postpartum haemorrhage, antepartum haemorrhage and peripartumanaemia. A woman was more likely to be inappropriately transfused if >34 years, not referred in or actively bleeding. Periodic audits/reviews of blood transfusion practice with feedback and refresher training will promote rational use of blood products.

3.1.8.6 Prevalence and factors associated with gestational diabetes mellitus among women attending antenatal care clinicsat Mbarara Regional Referral Hospital, South-Western Uganda.

Kahimakazi Irene, Henry Mark Lugobe, Lenard Abesiga, Yarine Fajardo

Background: Gestational diabetes mellitus (GDM) is carbohydrate intolerance with first recognition during present pregnancy. GDM is one of the major causes of morbidity and mortality among pregnant women worldwide. There is variation in the prevalence and factors associated with GDM across different settings.
Objectives: To determine the prevalence and factors associated with gestational diabetes mellitus among women attending antenatal care clinics at Mbarara Regional Referral Hospital, south western Uganda.
Methods: This was a hospital-based cross-sectional study conducted among women at ≥ 24 weeks of amenorrhea attending the antenatal care clinics at Mbarara Regional Referral Hospital between December 2020 and March 2021. We screened all women for GDM using the World Health Organisation 2013 diagnostic Criteria. Interviewer-administered questionnaires were used to obtain socio-demographic, medical and obstetric data. Multivariable logistic regression was used to determine the factors independently associated with GDM.
Results: We enrolled 343 pregnant women with a mean age of 27.3 (SD ±12.3) years. Of the 343 participants, 35 (10.2%) had GDM (95% C.I: 7.4-13.9) and 7 (2%) had Diabetes in pregnancy. The factors significantly associated with GDM were; previous history of foetal macrosomia in any of the previous pregnancies [adjusted odds ratio (aOR): 6.90, 95% C.I: 1.79-26.51] and family history of DM in the first-degree relatives [aOR: 3.06, 95% C.I:1.14-8.22].
Conclusions: One in every ten pregnant women attending antenatal care at Mbarara Regional Referral Hospital is likely to have Gestational Diabetes Mellitus in pregnancy. There is need to strengthen routine testing for GDM, especially pregnant women with a prior history of foetal macrosomia and a family history of DM in the first-degree relatives.

3.1.8.7 Prevalence and factors associated with Primary Postpartum Haemorrhage among Women with Pre-Eclampsia/ Eclampsia Delivering at Mbarara Regional Referral Hospital

Martínez García Kenia Raquel, Yarinefajardo Tornes, Wasswa G.M, Henry Mark Lugobe

Background: Primary postpartum hemorrhage (PPH) is a leading cause of maternal morbidity and mortality in both developed and developing nations. Women with pre-eclampsia/ eclampsia are at higher risk ofdeveloping postpartum hemorrhage compared to normotensive women. The coexistence of pre-eclampsia/ eclampsia and PPH increases the risk of maternal death even further. Despite timely diagnosis and management of pre-eclampsia/ eclampsia, PPH among these mothers continues to be a challenge at Mbarara Regional Referral Hospital (MRRH). The prevalence of PPH among women with Pre-eclampsia/eclampsia and which of these mothers are likely to get PPH is unknown.

Objectives: This study aimed at determining the prevalence and factors associated with primary postpartum haemorrhage among women with pre-eclampsia/ eclampsia delivering at Mbarara Regional Referral Hospital.

Methods: A hospital-based cross- sectional study was conducted from December 2020 to April 2021, in the postnatal ward at MRRH. A total of 116 eligible women were consecutively enrolled in the study. Using a structured interviewer-administered questionnaire and chart review, data on socio-demographics, medical and obstetric characteristics were collected. Data was entered into REDCap and analysed using STATA version 15. The prevalence of primary PPH was calculated as a proportion of women who had PPH. Logistic regression was used to determine the factors independently associated with primary PPH.
Results: The prevalence of primary PPH among women with pre-eclampsia/ eclampsia was 47.4% (95% CI: 38.4-56.6). Abruptio placentae was the sole factor found to be associated with primary PPHamong women with pre-eclampsia/eclampsia [AOR= 8.25, 95% CI (1.51-44.97)] and p-value of 0.015.

Conclusions: The prevalence of primary PPH among women with pre-eclampsia/eclampsia is high. Women with abruptio placentae are 8 times more likely to develop primary PPH compared to those without abruptio placentae.We recommend prophylaxis against PPH among women with pre-eclampsia/eclampsia by adding uterotonic drugs to the routine AMTSL especially to women with abruptio placentae.

3.1.7.8 Predictors of Adverse Maternal and Neonatal Outcomes among Mothers admitted with Antepartum Hemorrhage at Mbarara Regional Referral Hospital

Musyoka Martha, Rogers Kajabwangu, George Wasswa, Godfrey Mugyenyi

Background: Obstetric hemorrhage accounts for 27% of maternal deaths globally. Almost a quarter (24.5%) of the maternal deaths in Sub–Saharan Africa are attributed to antepartum hemorrhage (APH)and it's associated with other adverse maternal and neonatal outcomes such as blood transfusion, admission to intensive care unit (ICU) and birth asphyxia. Some factors for example type of APH, pre-eclampsia, maternal age have been shown to predict adverse outcomes among mothers with either placenta previa or placenta abruption but there is limited information on predictors of these adverse outcomes among mothers with APH irrespective of the cause.

Objectives: To determine the proportion of six predetermined adverse maternal and five predetermined adverse neonatal outcomes, predictors of adverse maternal and neonatal outcomes among mothers admitted with APH at Mbarara Regional Referral Hospital.

Methodology: Prospective cohort study from January-March 2021. We consented, enrolled and interviewed 107 mothers admitted with APH with an imminent delivery and followed the mother-baby pair for 72 hours. We did log binomial analysis to determine the predictors.

Results: Seventy percent (70.1%) of mothers had at least one adverse maternal outcome and 67.3% had atleast one adverse neonatal outcome. Proportions of adverse maternal outcomes were; blood transfusion (45.8%), cesarian delivery (45.8%), post-partum hemorrhage (44.9%), obstetric hysterectomy (5.6%), ICU admission (3.7%)and one maternal death (0.9%). Proportions of adverse neonatal outcomes were birth asphyxia (42.1%), prematurity (40.2%), neonatal ICU admissions (37.4%), perinatal death (36.5%) and low birth weight (29.9%). Placenta abruption was a predictor of adverse maternal outcomes (aRR 1.57: 1.13-2.19, $p<0.007$) and adverse neonatal outcomes (aRR2.27: 1.16-4.44, $p<0.017$). Less than four ANC contacts also predicted adverse fetal outcomes (aRR 1.35: 1.02-1.78, $p<0.037$).

Conclusion: Adverse outcomes among mothers with APH are high and abruption placenta is a predictor for both maternal and neonatal adverse outcomes.

3.1.8.9 Proportion and factors associated with Intra-Procedural Pain among women undergoing Manual Vacuum Aspiration for Incomplete Abortion at Mbarara Regional Referral Hospital

Opee Jimmyy, Joseph Ngonzi, Stephen Bawakanya Mayanja

Background: Intra-procedural pain (IPP) is common among women undergoing Manual Vacuum Aspiration (MVA) for incomplete abortion. Globally, the proportion varies between 60% to 90% while in Sub-Saharan Africa including Uganda, the proportion varies from 80% to 98%. IPP management during MVA include Para-cervical block (using 1% lidocaine) or an opioid (using 100mg of intravenous pethidine).

Objective: This study determined the proportion and factors associated with IPP among women undergoing Manual Vacuum Aspiration (MVA) for incomplete abortion at Mbarara Regional Referral Hospital (MRRH).

Methods: We conducted a cross-sectional study among 207 women who underwent MVA for incomplete abortion from 17th December 2020 to 28th May 2021.An interviewer-administered structured questionnaire was used to capture socio-demographic, gynaecological and medical characteristics of the study participants. Pain assessment was done using VAS considering an IPP as a pain score of 6 or more. The participant characteristics were summarized. The proportion of women with IPP was calculated. We performed multivariable logistic regression to determine the factors associated with IPP.

Results: We consecutively enrolled 207 women with amean age of25.8 ±5.8 years. The proportion of women with IPP undergoing MVA at MRRH was 82.6% (95% C.I: 76.8-87.2).The factors significantly associated with IPP were age and cervical dilatation. The odds of IPP increased with decreasing age of the women; compared to older women (aged >30 years),teenagers (age<20 years);aOR: 8.0 (95% C.I: 1.85-34.61)(p-value=0.005), while women aged 20-24 years;aOR: 3.45 (95% C.I: 1.47-8.20)(p-value=0.004), and those aged 25-30 years;aOR: 2.84 (95% C.I: 1.20-6.74)(p-value=0.018).Women with cervical dilatation of 1-2 cm had the odds of IPP increased;aOR: 2.27 (95% C.I: 1.11-4.62)(p-value=0.024), compared to those who had a cervical dilation of 3-4 cm.

Conclusion: Majority of women undergoing MVA at MRRH experienced IPP. Younger women and those with cervical dilatation 1-2cm are more likely to experience IPP. We recommend improvement of pain control among women undergoing MVA.

Keywords: Intra-procedural pain, Manual vacuum aspiration, Incomplete abortion.

3.1.8.10 Proportion and factors associated with Episiotomy among Mothers Delivering at Mbarara Regional Referral Hospital

Sina Sosthenes, Musa Kayondo, Joy Muhumuza Kato Paul Kalyebara

Background: Episiotomy is a surgical incision made in the posterior vaginal wall and perineum during the late second stage of labour to widen the introitus. Although episiotomies are done to minimize trauma during vaginal delivery to the mother and fetus, episiotomies are associated with complications such as severe lacerations, postpartum hemorrhage, sexual dysfunction, urinary and fecal incontinence. The World Health Organization recommends restrictive episiotomy but despite this, the rate of episiotomy is still high in developing countries, including Uganda. The proportion of women and which women are likely to get an episiotomy are not documented in our setting.
Objectives: The main objective of this study was to determine the proportion and factors associated with episiotomy among mothers delivering at Mbarara Regional Referral Hospital (MRRH).
Methods: A cross-sectional study was conducted on post-natal ward of MRRH during February and March 2021. A total of 336 women who had a vaginal delivery were consecutively enrolled and information obtained by administering a structured questionnaire and checking the patients' clinical charts. The proportion of mothers who had an episiotomy was calculated as the number of women with an episiotomy divided by the total number of participants. Multivariable logistic regression was done to evaluate the factors independently associated with episiotomy.
Results: The proportion of women who had an episiotomy was 61.0% (95% C.I:55.7-66.1). The mean age of participants was 25.5 (±5.4). Primiparity (aOR: 18.4, 95% C.I: 8.36-40.51, p <0.001), prior episiotomy or perineal tear (aOR: 10.22, 95% C.I:4.10-25.52, p<0.001), and a birth weight ≥4 kg (aOR: 6.22, 95% C.I: 1.86-20.84, p=0.003) were independently associated with episiotomy.
Conclusion*:* The proportion of episiotomy in this study was six times higher than the recommended practice by WHO. Primigravidity, having a history of prior episiotomy or perineal tear, term gestation and delivering a macrosomic baby were independently associated with episiotomy.
Recommendations: We recommend further study to explore the indications and the complications of episiotomy and assessment of the need for episiotomy in primigravidae, mothers with history of previous episiotomy or perineal tear and fetal weight ≥4kilograms

3.1.9 MASTER OF MEDICINE IN OPHTHALMOLOGY

3.1.9.1 Phenotypes of corneal scars secondary to microbial keratitis in patients treated at Mbarara University& Referral Hospital Eye Hospital and, Ruharo Eye Centre

Ali Mohamed Hassan Soliman, Simon Arunga, Amos Twinamasiko

Introduction: Corneal scarring secondary to Microbial Keratitis (MK) accounts for an estimated 3.2% (1.3 million people) of binocular blindness globally and ~10% in Sub-Saharan Africa (SSA). In South Western Uganda, in the cohort study that treated patients with microbial keratitis, 71% of the patients developed corneal scars after 3 months. The patients present with scars of different phenotypes and severity.

Objective: To describe corneal scar phenotypes secondary to microbial keratitis, their associated factors with its severity, and subsequent ocular complications.

Methodology: This study was nested in the main cohort that prospectively enrolled patients presenting with features of microbial keratitis at the two largest tertiary eye hospitals in Southern Uganda between December 2016 and March 2018. This study collected information on clinical history and presentation, microbiology and 3-month outcomes. We conducted a 3 year follow up on these patients and collected information on vision, anterior segment OCT scar profile (site, size, depth and grade). Scars were graded based on their site, density, and size as mild, moderate and severe. In a multivariable regression model, we tested the baseline features that were associated with severe corneal scarring.

Results: A total of56 individuals were enrolled. Scar size was variable (Median size was 7.6 mm (IQR 2-12.5 mm). Median scar thickness 183 µm (IQR 125-296 µm). Twenty-two (41.5%) had mild scarring, 9 (17%) had moderate scarring and 22 (41.5%) had severe scarring. Baseline factors which were strongly associated with severe corneal scarring were; Hypopyon (aOR 13.0 [95% CI 1.10- 152.4], p=0.042); An endothelial plaque (aOR 21.75 [95% CI 2.07- 228.77], p=0.010), Satellite lesions (aOR 5.3 [95% CI 0.97- 28.58], p=0.054). The complications associated with the corneal scars are 28.57% corneal neovascularization and 9% Synechia.

Conclusion: The study showed that more than half of the patients develop moderate to severe corneal scarssecondary to MK. The study also showed that patients with stromal abscesses or masses, hypopyon, endothelial plaque and satellite lesions were at more risk of developing severe corneal scars secondary to MK. Lastly, the study also showed that the most common complications accompanied by corneal scars secondary to MK were corneal neovascularization and synechia. We, therefore, recommend proper prognostic counselling and a more aggressive treatment approach to patients presenting with the above features.

Keywords: Corneal scars (CS), Microbial Keratitis (MK)

3.1.9.2 Prevalence and factors associated with Retinopathy among Women with Hypertensive Disorders of Pregnancy attending Hospitals in Mbarara Municipality, Southwestern Uganda

Ibrahimu Zamaladi, Sam Ruvuma, Lugobe Mark

Background: Retinopathy in hypertensive disorders of pregnancy is a condition that may worsen or alter during pregnancy as aresult of hematologic, hormonal and metabolic changes.High blood pressure causes visual disturbance and retinopathy in hypertensive disorders of pregnancy seem to a frequent phenomenon. The global prevalence of hypertensive disorders of pregnancy ranges between 5-10%, and fundus changes are seen in 40-100% of these patients.Hypertensive disorders of pregnancy are a burden for the community because of its complications including retinopathy which can lead to permanent loss of vision.It is relevant to know the burden of retinopathy among women,the modifiable associated factors thereby improving the patient's outcome to prevent blindness.

Objective: To determine the prevalence and factors associated with retinopathy among women with hypertensive disorders of pregnancy attending three selected hospitals in Mbarara municipality.

Methods: This was a cross-sectional study to determine the prevalence and factors associated with retinopathy among women with hypertensive disorders of pregnancy attending three selected hospital in Mbarara municipality, includingmbarara regional referral hospital, Mayanja memorial hospital and Divine mercy hospital.

Results: A total of 216 women with a diagnosis of hypertensive disorders of pregnancy participated in the study. The prevalence of retinopathy was 60.1%.Grade 1 retinopathy characterized by a narrowing of arterioles accounted for 86.9%, Grade3 (retinal hemorrhages) (10%) and Grade 4(papilledema) (3%). Factors associated of the occurrence of retinopathy were gravidity pre-eclampsia,eclampsia,severe systolic and diastolic hypertension and diabetes mellitus. Majority of patients had better uncorrected visual acuity of 6/6-6/18. Only 0.5% of patients presented with severe visual impairment.

Conclusion: The prevalence of retinopathy in hypertensive disorders of pregnancy is high among women attending hospitals in Mbarara municipality.

3.1.9.3 Prevalence and factors associated with Refractive Errors among Medical Undergraduate students at Mbarara University Of Science and Technology, Uganda

Denis Kamara, John Onyango, Simon Arunga

Introduction: WHO estimated that uncorrected refractive errors are the leading cause of visual impairment and second leading cause of blindness among people of all ages. University students are prone to develop refractive errors due to their curriculum that requires a lot of near work affecting their performance and quality of life unknowingly. Genetic and environmental factors are thought to play a role in the development of refractive errors. The study fills the existing knowledge gap about refractive errors among university students in East Africa and the information provided can be used for further screening.

Objectives: To determine the prevalence and factors associated with refractive errors among students in the Faculty of Medicine at Mbarara University of Science and Technology. Ethical clearance was thought from the University and STATA 14 used in analysis.

Methodology: This was a cross-sectional descriptive and analytical study in which 368 undergraduate students were assed for refractive errors.

Results: Out of 458 students invited, 368 participated (response rate of 80.3%). The mean age was 22.7 ± 3.7 years (range, 18-45 years). Male students were the majority 240(65%). The prevalence of refractive errors in the study population was 26.36%. Myopia at 60% was the commonest followed by 37% Astigmatism then 3% Hypermetropia. Only 28% of the students with refractive errors were using glasses. Students with a positive family history of using glasses were significantly associated with having refractive errors p Value < 0.05.

Conclusion: With a 26.36% prevalence of refractive errors in the study, Myopia most predominant at 60%, followed by 37% Astigmatism then hyperopia of 3% among medical students. Positive Family history was significantly associated with refractive errors among students.

Recommendations: Early and regular screening of all persons at risk of refractive errors leads to early detection and correction hence improving quality of life.

3.1.9.4 Prevalence of Operable Cataract and factors associated with Uptake of Cataract Surgery among Adult Patients attending Ruharo Eye Centre and Mbarara University and Referral Hospital Eye Centre: a Hospital-Based Study

Kanji Raheel, Twinamasiko Amos, Onyango John

Background: Cataract prevents clear vision and is due to clouding of the lens of the eye, it is an ageing process. Despite the gradual rise of cataract surgical uptake and cataract surgical coverage in recent years with regard to advances in technology, there is a backlog of patients with operable cataract. This study will help to plan for better uptake of cataract services in the south-western region of Uganda.

Objective: To determine the prevalence of operable cataract proportion and factors associated with the uptake of cataract surgery among patients with operable cataract attending MURHEC and REC.

Methods: In a hospital-based cross-sectional study, patients presenting with operable cataract at two large tertiary level eye hospitals in south-western Uganda were prospectively consecutively enrolled from October 2020 to January 2021. Operable cataract was defined, as a best-corrected visual acuity equal to or less than 6/60 where the principal cause is cataract. The outcome of interest was undergoing cataract surgery within 3 months of diagnosis. In a multivariable logistic regression model, we tested for social demographic and other baseline features associated with uptake of a cataract operation.

Results: During the study period, a total of 400 patients with operable cataract were enrolled out of a total outpatient attendance of 1692 in the two hospitals (23.6%). The median age was 71 (IQR 65-80, full-range 30-102) and 55.5% were female. Most were married 60.5%, the majority with no formal education 46%. The most common occupation was being a peasant 64%. The majority of the patients were household heads 71.2% and a large proportion required an escort to the hospital 87%. Bilateral operable cataract was present in 36.5%. Within the study period, the uptake of cataract surgery was 64% 95% CI (59- 68). In a multivariable logistic regression model, <50 years (OR 3.0, 95% CI (1.26 – 7.23) P-value = 0.021), female gender (OR 1.5, 95% CI (1.04 – 2.34) P-value=0.032) and bilaterally affected eyes (OR 2.95, 95% CI (1.8 – 4.8) P-value 0.001) were associated with uptake of cataract surgery.

Conclusion: This study showed that younger aged patients, female gender and bilaterally affected eyes were more likely to uptake cataract surgery. This provides useful background information for planning improvements in the uptake of cataract services.

3.1.9.5 Incidence and factors associated with Cystoid Macular Edema Post Cataract Surgery at Mbarara University and Referral Hospital Eye Centre

Tumu Mbarak Zaunga, John Onyango, Simon Arunga

Background: Cystoid macular edema (CME) is a common outcome of uncomplicated cataract surgery and is one of the feared causes of visual impairment after cataract surgery. The burden of CME and its associated risks are poorly documented on the African continent.

Objective: To determine the prevalence of CME, its associated factors and establish the average macular thickness post cataract surgery at Mbarara University and Referral Hospital Eye Center in Western Uganda.

Methodology: This was a prospective observational cohort study of 108 patients undergoing cataract surgery at the eye clinic. These patients were sent for OCT imaging to rule out or confirm cystoid macular edema before and after cataract surgery. Ethical Clarence was obtained from Mbarara University of science and Technology (Ref MUREC 1/7; 10/02/21). We analysed the data using Stata version 14.0

Results: Of 108 patients, 83 were seen and reviewed for complete six weeks follow-up. The prevalence of CME was 3.6% (n=3). The factors that were significantly associated with CME at six weeks were history of diabetes mellitus ($p<0.01$), history of being on medication at time of surgery ($p=0.02$), presence of ocular pathology (glaucoma) ($p<0.01$). The average macular thickness among patients with CME post cataract surgery was 367.3 μm±51.4 SD.

Conclusion: The CME burden post cataract surgery is relatively low at 3.6% in our setting and the most common risks are diabetes mellitus, ocular pathologies and pre-existing medication. The study also found a considerable increase in macular thickness amongst patients who develop CME after small incision cataract surgery.

Recommendations: For patients who present with poor vision post cataract surgery, they should be screened for early detection and mitigation of cystoid macular edema. Future research should be long term prospective cohort studies to evaluate how macular thickness impact on visual ability.

3.1.9.6 Outcomes of Autologous Blood Conjunctival Graft for Pterygium Surgery at Mbarara University and Referral Hospital Eye Centre and Ruharo Eye Centre

Tusingwire Pliers Denis, John Onyango, Simon Arunga

Introduction: Pterygium management in its advanced stages needs surgery and conjunctival grafting. Traditionally, conjunctival grafts were being sutured. Newer techniques such as attachment of the graft with autologous blood are becoming prevalent and are comparable to other methods of grafting. A few autologous blood coagulum grafts had been performed in MURHEC and the outcomes were not well known.

Objective: The study determined the average duration of surgery using autologous blood conjunctival grafts, stability of the graft and associated discomfort post operatively.

Methods: A case series study with 19 eyes that received sutureless autologous blood coagulum grafts on the bare sclera was conducted. Surgery duration was timed from time of speculum insertion to speculum removal. Patients were assessed on days 1 and 14 for discomfort and graft stability.

Results: Nineteen eyes received autologous blood coagulum grafts following their pterygium excision. The mean age of participants was 37 (20-55) years. The average duration for the surgery was 31 (25-40) minutes. Thirteen (68.4%) eyes had their grafts adherent on all corners on their first post-operative day. By the 14th day post operatively, 94.4% had their

grafts well secured. One (5.3%) eye had graft displaced on 3 sides and it was reattached with sutures. Five participants (27.8%) had minimal graft dehiscence nasally which later closed.

Conclusion: Autologous blood coagulum takes a shorter duration, has stable grafts and with minimal post-operative discomfort. The procedure is equally effective in securing the graft however some patients may have medial dehiscence.

Keywords: Autologous blood conjunctival grafts (ABC), pterygium, graft stability, outcomes.

3.1.10 MASTER OF MEDICINE IN PAEDIATRICS & CHILD HEALTH

3.1.10.1 Factors associated with Virological Non-suppression among HIV-positive Children under 5 years on Antiretroviral Therapy in Mbarara Regional Referral Hospital

Kyewalyanga Mike, Kumbakumba Elias, Keneema Olive

Back ground: Achieving virological suppression is still a major challenge among HIV positive children especially those under 5 years. In this study we set out to determine the proportion of virological non-suppression and its associated factors among HIV positive children under 5 years on ART in Mbarara Regional Referral Hospital (MRRH).

Methods: The study was conducted in the ISS clinic of MRRH from June to August 2021. We used a mixed methods study design. This comprised a retrospective cohort study where we reviewed records of HIV Positive children aged 6 months to 59 months who had completed at least 6 months of ART. We extracted data on socio-demographic, information regarding ART, clinical information and Viral Load test results. We used bivariate analysis with Chi-square testing and multivariate modified Poisson regression to determine factors associated with virological non-suppression. In order to determine qualitative factors influencing virological non-suppression among HIV positive children under 5 years who are on ART, we conducted Key Informant and In-depth Interviews with health-care providers and parents/guardians respectively. We used thematic inductive approach to identify themes, subthemes and analyse qualitative data.

Results: Out of the 52 HIV positive children evaluated, 6 (11.5%) had virological non-suppression. Non-adherence (Fair/poor)to ART **w**as an independent factor associated with virological non-suppression (IRRadj. = 7.9, 95%CI = 1.55-40.16, p-value = 0.017)**.** Themes that emerged from interviews on qualitative factors influencing virological non-suppression were: Non-adherence to ART, Drug regimen, Long turn-around time for viral load results, Missed appointments, Drug administration, Gender based violence, Perceived stigma, Nutritional status, HIV status non-disclosure, Poverty, Work overload, and Weak immunity. Subthemes that emerged from the theme 'Drug administration' were: Pill burden, Lack of adequate treatment support, Lack of knowledge on proper drug administration, Delegation of drug administration to different people and Poor storage ARVs.

Conclusion: In MRRH, over more than 1 in 10 HIV positive Children under 5 years had Virological non-suppression. Virological non-suppression under 5 years is mainly influenced by non-adherence to ART. Non-adherence among these children is a result of interplay between, child, health care provider, parent/guardian and policy related factors. There is need

to design age-appropriate strategies to address factors influencing non-adherence to ART under 5 years**.**

3.1.10.2 Diagnostic delay and its correlates among Pediatric cancer patients at Mbarara Regional Referral Hospital Cancer Unit

Murorunkwere Angeliqu, Nampijja Dorah

Background: Early diagnosis of cancer is a goal in cancer care. It gives an opportunity of timely treatment while the disease is in its earliest stages and provides better treatment outcomes. Diagnostic delay of pediatric cancers results from caregivers delay in seeking care and/or health system delay in suspecting the disease. Age of children, type of cancer and parental level of education affect time to diagnosis of cancer in children. This study aimed at determining the average time between onset of symptoms and diagnosis of cancer, and exploring the correlates responsible for diagnostic delay among children at PCU of MRRH.

Methods: This was a hospital-based analytical cross-sectional study, we included 82 caregivers of children < 18yrs with a confirmed new diagnosis of cancer. Data were obtained consecutively via interviews of the caregivers using structured questionnaires. We abstracted the diagnostic details from the medical records into structured questionnaire. Simple linear regression was performed to establish the correlation between each independent variable with diagnostic delay.

Results: Eighty-two (82) eligible caregiver-child pairs were recruited. The children's mean age was 7.4 years. Median (IQR) overall diagnostic delay was 96 (46-267) days. The health system delay (52.5 days) was longer than caregiver delay (29 days). Age of children was significantly associated with diagnostic delay of cancer (p=0.0029). The commonest caregiver self-reported reason associated with diagnostic delay was that the caregivers did not know about the cancer in children. Type of cancer (p=0.891) and sex of the child (p=0.651) were not associated with diagnostic delay of cancer.

Conclusion: Diagnostic delay of cancer among children is a problem in our setting. Health system delay was longer than caregiver delay. There is need to strengthen trainings for primary health workers in early recognition of children with cancer in order to shorten health system delays.

Keywords: Cancer, Diagnostic, Delay, Pediatric

3.1.10.3 Seizure control among children on Antiepileptic drugs at a Tertiary Institution in Southwestern Uganda: a Retrospective Cohort Study

Namusisi Jane, Kyoyagala Stella, Kalubi Peters

Background: Epilepsy is the commonest neurological disease globally. Up to 70% of the people with epilepsy can attain good seizure control with appropriate treatment and hence better quality of life. However, this is not often achievable in low resource settings.

Aims: This study aimed at determining the seizure control status, describing the seizure types and the factors associated with poor seizure control among children attending the Epilepsy clinic for at least six months at MRRH.

Methods: A retrospective cohort study was done, we obtained secondary data from the medical records about the baseline social demographics and clinical characteristics of the participants at enrolment into the Epilepsy clinic. We then conducted either physical or telephone interview with the care takers about the current status of the participants. Consecutive enrolment of children below 18years of age on anti-epileptic drugs for at least six months was done.

Results: A total of 112 participants were enrolled. Of these, three quarters (75%) had generalized onset seizures, 23% had focal onset seizures and 2% had unknown onset motor seizures. Poor seizure control occurred among 60.4% (95% CI 50.9- 69.9) of the participants. Having a comorbidity p-value 0.048 AOR 3.2 (95% CI 1.0-9.9), history suggestive of birth asphyxia p-value 0.014 AOR 17.8 (95% CI 1.8- 176.8) and being an adolescent P-value 0.006, AOR (95% CI 1.8-26.6) were significantly associated with poor seizure control.

Conclusion: The commonest seizure type in our setting were the generalized onset seizures. The proportion with poor seizure control at six months was high. Children with a comorbidity, history suggestive of birth asphyxia at baseline and adolescents were more likely to have poor seizure control and therefore need to be keenly followed up.

Keywords: epilepsy, anti-epileptic drugs, children, seizure control, seizure types, comorbidity, adolescence.

3.1.10.4 Clinical and Hematological Outcomes of Children with Sickle Cell Anemia Treated with Fixed-dose Hydroxyurea at Mbarara Regional Referral Hospital, South Western Uganda: a Retrospective Observational Cohort Study

Sabiiti Stephen, Nampijja Dorah, Atwiine Barnabas

Background: Sickle Cell Anemia (SCA) is the world's most common inherited hemoglobinopathy associated with high morbidity and mortality in children. Hydroxyurea (HU) has shown to decrease the frequency of vaso-occlusive crisis, acute chest syndrome, hospitalization, blood transfusion and improve complete blood count indices in patients with SCA.

Objective: The study aimed to describe the clinical and hematologic features of children below 18 years with SCA before and after initiation of fixed dose hydroxyurea.

Methods: This was a retrospective study of children with SCA enrolled at the hematology clinic of MRRH from January 2019 to June 2021. A consecutive sampling method was used and data abstraction tool utilized to capture information from medical records. The proportions of children with SCA related clinical events at baseline were calculated. The change in frequencies of SCA clinical events and mean hematological indices at different follow-up time points were computed using Pearson's correlation coefficient and t- test respectively.

Results: One hundred and six children were enrolled into the study. Of these, three died during the study period. Painful crisis (85.9%), hospitalization (82.1%), fever (66.7%) and

blood transfusion (64.1%) were the commonest clinical events reported before starting hydroxyurea. Mean hemoglobin, WBC, neutrophils, platelet and MCV were 7.8±1.3g/dl,15.3±8.24x10³/µl, 7±5.7x10³/µl, 452.6±187x10³/µl and 88.9±11.5 (fl) respectively before HU therapy. The frequency of clinical events gradually reduced after initiating HU with only painful crisis having statistically significant reduction (p=0.010) and correlation coefficient (r= -0.91).Statistically significant reduction was also observed inMean WBCs (p=0.009) and mean neutrophils (p=0.001) after starting HU. Platelet counts reduced (p=0.278) but the reduction was not statistically significant. A non-statistically significant gradual increase in hemoglogin (p=0.233) and MCV (p=0.173) concentrations were observed after starting hydroxyurea.

Conclusion: Fixed dose hydroxyurea improves both clinical and hematological outcomes of children with SCA and can be used as an alternative treatment option in situations, like ours, where dose escalation is difficult.

Key words: sickle cell anemia, sickle cell anemia related clinical events, fixed dose hydroxyurea, children below 18 years, South Western Uganda

3.1.11 MASTER OF MEDICINE IN PATHOLOGY

3.1.11.1 Expression of p53 and p16 (INK4a) in Penile Squamous Cell Carcinoma and their correlation with its Histologic Types at MUST Pathology Laboratory

Eloba Simeon, Marvin Mutakhoowa, Carlos Manuel Carbrera Dreque, Raymond Atwine

Introduction: Uganda has the second highest incidence of penile squamous cell carcinoma in the world. High risk HPVhas been reported to play a major role in its oncogenesis. No studies have been done in this region to establish the histologic subtypes of pSCC, p53 or p16INK4a statuses and their relationships to the histologic subtypes of pSCC.

Objectives: In this study, our main objective was to evaluate the histologic subtypes, the p53 status and p16 INK4a expression for high risk Human papilloma virus (HR HPV) in archived penile squamous cell carcinoma formalin fixed paraffin embedded blocks at MUST Path Lab from 2009 to 2020.

Methods: This study was a laboratory based cross sectional study, 87 tissue specimens previously histologically diagnosed with penile squamous cell carcinoma from 2009 to 2020 were included. The specimens were examined under H&E stain to establish their histologic subtypes and immunohistochemistry using p53 and p16INK4a antibodies was done to establish their p53 and p16INK4a status.

Results: Of the87 specimens, the conventional (keratinizing) subtype made up the majority of the cases 68(78.1%) followed by the basaloid subtype 7(8.0%), papillary subtype 4(4.6%), warty subtype 3(3.4%), adenosquamous subtype 2(2.3%) and then the clear cell, sarcomatoid and verrucous subtypes that each contributed 1(1%) of the cases. The prevalence of p16INK4a and p53 positivity was 57.5% and 41.4% respectively. There was no significant difference in p16INK4a or p53 staining within the individual histologic subtypes of pSCC.

Conclusion: The most common histologic subtypes of penile squamous cell carcinoma present in the MUST pathology Laboratory were the keratinizing and basaloid subtypes. The prevalence of p16INK4a and p53 positive pSCC is high and there was no association between p16INK4a, p53 status and the histologic subtypes of pSCC in the MUST path Lab.

3.1.11.2 The Histologic Grades of Conjunctiva Squamous Neoplasms and their association with p16 and p63 in the Histopathology Archive of Mbarara University of Science and Technology, Uganda

Otak Charles, Tobias Tusabe, John Onyango

Introduction: Conjunctiva squamous neoplasia (CSN) is the commonest neoplasm of the conjunctiva comprising intraepithelial neoplasia (CIN) and conjunctiva squamous cell carcinoma (CSCC). The CIN is the varying degree of epithelial dysplasia graded into low-grade and high-grade CIN meanwhile CSCC is an invasive tumor with or without metastasis. In Uganda, there isa high incidence of CSN coupled with a lack of CSN histologic diagnosis, prognostic tests, and targeted therapy which enhance poor treatment outcomes including tumor metastasis, and recurrence. These complications could be minimized by diagnosis at early histologic grade, and evaluation of prognostic proteins p16 and p63 for targeted therapy.

Objectives: We determined the histologic grades of CSN at the histopathology laboratory of Mbarara University of Science and Technology (MUST), Uganda between January 2018 and December 2019. We also determined the prevalence of p16 and p63 and established their association with the histologic grades of CSN.

Methods and material: This was a laboratory-based cross-sectional study on archived formalin-fixed paraffin-embedded CSN tissue blocks. A total of 72 formalin-fixed paraffin-embedded CSN were processed and examined under H&E for verification of CSN diagnosis and histologic grades, and immunohistochemistry (IHC) tests were used to determine p16 and p63 expression.

Results: Had 40 males and 32 females of the age range 13-73years, and a mean age of 38.7 ± 13.4 SD. The most affected age group was 31-40 years (30.7%) and the least affected age group was the above 60 years (4.2%). The majority of CSN histologic grades were CSCC (45/72) followed by high-grade CIN (19/72), and low-grade CIN (8/72). The prevalence of p16 and p63 in CSN was 43.06% and 95.83% respectively. There was no significant relationship between CSN histologic grades and the expression of p16 and p63 in CSN (p= .674 and p= .076 respectively).

Conclusion: The histologic grades of CSN were dominated by CSCC. The prevalence of p16 and p63 was 43.06% and 95.83% respectively; not associated with the CSN histologic grade.

3.1.12 MASTER OF MEDICINE IN PSYCHIATRY

3.1.12.1 Prevalence and factors associated with older person abuse among older persons presenting to Mbarara Regional Referral Hospital.

Atim Letizia, Maling Samuel, Ashaba Scholastic

Background: The global number of older persons is expanding, especially in low- and middle-income nations, putting many of them at risk of abuse as their functional abilities deteriorate. Abuse of any kind affects one out of every ten older persons. Despite this burden, few studies have been conducted in Africa, notably Uganda.

Objective: To determine the prevalence of and types of older person abuse, the socio-demographic profile of victims and perpetrators among older persons presenting to Mbarara Regional Referral Hospital.

Methods: This was a hospital based cross-sectional study of older persons aged 60 years and above attending a tertiary hospital. Interviews using a designed questionnaire captured information about socio-demographic characteristics, neurocognitive impairment based on Mini-Mental status examination, functional impairment based on Barthel index scale, older person abuse based on Hwalek- Sengstock elder abuse screening test, and other forms of abuse. Logistic regression was used to determine the victim characteristics associated with the forms of abuse.

Results: The prevalence of severe neurocognitive impairment was (28%) and over all, the prevalence of older person abuse was 80.8%. The prevalence of the types of abuse were; emotional (49%), financial (46.8%), physical (25%), sexual (6.8%) and neglect (86%). On bivariate analysis the odds of older person abuse were higher among females, those who were separated and elders with physical impairment. On Multivariate analysis, older person abuse was associated with separation (AOR=8.61, 95%Cl= 1.14 – 65.32, P=0.0370, being widowed (AOR=1.20 95% Cl=0.59–2.45, P=0.003) and physical impairment (AOR=2.43,95%Cl=1.34 – 4.41, P=0.003). The most common perpetrators were sons (33%) and grandsons (12.9%).

Conclusion: There is a high prevalence of abuse among older persons presenting to Mbarara Regional Referral Hospital with neglect being the commonest type, and older persons who are widowed, separated and physically impaired being the most affected. Interventions such as screening in health care facilities and sensitization need to be incorporated in regular clinical care and public health initiatives.

3.1.12.2 Factors associated with length of hospital stay among patients with mental illness at Mbarara and Kampala International University Teaching Hospitals

Kaggwa Mark, Ashaba Scholastic, Novatus Nyemara

Background: Hospital admissions of patients with mental illness have increasing over the past decade. However, patients have varying length of hospital stay (LOS). Various factors including caregiver presence have shown to impact the patient LOS. However, literature has been inclusive about effect of caregiver's presence during hospital stay, with some reporting it to be associated with longer stay and other with shorter stay.

Objective: To determine the factors associated with the length of hospital stay of patients with mental illness admitted in MRRH and KIUTH hospitals and determine the roles and burdens of caregivers and their effect on the duration of hospital stay of patients admitted at MRRH psychiatry ward during the period study.

Methods: A cross-sectional study conducted in two hospitals in southwestern Uganda, one with caregivers (Mbarara Regional Referral Hospital) and the other without caregivers during mental patient's hospital stay (Kampala International University Teaching Hospital). A data collection tools were designed to capture information about patients (i.e., sociodemographic characteristics, clinical factors, and side effects due to mental illness) and their caregivers (i.e., sociodemographic characteristics, roles of caregivers, burdens of caregiving, caregivers' mental symptom, and affiliated stigma). Data was analyzed in STATA. Student t-test used to compare the length of stay in the two hospitals and linear regression used to determine the patient factors associated for length of hospital stay. However, the relationship with caregivers' roles and burden was determined with Pearson correlation coefficients and analysis of variance tests (ANOVA). In addition, multiple hierarchical Poisson regression analysis used to 7 models factor contribution to variation on LOS

Results:

Objective 1: A total of 222 patient participants were enrolled, majority males (62.39%). Mean age of 36.34 (standard deviation (SD) = 13.13). The average LOS was 18.30 (SD = 22.28) with patients without caregivers staying statistically longer than those with caregivers (i.e., 36.39±27.49 vs 9.38±11.42; $p < 0.001$). Factors associated with LOS were having no caregivers that increased the LOS by 13 and spending an extra UGX100,000 during admission increased the LOS by 2 days. While an increase in the number of reviews per day, increased the length of stay by 1.4 days.

Objective 2: A total of 422 caregivers were enrolled in the study, mean age 39.6±14.6. Majority were female (62.1%) and primary caregivers (67.3%). Participant's roles and burdens were all positively correlated with increase in LOS. However, in the model caregivers' roles explained the variation in LOS by 5% while burden of caregiving by 2%. The final model explained 45% of the LOS variation.

Conclusion**:** Mental health patients in southwestern Uganda have a short LOS, and the stay is shorter among patients who have caregivers than those without caregivers. We recommend caregivers presence during patient's hospital stay to in order to reduce the LOS.

3.1.12.3 Depression, suicidal behaviourand associated factors among children and adolescents attending the sickle cell clinics in Mbarara and Mulago Referral Hospitals, Uganda

Baker Makaya Sserumaga, Godfrey Zari Rukundo

Background: Children and adolescents with sickle cell disease are prone to depression and suicidal behaviour which can have detrimental effects including long hospital stays, disease progression, poor school attendance, failing family support, substance use and nonadherence to treatment. This further leads to poor prognostic outcomes amongst this group of people. This study aimed to determine the prevalence of depression, suicidal behavior and associated factors among children and adolescents diagnosed with sickle cell disease and attending the sickle cell clinics in Mulago and Mbarara regional referral hospitals in Uganda.

Methods: A cross-sectional study was conducted in April – June 2021, enrolling a consecutive sample of 213 participants consisting of 114 (53.52%) children and 99 (46.48%) adolescents from Mulago national and Mbarara regional referral hospitals. We collected information on sociodemographic characteristics, hospital factors and applied the MINI-KID

to diagnose depression and suicidality. This study was reviewed and approved by the Mbarara University of Science Technology Research Ethics Committee (MUST-REC). Ascent was sought from the children and adolescents below 18 years of age but informed consent was obtained from the caregivers/parents. The adolescents aged 18-19 years provided their own informed consent.

Results: The overall prevalence of depression amongst the children and adolescents was 46.95% (n=100). Among children alone, the prevalence of depression was 15.02% (n=25) where as it was 31.9% (n=75) among the adolescents. The aggregate suicidality prevalence was 54.46% with children and adolescents accounting for 17.84% (n=33) and 36.61% (n=83) respectively. At bivariate analysis the odds of having depression where higher amongst adolescents {OR=7.28, 95% CI 3.38- 15.68, P<0.0001} and those whose came from home where there was one parent (divorced, widowed, separated) {OR=3.01,95% CI1.69 - 5.36, P<0.0001}. At multivariate analysis the odds of having depression were higher in adolescents and participants living with a single parent (Separated, Widowed, Divorced) {OR= 2.12, 95% CI 1.13 - 3.97, P<0.02}. Old adolescents had higher odds than young adolescents {OR=5.71, CI 2.58 - 12.62, P<0.0001}. In bivariate analysis of suicidal behavior, the odds were higher for adolescents with young adolescents having {OR=1.96, 95% CI 1.02 - 3.74,P<0.043}and older adolescents having {OR=6.21, 95% CI 2.85 - 13.50, P<0.0001}, those staying with biological parents {OR=0.42, 95% CI 0.19-0.92, P<0.031}and those from single parented families (divorced, widowed, separated) {OR=2.00,95% CI 1.13 - 3.55, P<0.017}. At multivariate analysis, only being an adolescent and staying in a family with separated parents had higher odds.

Conclusion: The prevalence of depression and suicidal behaviour is high amongst children and adolescents with sickle cell disease, being more significant amongst adolescents than children. Among the adolescents, older adolescents are more prone than young adolescents. Apart from being an adolescent and staying in a single parented family (separated, widowed, divorced), all other factors were not significant in this study. The objective of this study wasn't fully achieved. A population with a bigger sample size will go further to elicit if these factors are significant.

3.1.13 MASTER OF MEDICINE IN RADIOLOGY

3.1.13.1 Sonographic placental thickness and its correlation with gestational age among low-risk singleton pregnant women at 15 to 36 weeks attending Mbarara Regional Referral Hospital

Fredrick Malunde, Mugisha Julius Sebikali, Kenneth Mhorozi

Introduction: Accurate determination of gestation is very important in routine antenatal care. Gestation age is usually determined from the last menstrual period which is unreliable due to recall bias and menstrual irregularities etc. It is also determined from fetal biometry whose accuracy decrease with increasing gestation age. Normal placental growth determines normal fetal growth.

Aim: To determine the average sonographic placental thickness and its correlation with GA among low-risk singleton pregnant women 15 weeks to 36weeks attending antenatal clinic at Mbarara Regional Referral Hospital.
Methods: This was a cross sectional study of 249 singleton low risk pregnant women with known first day of last normal menstrual period (LNMP) at 15 to 36weeks of gestation attending antenatal clinic at Mbarara Regional Referral Hospital (MRRH) from June 2021 to September 2021. Ultrasound scanning was done using GE logic V2 ultrasound machine with (3-5MHZ) convex probe. Placental thickness (PT) was measured perpendicular at umbilical cord insertion, fetal growth parameters (BPD, HC, AC and FL) were also determined. Statistical analysis was performed using STATA© 15.0 software). Mean placental thickness with standard deviation was calculated. Pearson's correlation was applied to determine the correlation between placental thickness (PT) and gestational age as well as foetal growth parameters.
Results: In this study the participants age range was 16-43 years with mean of (25±5.59) years. Their parity ranged from 0-7(mean 1.28±1.37). The mean PT was (28.47 ± 5.43) mm. PT ranged from (17.95± 1.10) mm at 15 weeks to (37.50 ± 1.69) mm at 36 weeks. PT (in mm) had a linear relationship and a statistically significant positive correlation with GA (in weeks) (r = 0.96), p=0.001. There was also a statistically significant positive correlation between PT and the fetal growth parameters.
Conclusion: Placental thickness increases with increase in gestational age. A strong positive correlation between PT and fetal gestational age as well as fetal parameters fetal growth parameters was observed and hence PT can be used to estimate gestational age when last normal menstrual period is uncertain or unknown.
Keywords: Placenta, Sonographic Placental Thickness, Gestational age, Ultrasound

3.1.13.2 Pelvic Sonographic findings and factors associated with Pelvic Inflammatory Disease among women at Gynaecology Clinic of Mbarara Regional Referral Hospital.

Masinde Peter, Acan Moses, Mworozi Kenneth

Objective: To study pelvic sonographic PID findings and factors associated with pelvic inflammatory disease among women at Gynaecology clinic of Mbarara regional referral hospital.

Methods: A total of 144 women aged 15-49 years with clinical diagnosis of PID at gynecology clinic of MRRH were enrolled. Participants were interviewed with structured questionnaires about sociodemographic, behavioural and gynaecological factors. Pelvic sonographic examination via transvaginal and transabdominal methods was performed. Analysis of sonographic PID findings, association with factors above and testing for gonorrhoea and Chlamydia by nucleic acid amplification test (NAAT), a DNA-PCR test was done.

Categorical variables were summarized as frequencies, percentages, Chi-square test followed by logistic regression. Continuous variables were summarized as mean and standard deviation. Afactorwas considered associated if$p \leq 0.05$.

Results: Sonographic PID was diagnosed in 41.66% (60/144) of patients. Uterine findings were the most common9.72% (14), free fluid in posterior cul-de-sac 6.94% (10). Few had fallopian tubalandovarianfindingseachat3.47% (5) respectively. However, most patients had mixed structural findings 18.05% (26). Women with history of STIs [AOR = 2.8 (95% CI:

1.00–7.57),p=0.05] or had adnexal mass [AOR = 7.1 (95%CI: 1.58–31.90), p=0.01] were statistically more likely to have sonographic PID. Of the 144women, 29.17%(42) were diagnosed with microorganisms, 22.92%(33) positive for Neisseria, 4.86% (7) positive for chlamydia and 1.39% (2). At 5% level of significance diagnosis with *Neisseria gonorrhoeae* was associated with a higher likelihood of sonographic PID compared to absence of microorganisms ($p<0.05$).

Conclusion: A high proportion of women with clinical diagnosis of PID have pelvic sonographic PID findings. History of STI and/or palpable adnexal mass conferred a high likelihood of sonographic PID. PID due to Neisseria conferred a high likelihood of sonographic PID compared to absence of microorganisms.

3.1.13.3 Sonographic and Radiographic Knee Findings and their association with the Anatomical Fracture Location in Patients presenting with Long Bone Fractures of Lower Limbs at Mbarara Regional Referral Hospital

Ogwang Eugene, Moses Acan, Mugisha Julius Sebikali

Aim: To establish the prevalence of knee injuries, their sonographic and radiographic patterns with regard to the anatomical location of the lower limb long bone fracture among trauma patients presenting to MRRH.

Methods: Cross-sectional study design was used as 90 participants aged 10 years and above with lower limb long bone fractures were investigated using radiography and ultrasonography for ipsilateral concomitant knee injuries. A complete dataset was imported into STATA 16.0 version for analysis. General characteristics of study participantswere described using means or medians for continuous variables and proportions for categorical variables.

Results: Majority of the participants were male 75 (83.33%) with the mean age of 33.51 ± 13.94 years. RTAs were the most common cause 71 (78.89%) of the fractures. Ultrasonographically, 36 (40%) abnormal findings were found with joint effusion being commonest 26 (28.89%). There were 15 (16.66%) tendon tears, majority 9 (60%) in QT; 10 (11.1%) ligament tears with equal distribution 5(50%) in LCL and MCL; 4 (4.44%) meniscal tears; majority 3(75%) in medial meniscus.There was statistical difference between gender and abnormal sonographic findings (P=0.021) with higher proportion in males 34 (94.44%). We found 24 (26.66%) abnormal radiographic findings, majority 16 (17.78%) were effusions, 4 (4.44%) tibial plateau fractures and 3 (3.33%) patella fractures. There was statistical significance between femur, tibia and fibula fractures and knee injuries (P = 0.042, 0.001 and 0.034 respectively) irrespective of anatomical fracture location.

Conclusion: The prevalence of concomitant knee injuries was 40% and 26.66% using ultrasonography and radiography respectively. The commonest sonographic findings were knee effusions at 28.89% followed by quadriceps tendon tears at 16.66%. Similarly, Knee effusions were the commonest radiographic findings at 17.78% followed tibial plateau fractures at 4.44%. The association between gender and abnormal sonographic findings was statistically significant with higher proportion in males (94.44%). We also found significant statistical associations between femur, tibia and fibula fractures and knee injuries irrespective of anatomical fracture location.

3.1.13.4 Prevalence of abnormal Pelvic Sonographic findingsand the Quality of Life of Women with Infertility attending Gynaecology Clinic at Mbarara Regional Referral Hospital, Uganda

Okello Patrick Ambrose, Acan Moses, Mugisha Julius Sebikali, Kanyesigye Hamson

Background: Treatment of infertility depends on accurate diagnosis of its cause. Ultrasonography is the initial imaging modality for evaluating structural causes of female infertility. This study aimed at assessing the prevalence of abnormal pelvic sonographic findings, patients' factors associated with abnormal sonographic findings and the quality of life (QoL) of women with infertility attending Gynaecology Clinic at Mbarara Regional Referral Hospital.

Methods: This was a cross-sectional study over a seven-month period. 95 participants were recruited, each underwent transvaginal ultrasound scan to assess for pelvic abnormalities. Participants' quality of life and its domains was assessed and scored using the validated fertility quality of life tool. Scores of ≥ 50 and < 50 meant good and poor quality of life respectively.

Results: The mean age was 30.03 ± 5.69, overall mean BMI was 25.47 ± 4.18 and the majority had secondary infertility, 67(70.53%). The prevalence of abnormal sonographic finding was 46.32% (44/95). Uterine fibroids were the commonest pathology at 19(20%), followed by ovarian masses, adenomyosis, polycystic ovaries, hydrosalpinx and endometrial hyperplasia at 17(17.89%), 6(6.32%), 3(3.16%), 3(3.16%) and 2(2.11%) respectively. Age category 30 -34 years was associated with sonographic abnormalities. Overall, the proportion of the participants with poor Core Fertility QoL was high, 63(66.32%) with the mean score of 38.74 ± 19.14. All the four Core Fertility QoL subscales had poor scores, with emotional domain having the highest proportion at 73 (76.84%), followed respectively by mind/body, social and relational at 68 (71.58%), 54 (56.84%) and 50 (52.63%). Participants with primary infertility had a higher proportion of poor QoL (82.14%) compared to those with secondary infertility (49.70%).There was an association between poor QoL and occupation, type of infertility, dyspareunia and pelvic surgery ($p<0.05$).

Conclusion: This study found outa high prevalence of pelvic sonographic abnormalities, uterine fibroids and ovarian masses being the commonest pathologies. The core QoL and all its domains was poor, with emotional subscale being highly negatively affected. The type of infertility, duration of marriage, occupation (housewife) and dyspareunia were factors associated with poor quality of life of infertile women.

3.1.14 MASTER OF SCIENCE IN BIOCHEMISTRY

3.1.14.1 Identification and Characterization of Petroleum Hydrocarbon-Degrading Bacteria from Soils around Auto Garages and Fuel Stations in Mbarara Town, South Western Uganda

Jonasi Munezero, Kennedy Kassaza, Gertrude N. Kiwanuka

Background: Petroleum hydrocarbons and their end products are the major sources of energy for industries and everyday life activities. However, over dependence on the petroleum hydrocarbon products leads to soil contamination. Different methods to clean up

the environment have been applied for a long time with bioremediation emerging as the most promising technology. Bioremediation involves the use of microorganisms such as bacteria that utilize hydrocarbons as a source of carbon and energy.

Method: The objectives of this study were to identify and characterize the petroleum hydrocarbon-degrading bacteria from soils around automobile garages and fuel stations in Mbarara town, Mbarara City in Uganda. Soils samples were collected from 2 auto garages and 2 fuel stations and were screened for the presence of bacteria using Bushnell Haas Media supplemented with diesel engine oil and purified using Luria Bertani media. Characterization of the isolates was done using morphological and biochemical tests. The efficiency and effectiveness of bacteria was determined by measuring the turbidity of cells grown on 1% diesel engine oil supplemented in mineral salt, and decolorization of 2,6-Dichlorophenolindophenol (DCPIP) respectively. DNA PCR assay was used to amplify bacteria with *alkB* gene.

Results: Nine different genera identified in 45 bacterial isolates were *Citrobacter spp, E. coli, Yersinia spp, Aeromonas spp, Bacillus spp, Proteus spp, Corynebacterium spp, Clostridium spp,* and *Salmonella spp.E.coli*and *Aeromonas spp* were the most effective bacteria in degrading the used diesel oil. The alkane hydroxylase *alkB-3* gene was identified in fifteen bacteria isolates indicating the catabolic potential of isolates to degrade alkanes with 2 isolates of *Yersinia spp* and *Aeromonas spp* showing two genes of 157bp and 250bp.

Conclusion: In general, the characterized bacterial isolates constitute potential candidates for biotechnological application in the environmental remediation of petroleum contaminants in the study area. Future studies to characterize the bacterial strains using the 16S rRNA gene sequencing, and optimization of the degrading efficiency of these bacteria are necessary to inform a bioremediation strategy of petroleum contaminated soils in Uganda.

Keywords: Petroleum hydrocarbon degrading bacteria, Bioremediation, AlkB-3 gene, Efficiency, Effectiveness, Soil contamination.

3.1.15 MASTER OF SCIENCE IN MICROBIOLOGY

3.1.15.1 Prevalence, Antimicrobial Susceptibility Pattern and Genotypic Characterization of Extended Spectrum Beta-Lactamase Uropathogens Isolated from Refugees with Urinary Tract Infections in Nakivale Refugee Settlement Southwestern Uganda

Ayan Ahamed Hussein, Joel Bazira

Background: According to World Health Organization, it is approximated that one in four individuals have had at least one UTI episode requiring treatment with an antimicrobial agent by the teen age. At Nakivale refugee camp, the overwhelming number of refugees is often associated with poor hygiene coupled with low standard latrines used and resulting in compromised health has resulted in a high number of suspected UTI reported at Nakivale refugee camp (at least 20 suspected UTI per day) according to the record from the health center.
Aim: To determine the prevalence, antimicrobial susceptibility pattern, and genotypic characterization of Extended Spectrum Beta-Lactamase Uropathogens isolated from

Refugees with Urinary Tract Infections in Nakivale Refugee Settlement Camp, Southwestern Uganda.

Methods: We conducted a descriptive cross-sectional study where midstream urine samples were drawn from 216 outpatients attending Nakivale Health Centre III from July 2020 to September 2020, Specimens were transported to MUML within 4 hours for laboratory tests. Plated on Cystine Lactose Electrolyte Deficient agar and incubated aerobically at 37°C 48hrs. Pure colonies were sub-cultured on Macconkey Agar, Blood Agar, and mannitol salt Agar and identified using gram stain, biochemical tests, and antibiotic sensitivities obtained by Kirby Bauer disc diffusion method. I was screened for ESBLs using cephalosporins and confirmed by double disc synergy genotyping was performed using the PCR for TEM, SHV, CTX-M. The obtained data were entered and cleaned in Microsoft Excel and were exported to STATA version 12.0 for analysis. The presentation of data was by use of pie charts and tables.

Results: The study recruited 216 participants among whom 164 (75.93%) were females and 52 (24.07%) were males. The prevalence of UTI was 24.1% (52/216). The majority 86(39.81%) of the refugees were from DR Congo, followed by those from Somalia 58(26.85%). The majority of the organism was *Staphylococcus aureus* accounting for 22/52 (42.31%) of total isolates, *followed by Escherichia coli 21/52*(40.38%). Multidrug-resistant isolates accounted for 71.15% *(*37/52) and mono resistance was 26.92% (14/52). Overall, sensitivities were Nitrofurantoin, Chloramphenicol. But Ampicillin resistances for all uropathogens were isolated. Out of the 52 bacterial isolates, 30 (58%) were Extended-Spectrum Beta-Lactamase organisms (ESBLs). Furthermore, 21 (70.00%) were ESBL producers while 9(30%) were non-ESBL producers. Both *bla*TEM and *bla*CTX-M were 62.5% each while *bla*SHV detected was 37.5%.

Conclusions: The prevalence of UTI among refugees in Nakivale settlement is high. The common bacterial isolates are *Staphylococcus aureus* and *Escherichia coli.* There is a high rate of multidrug resistance to common drugs used to treat UTI. Most sensitivities to Nitrofurantoin and Chloramphenicol. The prevalence of ESBL-producing Enterobacteriaceae is high and the common ESBL genes are *bla*TEM and *bla*CTX-M.

3.1.15.2 Prevalence of Helicobacter pylori, associated factors and resistance to Clarithromycin and Fluoroquinolonesin- out patients presenting with gastrointestinal symptoms at Mbarara City Health Centre IV

Baweera Agnes, Kabanda Taseera,

Background: *Helicobacter pylori* is the third most common cause of cancer death worldwide and is also associated with common conditions such as dyspepsia, peptic ulcer, Mucosa associated lymphoid tissue lymphomas (MALT), immune thrombocytopenia, gastric cancer, some cases of vitamin B12 and iron deficiency.

Objective: To determine the prevalence of *H. pylori*, associated factors and resistance to selected antibiotics in patients presenting with gastrointestinal symptoms at Mbarara City HCIV.

Methods: We conducted a descriptive cross-sectional study where the patients that presented with gastrointestinal symptoms were individually approached to obtain informed consent (or from a legal guardian) and consecutively recruited into the study. An interview guided questionnaire was used to collect both demographic and clinical data. After consenting, each participant was provided with a sterile dry stool container and given instructions to collect

four scoopful of stool into the stool container. The stool specimen was placed in a cool box and transported to the laboratory within 30 minutes of sample collection for *H. pylori* antigen analysis and those that were positive for *H. pylori* were stored in a fridge at a temperature of -20^{o}c for a week, they were then transported by the Principal investigator to MBN clinical laboratories under cold chain for drug resistance.

Results: The prevalence of *H. pylori* among participants that presented with GIS at MCHCIV was 27%. Sanitation, smoking, source of drinking water and bloody stool were found to be significant to *H. pylori* infection with a p value < 0.05 in this study. The proportion of *H. pylori* resistant to CLA was 40% and that to FLQ was70%. All *H. pylori* resistant samples to CLA showed a mutation in the 23srRNA gene similarly, all those that were resistant to FLQ a mutation was detected in the gyrase A gene.

Conclusion: In this study, poor sanitation, smoking, source of drinking water and bloody stool were found to be associated with *H. pylori* infection. *Helicobacter pylori* is highly resistant to CLA and the highest proportion was seen in FLQ which probably indicated that resistance to antibiotics is increasing greatly and this demands for prior antimicrobial susceptibility testing.

3.1.15.3 Assessment of Bacterial, Fungal Contaminants and Antimicrobial Activity of Selected Herbal Medicinal Remedies in Mbarara Municipality, Southwestern Uganda

Guti Walker, Habert Itabangi

Background: Herbal formulations in Mbarara Municipality have been used in the treatment and management of several disease conditions extensively overtime due to low cost compared to empirical synthetic medicine, however it is evidenced that they can be contaminated with dangerous pathogenic organisms which are all tailored to handling practices, storage, and other environmental conditions thus, the need to further asses these herbs for safety to the consumers.
Methods: Forty-five (45) Oral and topical liquid herbal formulations of different brands for the treatment and management of communicable infections were purchased on open market. All Samples were cultured on plate count agar for colony counts after which were subcultured on different laboratory media and analyzed for antimicrobial activity using the agar diffusion method.
Results: Out of the 45 herbal formulations, 32(71.1 %) were contaminated while 13 (28.9 %) were not. Of the organisms isolated from individual formulations, 19 (59.4 %) were for *Bacillus subtillis and S. aureus, 4(12.5%)* for *C. freundi and Proteus mirabilis, 2(6.3%)* for *C.divergens,* 1(3.1 %) *Rhodotorula* and *Aspergillus spp,* 5(15.6%) for *E. cloacae* and 1 (3.1%) for *Klebsiella spp*. 29(87.9%) had contaminants within acceptable limits (< 103CFU/mL), while 12(36.4%) beyond 103 CFU/mL, 29(64.4%) were active while 16(35.6%) had no activity, all MICs were >1000mcg/mL and none of the herbal formulations could qualify for pharmaceutical use.
Conclusion: Herbal formulations in Mbarara are contaminated with various microbes and have very limited antimicrobial activity, herbalists therefore should be trained on good harvesting, safe handling, storage, and good manufacturing practices of these medicinal raw materials and their products, responsible authorities should enact policies and regulations to guide the herbalists and protect the public from adverse effects of consuming the unverified herbal medicinal remedies.

Key words: Herbal medicines, Contamination, Antimicrobial Activity

3.1.15.4 Prevalence of Community Acquired Salmonellosis, Associated Factors and Antibiotic Susceptibility among Out Patients attending Kagando Hospital, Kasese district, Mid-western, Uganda

Kabahinda Boaz , Taseera Kabanda

Background: Uganda has experienced a number of typhoid fever out breaks, the most recent being in Kampala city in which 1,038 (29%) patients were positive out of 3464 suspected cases. In 2011, typhoid cases (1042) were reported in Kasese and neighboring Bundibugyo District with more patients suffering from intestinal perforations (566) and with emergence of multidrug resistant strains.The study was conducted at Kagando hospital in Kasese district to determine the prevalence of community acquired Salmonellosis, evaluate antimicrobial susceptibility and document factors associated with salmonellosis.

Methods: A total of 165 Outpatients at Kagando hospital suspected of having salmonellosis were enrolled in a cross sectional study. Data on demographics and risk factors were explored by use of an interviewer guided questionnaire. Venous blood and stool samples were taken from each participant. Venous blood samples were used to run a rapid test for *Salmonella*Typhi/ParatyphiIgM/IgG using the NOVA TEST®cassettesand culture. Stool samples were used for culture. Data was entered into Microsoft Excel spread sheet and transferred to STATA for analysis.

Results: Prevalence of Salmonellosis by *Salmonella*ser. Typhi/ParatyphiIgM/IgG serological testing was 22% and 15.8% by culture of blood and stool. NTS accounted for a prevalence of 10.3% followed by *Salmonella* Typhi 4.9% and then *Salmonella* Paratyphi 0.61%. Most isolates were susceptible to levofloxacin, Gentamycin, Imipenem, Tetracycline and Cotrimoxazole. Most isolates were resistant to ampicillin, ceftriaxone and amoxicillin-clavulanic acid. Salmonellosis was associated with consumption of locally packed water, primary level of education, non-hand washing, history of gastric surgery and history of treatment for *Helicobacter pylori*. All the observed associations were not statistically significant.

Conclusion: Confirmed Community acquired salmonellosis exists among out patients attending Kagando hospital in Kasese district at a prevalence of 15.8% and a sero prevalence of 22%. NTS accounted for most of *Salmonella* infections followed by *Salmonella* Typhi and then *Salmonella* Paratyphi. Most isolates were susceptible to levofloxacin, Gentamycin, Imipenem, Tetracycline and Cotrimoxazole. Routine Culture and sensitivity test is recommended for proper diagnosis and appropriate treatment of patients with clinical diagnosis of salmonellosis. Also sensitization on community acquired salmonellosis through health education programs should be considered.

3.1.15.5 Molecular Characterization of Brucella Species at the Human-Animal Interface in Rubanda District, South Western Uganda

Katumba Hannington, Joel Bazira

BACKGROUND: Brucellosis is the world's commonest zoonotic infection, estimated at 500,000 new human cases annually, and about half of humanity (3.5 billion people) living at risk of caprine brucellosis alone. Its accurate diagnosis in rural health facilities remains a challenge, especially since it presents like many other febrile illnesses. Secondary data indicated a rising trend in the number of brucellosis cases being detected in Rubanda district, South Western Uganda. METHODS: A combined serological and rt-PCR/HRMA was conducted in the District, to determine the seroprevalence of the disease in febrile patients, detect and identify the Brucella species in these patients and their livestock. We purposively selected 223 febrile patients reporting to health centers and screened their serum using RBPT. Serum was also obtained from goats, sheep, and cattle (N=283) of febrile seropositive participants who owned livestock. Serum was extracted from all human and animal blood samples, and a real-Time PCR run using *B.melitensis* and *B.abortus* primers, followed by HRM curve analysis. RESULTS: The seroprevalence in febrile patients based on the RBPT was 12.1% (n=27, 95% CI: 8.1% – 17.1%). The overall seroprevalence of brucellosis in animals of febrile patients was 4.9% (n=14, CI: 2.7-8.2%). This study found that 90% (n=36) of all seropositive human and animal samples had brucella. Basing on the primer amplification and Melt curve analysis, we were able to detect and identify *B.melitensis* and *B.abortus*. Two other Brucella species were detected but not identified. *B.melitensis* was more prevalent than other Brucella species, both in febrile patients as well as their livestock. Four (4) febrile patients had mixed brucella infection. CONCLUSION: Brucellosis is prevalent in humans and animals in Rubanda district and is caused by several Brucella species. We were able to detect and identify *B.melitensis* and *B.abortus*, and two other species, Use of rt-PCR helped to confirm infection and offering more concrete evidence for more informed and robust control measures. *B.melitensis* is more prevalent in Rubanda District than other common zoonotic Brucella species. The presence of the disease in humans and their animals is an indication of the much-needed effort to understand in detail the identity and direction of infection to better understand its epidemiology as a tool for better control strategies. Additionally, continued sensitization of communities is necessary. This was the first study of its kind in the region to demonstrate the presence of Brucella DNA in febrile human serum as well as livestock of febrile patients.

3.1.15.6 Status of pulmonary fungal pathogens among individuals with clinical features of pulmonary tuberculosis at Mbarara University Teaching Hospital in Southwestern Uganda.

Israel Kiiza Njovu, Itabangi Herbert

Background: Pulmonary mycoses are important diseases of the respiratory tract caused by pulmonary fungal pathogens. These pathogens are responsible for significant morbidity and mortality rates worldwide; however, less attention has been paid to them. In this study we determined the prevalence of pulmonary fungal pathogens among individuals with clinical features of pulmonary tuberculosis at Mbarara Regional Referral Hospital.
Method: This was a hospital based cross sectional survey. Sputum samples were collected from each study participant. For each sample, the following tests were performed: Sabouraud dextrose agar for fungal culture, GeneXpert for *Mycobacteria tuberculosis* (MTB) and potassium hydroxide for fungal screening. Filamentous fungal growth and yeasts were further examined with lactophenol cotton blue staining and germ tube respectively.
Results: Out of 113 study participants, 80 (70.7%) had pulmonary fungal pathogens whilst those with pulmonary tuberculosis numbered five (4.4%). *Candida albicans* [21 (22.58%)]

and *Aspergillus* species [16 (17.20%)] were the pathogens most identified among others. Two (1.7%) TB GeneXpert positive participants had fungal pathogens isolated from their sputum samples. We established a prevalence of 57 (71.3%) for pulmonary fungal pathogen (PFP) isolates, three (60.0%) for MTB in HIV positive patients and 18 (22.5%) for PFP, and zero (0.0%) for MTB in HIV negative patients. On the other hand, two (100%) HIV positive patients had both PFP isolates and MTB.
Conclusion: Our findings highlight the diversity of neglected pulmonary fungal pathogens whose known medical importance in causing pulmonary mycoses cannot be over emphasised. Therefore this presents a need for routine diagnosis for pulmonary mycoses among TB suspects and set-up of antimicrobial profile for pulmonary fungal isolates to support clinical management of these cases.

3.1.15.7 Quantification and Molecular Characterization of Extended Spectrum Beta-Lactamase Producing Enterobacteriaceae from Agropastoral Communities of Mbarara District, Southwestern Uganda

Muhwezi Ivan, Frederick Byarugaba

Background: Bacterial infections are the commonest in both community and healthcare settings. Emergency of Extended Spectrum Beta-Lactamase producing *Enterobacteriaceae* has contributed to poor clinical outcomes. More efforts regarding antibiotic resistance have been dedicated to clinical settings and we do not know the extent of the catastrophe in community settings. We aimed at determining the burden, antimicrobial susceptibility patterns and molecular characteristics of Extended Spectrum Beta-Lactamase producing *Enterobacteriaceae* in agro-pastoral communities of Mbarara district, South western Uganda.
Methods: A laboratory based descriptive cross-sectional study was carried out among *Enterobacteriacea*e isolated from outpatients presenting with signs and symptoms of Urinary Tract Infections. Urine samples were delivered to Microbiology Laboratory of Mbarara University of Science and Technology for culture, identification, testing for ESBL production and Antibiotic Susceptibility Testing. Molecular characterization of ESBL producing *Enterobacteriaceae* was carried out at Medical and Molecular Laboratories Limited of Makerere University.
Results: A total of 88 *Enterobacteriaceae* fulfilling the inclusion criteria were considered into the study. *Escherichia coli* 70.45% and *Klebsiella pneumoniae* 13.64% were the most isolated followed by *Klebsiella oxytoca, Proteus mirabilis* and *Enterobacter aerogenes* at 10.23%, 3.41% and 2.27% respectively. The production of ESBL was observed at 23.86%. Generally, high resistance rates were observed against Ampicillin 100%, Cefepime 100%, Aztreonam 95.24%, Nalidixic acid 90.48%, Ciprofloxacin 85.71% and Amoxicillin/clavulanate 80.95%. High rates of sensitivity were observed to Meropenem 95.24%, Imipenem 95.24%, Amikacin 95.24%, Gentamycin 90.48%, Cefoxitin 76.19% Piperacillin/tazobactam 80.95% and Nitrofurantoin 66. 67%. MDR was observed at 85.71%. The most prevalent genes in ESBL producing Enterobacteriaceae were CTX-MU 46.7%, TEM 30.00% and SHV 23.3%.

Conclusion: We demonstrated high prevalence, antibiotic resistance rates among Extended Spectrum Beta-Lactamase producing *Enterobacteriaceae* in the community. We recommend more community ESBL related studies and a One Health Approach to guide public health interventions.

Keywords: *Enterobacteriaceae*, agro-pastoral, community, Extended Spectrum Beta-Lactamase, antibiotic, genotyping.

3.1.15.8 Klebsiella Pneumoniae Carbapenemases in Escherichia Coli isolated from Humans and Livestock in Rural Southwestern Uganda

Tuhamize Barbra, Joel Bazira

Background: Production of *Klebsiella pneumoniae* carbapenemase (*KPC*) by *Escherichia coli* renders it resistant to broad-spectrum β-lactam antibiotics. There is existing evidence of spread of Carbapenem-resistant *E. coli* in both humans and livestock driven by acquisition of the *Klebsiella pneumoniae*carbapenamase gene (KPC). Overall there is little information regarding the extent of *KPC* gene distribution in *E. coli.* We set out to determine the prevalence, and evaluate the phenotypic and genotypic patterns of *KPC* in *Escherichia coli* isolated from humans and their livestock in Rural South Western Uganda.

Methods: A laboratory-based, descriptive cross section study was conducted involving 96 human and 96 livestock isolates previously collected from a larger study. Phenotypic methods (Kirby-Bauer and modified Hodge methods) and molecular method; Polymerase chain method and electrophoresis were used for identification of *KPC* gene in the *E. coli* isolates. A Chi-Square test of independence was used to evaluate the associations of resistance patterns between carbapenems and isolates.

Results: The overall prevalence of carbapenem resistanceby DST for both humans and livestockwas 41.7% (80/192). DST-based resistance was similar in both human and livestock isolates (41.7%). Prevalence based on MHT was 5% (2/80) and 10% (4/80) for humans and livestock isolates respectively. 48.7% (95/192) of both the human and livestock isolates had *KPC* gene, higher than phenotypic expression; 41.7% (80/192). A higher prevalence of *KPC* gene was observed in human isolates 51% (49/96) compared to that of livestock 47.9% (46/96). 15/80 (18.8%) isolates that were resistant to carbapenems had *KPC* gene and the sensitive strains found to carry *KPC* gene were 79/112 (70.5%). There was no difference in the resistant patterns between human and livestock isolates and among the individual carbapenems.

Conclusion: Our results suggest that both human and animal isolates are carrying the KPC gene although not all of these strains are actively expressing presence of the gene. The finding of fewer isolates carrying the *KPC* gene than those resistant to carbapenems suggests that other genes are playing a role in this phenomenon. This calls for more research to elucidate the other genes responsible for presence of Carbapenemases in human and animal isolates.

3.1.15.9 Antimicrobial resistance patterns of bacterial faecal pathogens isolated from patients presenting with bacterial diarrhoea in Nakivale refugee settlement, southwestern Uganda

Tusingwire Francis, Fredrick Byarugaba

Background: Antimicrobial resistance (AMR) is a threat to global public health. Antimicrobial resistance threatens effective prevention and treatment options of bacterial

diarrheal diseases in the refugee population. Therefore, our study aimed at determining antimicrobial resistance patterns in *E. coli* isolated from faecal specimens.
Method: The study was carried out in Nakivale Refugee settlement camp in Isingiro district Southwestern Uganda. All stool samples were aseptically collected after informed consent of study participants were transported in Cary Blair subsequently cultured on MacConkey, XLD, and TCBS culture media. Significant organisms were identified using conventional biochemical identification. Further identification of presumptive bacterial organisms using Bruker MALDI Biotyper was performed. Subsequent isolation on Sorbitol MacConkey and Latex agglutination was performed to identify potential bacterial pathogenic microorganisms to the species level. Polymerase Chain Reaction was used for genotyping extended beta Lactamase genes in *E. coli* isolates.
Findings: Of 197 samples collected, 39% (n=77) showed significant pathogenic enteropathogens growth. Further analysis showed that *E. coli* was the most isolated causative agent of bacterial diarrhea at 53.2%(n=41). *E. coli* showed the highest resistance to Trimethoprim, Tetracycline, and Ampicillin at 92.68%, 90.24%, 82.93%, respectively. In contrast, organisms showed the least resistance to Cefuroxime (30ug), Levofloxacin (15 mcg), and Ceftazidime (30ug) at 73.17%, 65.85%, 92.68% respectively among the isolated *E. coli.* Molecular detection of Extended Spectrum Beta-Lactamase genes in *E. coli* isolates showed that *blaTEM., bla CTX-M, bla SHV* were detected at 96.96%(32/33), 87.87%(29/33) 45.45%(15/33), respectively.
Conclusion and recommendation: *E. coli was* the leading cause of bacterial diarrhea among the refugee population. *E. coli* isolates were resistant to antibiotics commonly used in the treatment of bacterial diarrhea. We recommend frequent AMR screening of *E. coli* pathogens isolated from faecal samples to commonly used antibiotics to treat bacterial diarrhea in refugee population.

3.1.15.10 Bacteriological Profile, Antibiotic Susceptibility and factors associated with Neonatal Septicaemia at Kilembe Mines Hospital, Kasese District Western Uganda

Zamarano Henry, Kabanda Taseera

Introduction: Neonatal septicaemia is one of the most common leading causes of neonatal morbidity and mortality in developing countries. It is estimated to affect more than 30 million people worldwide annually, potentially leading to 6 million deaths.

Objective: To determine the prevalence, bacteriological profile, antibiotic susceptibility and factors associated with neonatal septicaemia among neonates seeking medical services at Kilembe mines hospital.

Methods: We conducted a descriptive cross-sectional studywhere blood was drawn from 122 neonates that were seeking medical attention at KMH during the period of July to November 2020. Specimens were inoculated in BHI broth, transported to FRRH, plated daily up to 7 days on blood, chocolate, MacConkey agar and incubated in aerobic and 5% carbondioxide. Pure colonies were identified by gram stain, biochemical tests and antibiotic sensitivities obtained by Kirby Bauer disc diffusion method. Statistical significance set at $P< 0.05$ and logistic regression wasused to determine predictors of neonatal septicaemia. Stata (version 14) used for statistical analysis.

Results: Blood cultures were positive in 59.0% cases with 55.5% male and 44.4% female. EOS was present in 56.9% and LOS 43.1% of the cases. Gram negative (56.9%) organisms

were most implicated with neonatal septicaemia than gram positives ones (43.1%).Gram positive organisms exhibited better susceptibility to amikacin, linezolid and vancomycin but more resistant to ampicillin and gentamicin. Of the aminoglycosides, amikacin exhibited a verge over netilmicin and gentamicin against gram negative isolates. Risk factors of neonatal septicaemia were mother's age of ≥25 years, employed mothers, tertiary-level of education, SVD, ANC attendance of ≥4 times, UTI during pregnancy, PROMS, foul Smelling liquor, urban residence, neonatal birth weight of ≥2500g, Apgar score 1^{st} and 5^{th} min ≥6 and resuscitation.

Conclusion: Multi-drug resistant organisms were isolated, thus caution is required in selection of antibiotic therapy and avoid empirical treatment.

3.1.16 MASTER OF SCIENCE IN PHARMACOLOGY

3.1.16.1 Sub-Acute Toxicity, Levels of Inorganic Copper and Zinc and Antimalarial activity of Maesalanceolata FORSSK Aqueous Leaf Extract against Plasmodium berghei in Mice

Jacqueline Njeri Muchiri, John Odda, Martin Amanya

Drug resistance, inaccessibility and unaffordability of conventional medicines used for malaria coupled with their known side effects require that new drugs be developed. Plants like *Maesalanceolata*are a potential source of new drugs. *Maesalanceolata* which is used traditionally in Uganda for local management of malaria was evaluated for antimalarial activity using Reley and Peters 1970 established test mice model, sub-acute toxicity following the 28 day OECD guidelines, and levels of copper and zinc ions using the Atomic spectroscopy method. *Maesalanceolata*aqueous leaf extract showed noantimalarial activity on *Plasmodium berghei* infected mice with all the three tested doses exhibiting less than 50% parasitemia suppression. This calls for more research on other possible factors that could be contributing to the relief experienced by malaria patients being managed using this herb such as its possible fever and pain reducing effect or appetite increase leading to alleviation of malaise. The aqueous leaf extract of *Maesalanceolata* was nontoxic to the kidneys, liver and blood of tested mice with P-value greater than 0.05 in comparison with the normal control group and weight gain was also recorded across all groups. Copper ions were 9.33 parts per million, according to the known posology of the extract use in Western Uganda, the amount of copper consumed by patients surpasses the recommended daily allowance which warrants further research on posology of this plant using a greater sample size as well as further investigations on possible effects of excess copper consumption. Level of zinc were 8.53 parts per million which falls within the recommended daily intake of the element.

3.1.17 MASTER OF SCIENCE IN PHARMACOGNOSY & NATURAL MEDICINE SCIENCES

3.1.17.1 Phytochemical and Abortificient Studies of Commelinabenghalensis in Wistar Rats

Adeyemi Chioma Njideka, Joseph Oloro, Clement Olusoji Ajayi

Abortion is common among females despite its being illegal and immoral leading to mortalities because of self-medication of conventional drugs. Medicinal plants have been used as abortifacients with some cases multiple organ system failures. This thesis studied the phytochemicals and the potential abortifacient activities of extracts of Commelinabenghalensis Linn. leaf and stalk in female Wistar rats.

The plant was collected, authenticated, dried, powdered and extracted with n-hexane, ethyl acetate, ethanol and water. The extracts were thereafter concentrated in vacuo and tested in the animals at 100, 200, and 400 mg/kg doses in the pregnant rats. The TLC fingerprint of the extract was determined using different solvent systems and the retention factor (Rf) values were taken, concurrently. The toxicity of the extract was determined using standard procedure and the haematological and biochemical parameters were evaluated in the blood. The histochemical analysis of the organs was done using normal group as a reference.

The results of the phytochemical screening showed the presence of flavonoids, phenolics, tannins, alkaloids, saponins, phlobatannins, steroids, cardiac glycosides, polyphenols and anthraquinones while the TLC of extracts showed different spots with different retention factors. The acute toxicity test showed LD50 greater than 2000 mg/kg. There was no observable toxicity symptom including respiratory distress, salivation, weight loss, dull eyes, diarrhoea and change in the appearance of fur. Extracts of C. benghalensis showed abortifacient activity (33.33-100.00%) at 200 – 800 mg/kg with a significant reduction in the number of live foetus compared to the normal group.

The phytochemicals contained in C. benghalensis may include, anthraquinones, alkaloids, cardiac glycosides, saponins, tannins, phlobatannins, flavonoids, phenols, polyphenols and steroids. The thin layer chromatography, showed the possible presence of many phytochemical components in C. benghalensis leaves and stalk extracts, suggesting the stalk contained more of these phytochemicals. The test extracts had the LD50>5000 mg/kg body weight of the rats and there was no observation of any adverse effect or clinical toxicity symptoms in the treated Wistar rats. At the dose of 100 mg/kg body weight of rat, the stalk decoction extract of C. benghalensis was found to have the highest abortifacient activity (100% efficacy) when compared with the leave extracts

3.1.17.2 In-vitro Anti-Mycobacterial Activity of Acacia hockiiDe Wild, Vernoniaamygdalina Delileand Smilax anceps Willdaqueous extracts

Amito Vivian Sharon, Jonans Tusiimire, Abdelgadir Alamin Abdelgadir

Tuberculosis has greatly devastated many Ugandans' health and is one of the greatest public health problem in Uganda. Due to the easy spread and great expense sustained to treat it, many people in communities have resorted to using medicinal plants to treat the TB infection. Not all plants being used have been scientifically evaluated to prove the claims. Identifying and validating these plants work could contribute towards identifying novel lead compounds for development of TB drugs.

*Acacia hockii*De Wild Fabaceae, *Vernoniaamygdalina* Delile Asteraceae and *Smilax anceps* Willd Smilacaceae were collected from Bushenyi, Western Uganda and their morphological characteristics described. They were decocted and phytochemical screening and TLC fingerprinting was done. The extracts were screened against *Mycobacterium tuberculosis* pan-sensitive strain H37Rv and rifampicin resistant *Mycobacterium tuberculosis* (TMC 331) strains using the agar-well diffusion method to determine their susceptibility and agar dilution method to determine Minimum Inhibitory Concentration (MIC).

Acacia hockii, *Vernoniaamygdalina* and *Smilax anceps* and their herbal combination (1:1:1) extracts contained alkaloids, terpenoids, phenols and tannins. The herbal combination exhibited the highest activity against the pan sensitive *M. tuberculosis H37Rv* at MIC=0.0733 mg/ml. *A. hockii*was the most active against*M. tuberculosis H37Rv* at MIC=0.147 mg/ml, *S. anceps* moderately active at MIC=0.586 mg/ml. However, *V. amygdalina* exhibited lowest activity against at MIC=2.34±1.10. The MICs were compared to the MIC of the standard drug rifampicin at 0.000763 mg/ml. MICs < 0.1mg/ml are active against mycobacterium. On screening against MDR-TB, the herbal combination had an MIC=0.293 mg/ml which was lower than that of *A. hockii* and *S. anceps* that had the same MIC=0.3906 mg/ml.

The results showed that *A. hockii*, *S. anceps* and their herbal combination exhibited activity against pan sensitive and rifampicin resistant MTB strains. This study is a contribution towards efforts of developing a novel alternative treatment for sensitive and drug resistant tuberculosis in patients. Further research must be done on the herbal combination toxicity and identification of actives in *A.hockii* and *S. anceps* responsible for tuberculosis treatment.

3.1.17.3 Pharmacognostical Evaluation, Safety and Efficacy of Citropsisarticulata and Kigeliaafricana, Traditionally Used for Management of Erectile Dysfunction

Anyase Ronald Amaza, Patrick Ogwang, Tusiimire Jonans

Background: Citropsisarticulata Swingle & Kellerman (Rutaceae) and Kigeliaafricana Lam. (Benth). (Bignoniaceae) are widely known for their aphrodisiac properties by different populations in Southwestern Uganda. They are both known by the same local name Omuboro which brings about confusion and quality control challenges. The pharmacognostical evaluation of their parts has barely been explored. Besides, there is little literature describing their safety and providing evidence for their use in treating erectile dysfunction.
Aim: Therefore, this study aimed at simultaneously determining the pharmacognostical parameters, safety and aphrodisiac efficacy of Citropsisarticulata leaf and root bark and Kigeliaafricana fruit and stem bark.
Methods: The WHO Updated Quality Control Methods for Herbal Materials were generally followed for the pharmacognostical evaluation of the study plants. Acute and subacute toxicity studies were done following the Organisation for Economic Cooperation and Development Test Guidelines 425 (Up-and-Down Procedure) and 407 (Repeated Dose 28-Day Oral Toxicity Study in Rodents) respectively. The aphrodisiac efficacy study was done using the same animals are employed in subacute toxicity for 28 days. This ensured the reduction and responsible use of laboratory animals for the study. Six male animals (age: 8 – 12 weeks old, weight: 140 – 200g) were used in each of the groups. Three animals per group (group B), unlike those immediately sacrificed at the end of 28 days (group A), were left for an extra 14 days without dosing to look out for delayed toxicity or efficacy signs. Male

sexual behaviour including attraction towards the female, penile erection, mount frequency, and mount latency was monitored on day 0, 3, 7, 14, 21, 28, 35 and 42. At the end of both 28 days and the extra 14 days, animals were humanely sacrificed by anaesthesia using halothane, and their blood taken for haematological and clinical chemistry analysis, while organs harvested were assessed grossly and histologically.
Results and Discussion: Thisstudy revealed the pharmacognostical parameters of the study plants such as macroscopic and microscopic characters, ash value, swelling index, foaming index, extractable matter, water and volatile matter, and haemolytic activity. Furthermore, thin layer chromatograms and high performance liquid chromatograms were developed. Phytochemical evaluation qualitatively and quantitatively determined the level of L-arginine and total saponins. All study plant materials had a median lethal dose above 5,000 mg/kg except the Soxhlet extract of Citropsisarticulata root bark (LD50: 3,129 mg/kg). Histopathological evaluation revealed that the acute mortality was due to acute haemorrhagic hepatotoxicity. Subacute studies showed no clinically significant findings on histopathological examination, but on blood analysis, Citropsisarticulata extracts mainly affected erythrocytes, while those of Kigeliaafricana affected mostly leucocytes. There was evidence of untoward effect in both group A and B groups signifying the potential for delayed toxicity effects. The main sub-acute toxicity haematological effects noted could be attributed to iron deficiency anaemia and bone marrow suppression. Also, testosterone levels greatly declined in group B animals, signifying delayed reproductive organ toxicity. All extracts showed aphrodisiac efficacy enhancement in male sexual behaviour and testosterone levels. This was attributed to the presence of L-arginine and saponins in the plant materials.
Conclusion: The pharmacognostical parameters of the study plants were determined. The plants were safe on single-use but could be relatively toxic when used repeatedly for a long period or even after their cessation. The plants possessed some aphrodisiac efficacy.

3.1.17.4 Effect of Fermentation on the Phytochemicals and Anti-Inflammatory Activity of Prunusafricana (Hook F, Kalkman) Aqueous Leaf Extract

Kaggwa Rashidah, Duncan Crispin Sesaazi, Patricia Wagana

Introduction: Fermentation of herbal medicines has been practiced in both Traditional Chinese and Aryuvedic medicine for a long time. Fermentation is believed to improve efficacy, palatability, extraction, absorption and reduce the side effects of the herbal medicines. During fermentation, there is decomposition and biotransformation of the complex compounds into simpler compounds. These compounds have diverse biological activities such as anti-cancer and anti-inflammation. The aim of the study was to determine the effect of fermentation on the phytochemicals and anti-inflammatory activity of *Prunusafricana* leaf extract.
Methods: Two types of *Prunusafricana*leaf extracts were used that is the fermented leaf extract (1000 mg/kg) and the decoction/aqueous leaf extract (1000 mg/kg). The quantification of the phytochemicals was done using UV Vis spectrophotometry and High performance liquid chromatography (HPLC) using the standard quercetin and Gallic acid. The anti-inflammatory activity was examined used the carrageenan induced paw edema (acute) and cotton pellet induced granuloma (chronic inflammation). The controls used were distilled water (10ml/kg) and indomethacin (2 mg/kg).
Results: Fermentation was able to increase the total amount of flavonoids by over 100 % but reduced the gallic acid and totally eliminated the quercetin from the extract. The fermented

extract exhibited anti-inflammatory activity in both acute and chronic tests unlike the aqueous extract that only exhibited activity in the chronic test.
Conclusion: Fermentation improves anti-inflammatory activity of *Prunusafricana* by increasing the total number of flavonoids present in the extract.

3.1.17.5 Acute and Sub-Acute Oral Toxicity of Aqueous Whole Leaf and Green Rind Extracts of Aloe vera Linn and Aloe ferox Miller in Wistar Albino Rats

Nalimu Florence, Patrick Ogwang, Joseph Oloro

Background: The aqueous leaf extracts of Aloe vera and Aloe ferox (family Asphodelaceae) are widely used for traditional treatment of various ailments such as malaria, fever, diabetes and skin infections. Despite the wide use of such preparations, inadequate documentation exists on safety profile of aqueous leaf extracts of these species posing a great health risk to the users. This study therefore, investigated the acute and sub-acute oral toxicity of the aqueous whole leaf and green rind extracts of A. vera and A. ferox in Wistar albino rats.
Methods: Fresh Aloe vera and Aloe ferox leaves were collected from Rwarire at 0°38'55.9"S and 30°38'04.0"E, Mbarara, Uganda in July, 2020. Aqueous leaf and green rind extracts were prepared using decoction method. Phytochemical analysis was performed using standard methods. Acute oral toxicity test was performed in 24 non pregnant female Wistar albino rats as per OECD 425 method at single doses of 175, 550, 1750, and 5000 mg/kg. Similarly, a sub-acute toxicity test was carried out in 78 rats of both sexes at doses of 200, 400, and 800 mg/kg as per OECD 407 test method for 28 days. The animals were monitored for behavioral, physiological signs of toxicity and mortality. On the 29^{th} day, the animals were sacrificed humanely blood was withdrawn for hematological and biochemical analysis. Relative organ weights were recorded while the liver and kidneys were used for histopathological examination.
Results: Tannins, anthraquinones, amino acids, alkaloids, saponins and flavonoids were present in all the extracts. No mortalities, behavioral or physiological changes were observed in both tests with exception of slight diarrhoea at 5000 mg/kg for the whole leaf and green rind extracts of A. ferox during acute toxicity test. The LD_{50} was above than 5000 mg/kg since no mortality occurred. . Creatinine and Chloride ion levels significantly increased ($p< 0.05$) while MCHC levels significantly decreased ($p< 0.05$) in comparison with the control. Histopathology revealed shrinked glomeruli in the males treated with 400 mg/kg and females treated with 800 mg/kg of A. ferox whole leaf extract. Mild inflammation of the renal interstitium was seen in females treated with 200 and 800 mg/kg of A. vera whole leaf extract.
Conclusion and recommendations: The research findings show that A. ferox and A. vera whole leaf and green rind extracts may be safe for short term use however prolonged use might cause kidney toxicity. The local communities need to be cautious about the doses of the extracts they take especially in prolonged treatment.

3.1.17.6 Anti-Ulcer Activity of Ipomoea hildebrandtiiMethanolic leaf extract in indomethacin induced gastric ulcers in Wistar rats and Markers for its quality control

Niwagaba Silivano, Patrick Ogwang, Joseph Oloro

Ipomoea hildebrandtii, Convolvulaceae family, is used by natives of Bushenyi district, South Western Uganda, to treat peptic ulcers. So far, there is no scientific clarification for its ethnobotanical use. Hence, this study aimed to carry out the phytochemical evaluation and antiulcer activity and safety of the crude methanol leaf extracts of Ipomoea hildebrandtii. Air-dried leaves of I. hildebrandtii were pulverized and macerated with 80% methanol for 72 hours with continuous shaking and dried by the rotator evaporator. The crude dried methanol extract was used to evaluate the antiulcer activity in an indomethacin-induced gastric ulcer model on Wistar albino rats weighing 100–250 g at three doses of 200, 400, and 800 mg /kg using omeprazole as a standard. Both the standard and the test drugs were administered orally twice daily for 14 days. Phytochemical evaluation was performed using standard procedures. The acute toxicity study was evaluated using Winstar albino rats before the antiulcer activity test with the help of the OECD guideline. No sign of toxicity was observed upon administering 5000 mg/kg of the crude extract to rats. Single-dose administration of 200mg/kg, 400mg/kg, and 800mg/kg extract showed a significant reduction in the ulcer index from 6.00 ± 0.95 of the ulcerated control group to 2.80 ± 0.49 extract-treated group. The study findings suggest that leaves of I. hildebrandtii have antiulcer effects and may be used to treat peptic ulcers.

3.1.18 MASTER OF PHARMACY (CLINICAL PHARMACY)

3.1.18.1 Prevalence of Medication Errors and the Associated Factors: A Prospective Observational Study among Cancer Patients at Mbarara Regional Referral Hospital

Abigaba Dorothy, Esther Atukunda, Tadele Mekuriya Yadesa

Background: Medication error is one of the most common medical error in the practice of modern medicine. Among cancer patients receiving chemotherapy, medication errors can be potentially harmful given the narrow therapeutic index, complex dosing and toxic nature of anti-cancer drugs.
Objective: This study aimed to determine the incidence and factors associated with medication errors among cancer patients.
Methods: The study was a prospective observational study carried out at the cancer unit of Mbarara Regional Referral Hospital, Southwestern, Uganda. The study included 110 participants both adult and children receiving chemotherapy. The study was carried out for a period of five months from January to May 2020.A checklist was used to collect patient, medication and disease information to identify the prescription, transcription, dispensing and administration errors.
Results: Of the 110 participants, 52 (47.3%) experienced a total of 78 medication errors (MEs). Of these, 33 (42.31%) were prescription errors, 29 (37.18%) administration errors9 (11.54%) transcription errors and 7(8.97%) dispensing errors. In the adjusted logistic regression of factors associated with medication errors, urban residents (aOR, 4.59; 95% CI, 1.08, 19.53, p= 0.039) and educated participants at secondary level (aOR, 10.51; 95% CI, 1.43, 77.14, p= 0.021) significantly had a higher risk of experiencing medication errors. Participants treated with alkylating agents (aOR, 2.87; 95% CI, 1.07, 7.72, p= 0.036) had a greater risk of experiencing medication errors with compared to other classes of chemotherapy.

Conclusion: The incidence of medication errors among cancer patients is high among cancer patients in Mbarara Regional Referral Hospital. Prescription errors are the most common type of errors followed by administration errors and dispensing errors are the least common. Residence, education level and alkylating agents as chemotherapy are significantly associated with occurrence of medication errors.

3.1.18.2 Assessment of Antibiotic Use and Its Impacts on Treatment Outcomes and Cost at Kitgum General Hospital, Northern Uganda

Aboda Alex Komakech, Esther C. Atukunda, Juliet Sanyu Namugambe

Background: Worldwide, the importance of antibiotics is indisputable since it have saved countless lives over the past century (Aminov, 2010). Overuse of antibiotic has been reported to be 65% globally of which two-third are from low-and middle- income countries (Klein et al., 2018). The purpose of the study was to assess antibiotic use, associated factors and impacts of treatment outcomes as well as cost at Kitgum general hospital.
Methods: A facility-based retrospective, cross-sectional, quantitative study design was utilized; prescriptions and medical files of patients were reviewed. The utilization data was obtained from the medical files of patients admitted to the medical ward of Kitgum general hospital with suspected systemic bacterial infection and received systemic antibacterial agents for treatment within twelve months. Descriptive statistics, chi-square model, and logistic regression was applied to determine prevalence, treatment outcomes, and factors associated with antibiotic use. Cost on antibiotic was determined by calculating all the value of medicine purchased in the reviewed period.
Results: Our study documented high prevalence of antibiotic use (62%) in medical ward of Kitgum General Hospital. There was a significant difference among individuals using antibiotics with respect to discharge, death, and self-discharge ($P<0.001$). Individuals aged 30 years and above had increased odds of antibiotic use. Female gender and individuals with presence of comorbidity were less likely to use antibiotics. Thirty-five percent of the total money spent on procurement of drugs for the year 2019/2020 at Kitgum General Hospital was spent on antibiotics.
Conclusion: A high prevalence of antibiotic use of 62% was observed in medical ward of Kitgum general hospital, Kitgum district, northern Uganda, largely, due to unspecified indications of antibiotics therapy and using few classes of antibiotics. We observed a significant difference among individuals using antibiotics with respect to discharge, death, and self-discharge ($P<0.001$). Individuals aged 30 years and above had increased odds of antibiotic use. Female gender and individuals with presence of comorbidity were less likely to use antibiotics. Thirty-five percent of the total money spent on procurement of drugs for the year 2019/2020 at Kitgum general hospital was spent on antibiotics.

3.1.18.3 Prevalence and factors associated with Drug Therapy Problems among Hypertensive Patients at Hypertension Clinic of Mbarara Regional Referral Hospital, Uganda

Babirye Merab, Robert Tamukong, Tadele Mekuriya Yadesa, Abwoya Paul Stephen

Background: Despite the use of safe and effective conventional drugs, drug therapy problems (DTPs) pose a threat to the successful management of hypertension. DTPs are of a

great concern in health care because of their serious consequences such as poor quality of life, increased health care costs, morbidity and mortality. However, there is no published information regarding the prevalence of DTPs and associated factors among hypertensive patients in Uganda.

Objective: The aim of the study was to determine the prevalence and factors associated with drug therapy problems among hypertensive patients at the hypertension clinic of Mbarara Regional Referral Hospital (MRRH).

Method: A cross sectional study was conducted from 2nd November 2021 to 30th January 2022 at the hypertension clinic, MRRH, Uganda among 228 hypertensive patients. Data was collected from medical records using a data abstraction tool and patients were interviewed using a structured questionnaire. Data analysis was done using Statistical Package for Social Sciences (SPSS) version 22.0.Descriptive analysis was used to determine the prevalence of DTPs .Logistic regression was used to determine the association between the independent and dependent variables. Variables were considered statistically significant at p-value <0.05.

Results: A total of 178 DTPs were identified among 141 hypertensive patients .The prevalence of antihypertensive-related DTPs was 61.8% (95%CI, 55.3-67.5) with an average of 1.26 ± 0.52 DTPs per patient. Out of 141 participants with DTPs, 109 (77.3%) had one DTP, 27 (19.1%) had two DTPs and 5 (3.5%) had three DTPs. The most common types of antihypertensive-related DTPs were 'dosage too low' which accounted for 53 (29.8%), followed by 'adverse drug reactions' which accounted for 48 (27%). Uncontrolled BP (AOR, 4.17; 95%CI, 2.33-7.45, P-value <0.001) and routine laboratory test results (AOR, 1.87; 95%CI, 1.04-3.36, P-value= 0.036) were significantly associated with antihypertensive-related DTPs among hypertensive patients.

Conclusion: Almost two-thirds of study participants had antihypertensive-related DTPs. The most common DTPs were 'dosage too low' and 'adverse drug reactions' which both accounted for almost a third of the total DTPs each. Uncontrolled BP and routine laboratory test results were significantly associated with antihypertensive-related DTPs among the study participants. Our study emphasizes the need for improved patient care by clinical pharmacists to identify and prevent DTPs among hypertensive patients.

3.1.18.4 Association between pre-hospital antibiotic Exposure & the level of Bacterial resistance: A matched -Case-control Study at the Medical & Paediatric wards of Mbarara Regional Referral Hospital

Buzaare Peter, **Jonans** Tusiimire, Juliet Sanyu Namugambe

Background: Many patients are irrationally pre-exposed to antibiotics before referral to higher centers of healthcare. This exposure is likely to increase the possibility of patients carrying antibiotic-resistant bacterial strains. This study set out to determine the nature and magnitude of the association between pre-hospital antibiotic exposure and antibiotic resistance at Mbarara Regional Referral Hospital.

Methods: This was a matched case-control study that compared 79 antibiotic pre-exposed patients (cases) and 79 non-pre-exposed patients (controls) hospitalized at medical and paediatric wards at MRRH for various bacterial diagnoses. Data collected included previous medications used, medication sources, knowledge about antibiotics and disease condition, bacterial culture and sensitivity results. Data was analysed to reveal the odds ratios for the occurrence of bacterial resistance between the cases and the controls, the factors associated

with antibiotic pre-exposure, and the common antibiotics to which participants were pre-exposed.
Results: Results from the study showed that pre-exposed patients were significantly more likely to carry antibiotic-resistant bacterial strains compared to the non-pre-exposed patients (OR: 4.76, 95% CI: 1.51 - 15.0; P = 0.008). When the definition of resistance was changed to "three or more antibiotics resisted", OR increased: (OR: 6.67, 95%CI: 3.13 – 14.2, P-value<0.001) and when the definition of resistance was further changed to "four or more antibiotics resisted", the OR increased even further: (OR: 12.4, 95% CI: 5.74 - 26.6; P-value< 0.001) antibiotics. Therefore, the results showed that pre-exposed participants were significantly more likely to have multi-antibiotic resistant strains of bacteria compared to non-pre-exposed participants (controls). In terms of frequencies, male gender, self-medication, seeking healthcare from private facilities, lack of knowledge about antibiotics and lack of knowledge about the disease condition were found to increase the chances of pre-hospital antibiotic exposure. Ceftriaxone (17.6%) and amoxicillin (14.1%) were the commonest antibiotics to which pre-hospitalized patients were exposed.
Conclusion: Pre-hospital exposure to antibiotics is strongly linked to antimicrobial resistance. Strategies should be sought to reduce the level of such exposures and to enforce proper screening of patients during admission to facilitate rational prescription of antibiotics, improve quality of care, and slow the emergence of antimicrobial resistance in the management of infections.

3.1.18.5 Non-Adherence to Hydroxyurea and Its Associated Factors among Children with Sickle Cell Disease at Mbarara Regional Referral Hospital

Gathii Kariuki Evenson, Robert Tamukong, Barnabas Atwiine

Aim: The aim of this study was to determine the prevalence of non-adherence to hydroxyurea among sickle cells disease patients at Mbarara Regional Referral Hospital, as well as listing the factors associated with non-adherence to Hydroxyurea therapy.
Methods: The study design was a single institution cross -sectional study using a Modified Morisky Adherence scale and a structured questionnaire. Stata version 15 was used in analysis of data and results were presented in tables as frequency and percentages for categorical variables, mean and median for continuous variables.
Results: Of the 97 enrolled children with SCD, 18 were non-adherent to HU giving an overall prevalence of 18.6% (11.9-27.7). No significant disparities were noted across the age and gender of the children, p>0.05. The odds of non-adherence to HU were 5.8 times higher among children of Muslim caregivers as compared to those of Christian caregivers, OR=5.8;95%CI:1.18-28.07. Other factors with an important association with non-adherence to HU despite being statistically non-significant are; children where physicians discussed the treatment with caregivers before initiation of HU. (OR=4.2;95%CI:0.91-19.25), Perceived high drug cost (OR=3.7; CI0.88-15.21), age of the child 5-9years (OR=2.8; CI:0.58-13.54), age of the child 10-14 years (OR=3.9; CI:0.54-29.25) and children who report having ever developed an adverse event (OR=3.0; CI 0.25-36.25).
Conclusion: The results of this research provide the first real-world description of HU adherence in a SCD population in Uganda. The results of this study highlight the need for further research to explore more factors and their relationship with non-adherence to HU among children with SCD.

3.1.18.6 Prevalence of Nephrotoxicity among Adult Cancer Patients at Mbarara Regional Referral Hospital Cancer Unit

Isiiko John, Joseph Oloro, Barnabas Atwiine

Background: Nephrotoxicity is common among cancer patients, yet some anti-cancer drugs, for example, platinum derivatives, are nephrotoxic and have narrow therapeutic indices. If nephrotoxicity is not managed, it can progress to kidney injury, which results in unregulated blood pressure, hormonal imbalance, electrolyte imbalance, body fluid imbalance and death. However, the burden of nephrotoxicity among adult cancer patients in Uganda is not documented.
Objective: This study assessed the prevalence and risk factors of nephrotoxicity among cancer patients receiving chemotherapy at Mbarara Regional Referral Hospital Cancer Unit (MRRHCU).
Methods: The study was a cross-sectional study carried out at the MRRHCU, Uganda. All the 206 adult cancer patients who received at least three cycles of chemotherapy and fulfilled the inclusion criteria were included. A data collection form was used to collect data, which was recorded into Microsoft Excel version 2013. Data were analyzed using Stata version 12.1.
Results: Of the 206 participants, 74 (35.9%) developed nephrotoxicity with majority in stage 1 (n = 83, 40.3%) and stage 2 (n = 55, 26.7%). In the multivariate logistic regression of risk factors for nephrotoxicity, age > 50 years old (aOR: 1.80, 95% CI: 1.06, 1.91; p > 0.001), hypertension (aOR: 1.71, 95% CI: 1.74, 1.94; p = 0.011) and use of platinum agents (aOR: 2.04, 95% CI: 1.82, 3.34; p = 0.002) were significant independent risk factors of nephrotoxicity.
Conclusion: About one-third (1/3) of the adult cancer patients at MRRHCU develop nephrotoxicity, which indicates a high burden of nephrotoxicity. The prevention of progression of nephrotoxicity from grades 0, 1 or 2 to grade 3 or 4 is therefore necessary, especially among the patients with risk factors, such as hypertension and age > 50 years old and use of platinum agents.

3.1.18.7 Factors associated with Non-adherence to Anti-diabetes Medications among Patients at the Mbarara Regional Referral Hospital

Karekoona Faisal, Jonans Tusimiire, Tadele Yadesa Mekuriya

Introduction: Non–adherence is a major concern in treatment of diabetes, and undermines the goals of treatment which is to avert severe complications of DM, keep blood sugars within control and prevent DM associated death. The objective of this study was to determine the magnitude of non-adherence to DM treatment and its contributing factors among diabetic patients attending the diabetic clinic at Mbarara Regional Referral Hospital.
Methodology: A descriptive cross-sectional study was adopted at the diabetes clinic, Mbarara Regional Referral Hospital, between July and October 2020. Study participants were systemically sampled and data regarding their medication non-adherence were collected using a structured questionnaire, based on the 8-item standard moriskys adherence scale. Data entry was done using Microsoft Excel (Version 10), and analysis was carried out using STATA.

Results: A total of 257 participants were recruited with 100% response rate.More than one third (98, 38.1%) of the participants were non-adherent to their antidiabetic medication, and this was higher than what was revealed in a previous study in Uganda (28.0%). Age above 60 years (AOR= 6.26, 95% CI= 1.009-39.241, P=0.049), and duration of diabetes above 5 years (AOR= 1.87, 95% CI= 1.034-3.392, P= 0.038) were independently associated with Non-adherence.
Conclusion: The prevalence of non-adherence is higher 38.1% than that revealed in previous studies in Uganda by Kalyango et al (2008) which revealed a prevalence of 28.9%. Patients with age above 60 years were six times more likely to be non-adherent to their medications. Patient education is important to address the challenge of medication non-adherence.

3.1.18.8 Predictors of Medication-Related Emergency Department Admissions among Patients with Cardiovascular Diseases at Mbarara Regional Referral Hospital, South-Western Uganda

Kiptoo Joshua, Robert Tamukong, Conrad Muzoora, Juliet Sanyu Namugambe

Background: Medication related emergency department admissions imposes a huge and unnecessary burden to the healthcare system. We sought to determine the prevalence and predictors of medication related emergency department admissions, among patients with cardiovascular diseases at Mbarara Regional Referral Hospital, Uganda.
Methods: Institutional research ethics approval was secured to conduct a cross-sectional study at the Mbarara Regional Referral Hospital emergency department, between February and September, 2020. All eligible and consenting patients were enrolled in a consecutive manner after a preliminary diagnosis was made by the attending physician. Structured questionnaire interview and comprehensive medication history reviews were used to identify medication therapy problems, in collaboration with a resident physician present on duty. We used sequential categorization for medication therapy problem(s). Descriptive and logistic regression analyses were used to determined prevalence and predictors of medication related emergency department admissions.
Results: Out of the 128 patients interviewed, 105 (82%) patient admissions were associated with a medication therapy problem: ineffectiveness of drug therapy (53.3%, 56), medication non-adherence (42.9%, 45), and adverse drug reactions (3.8%, 4). Out of a total of 90 incidences of medication non-adherence, 34.4% (31/90) were due to lack of understanding of patient medication regimen, and 27.8% (25/90) due to unaffordable cost of medicines. Female gender (AOR = 4.31 [1.43, 13.03 at 95% C.I]; P-value = 0.010]) and a history of tobacco use (AOR = 9.58 [1.14, 80.28 at 95% C.I]; P–value = 0.037) were statistically significant predictors of medication related emergency department admissions in adjusted analysis.
Conclusion: Four in five emergency department admissions were associated with medication related causes, majorly due to ineffectiveness of drug therapy. Knowledge gap on patient medication regimens was the most prevalent cause for medication non-adherence. Female gender and previous or current tobacco use was an independent risk factor for medication related admissions.

3.1.18.9 Prevalence and factors associated with Adverse Drug Reactions among Patients with Multi Drug Resistant-Tuberculosis at Mbarara Regional Referral Hospital

Kushemererwa Oliver, Tadele MekuriyaYadesa, Edwin Nuwagira

Background: The management of MDR-TB involves the use of second-line drug therapy which is more toxic, and their longer duration of use predisposes patients to adverse drug reactions. In this study, we sought to determine the prevalence and factors associated with adverse drug reactions among MDR-TB patients at Mbarara regional referral hospital.
Methods: A retrospective study involved all MDR-TB patients registered at the MDR-TB unit of MRRH from 1st January 2013 to 31st December 2020. Relevant data from the patients' medical records were recorded in a data collection form. Data that was extracted included the patients' demographic and clinical characteristics, drugs administered in the regimen, as well as patients' monthly clinical data and information on ADRs due to anti-TB drugs. ADRs in this study were identified from the medical records based on patient self-reported symptomatic ADRs that were documented in the ADR reporting form and the laboratory-confirmed ADRs. The probability and severity of ADR were determined using the Naranjo algorithm and modified Hart wig and Siegel tool respectively by a team of two pharmacists.
Results: Out of 178 patients included in this study, 120 patients experienced a total of 378 ADRs; with an estimated prevalence of 67.4%. The most frequently affected body systems were endocrine/metabolic (18.3%), otic (14.6%) and musculoskeletal (11.4%). The commonly experienced specific ADRs were arthralgia (24.7%), hearing loss (22.5%) and hypothyroidism (19.7%). Patients who had a history of ADR were 2.85 times (AOR = 2.85 [1.08, 7.53 at 95% C.I]; P-value = 0.03]) more likely to experience an ADR during MDR-TB treatment. However, patients who were underweight (AOR = 0.34 [0.16, 0.69 at 95% C.I]; P-value = 0.003]) and those that used the bedaquiline based regimen in the management of MDR-TB regimen (AOR = 0.2 [0.07, 0.59 at 95% C.I]; P–value = 0.004) were 66% and 80% less likely to experience an ADR respectively.
Conclusion and Recommendations: At least six in ten patients with MDR-TB experienced at least one ADR, with arthralgia and hearing loss being the most prevalent. Patient body mass index, history of ADR, and use of Bedaquiline based regimen in the treatment of MDR-TB were independently associated with ADR in this study. Comprehensive medication use assessment and ADR history taking, especially among patients being re-treated with anti-TBs, is paramount in reducing ADR recurrence among MDR TB patients.

3.1.18.10 Costing of Breast cancer Treatment Depending on Stage of Diagnosis at Mbarara Regional Referral Hospital Cancer Unit

Kyambadde Deo, Esther Atukunda, Juliet Sanyu Namugambe

Introduction: Better treatment and survival outcomes for breast cancer are achieved if the cancer is diagnosed early. Although breast cancer is a growing health problem in Uganda, the costing of its treatment, for different stages of diagnosis still remains undocumented.
Purpose: The study aimed at costing breast treatment at Mbarara Regional Referral Hospital (MRRH) Cancer unit depending on different stages of cancer diagnosis
Methodology: A retrospective descriptive cost analysis method was adopted for this study and involved reviewing patient charts for all patients aged 18-65years diagnosed with breast cancer in the year 2018. A Micro-Costing approach was used to cost the investigations done,

major stage specific treatment options (Surgery, Radiation therapy, Chemotherapy, Hormone therapy), other supportive medication, and human resource used to offer the treatment.
Results: There was 100% compliance to the documented treatment guidelines for stage II and stage IV breast cancer patients over the 2 years of review. The average treatment costs for stage I,II, III, and IV, were $537.5, $609.6, $994.4, and $1403.2 respectively indicating a positive relationship between cost of treatment and stage of diagnosis.
Conclusion: The cost of breast cancer treatment increased with tumor stage of diagnosis and there was 89.2% compliance to the Uganda Cancer Institute Treatment guidelines of 2017, and National Comprehensive cancer Network guidelines in the management of breast cancer at Mbarara Regional Referral Hospital Cancer unit.

3.1.18.11 Cost-effectiveness analysis of integrated community case management delivery models utilizing drug sellers and community health workers for treatment of under-five febrile cases of malaria, pneumonia, diarrhoea in rural Uganda

Lubogo Patrick, Edgar Mugema Mulogo, Freddy Eric Kitutu

Background: Malaria, pneumonia and diarrhoea continue to be the leading causes of death in children under the age of five years (U5) in Uganda. To combat these febrile illnesses, integrated community case management (iCCM) delivery models utilizing community health workers (CHWs) or drug sellers have been implemented. The purpose of this study is to compare the cost-effectiveness of delivering iCCM interventions via drug sellers versus CHWs in rural Uganda.
Methods: This study was a cost-effectiveness analysis to compare the iCCM delivery model utilizing drug sellers against the model using CHWs. The effect measure was the number of appropriately treated U5 children, and data on effectiveness came from a quasi-experimental study in Southwestern Uganda and the inSCALE cross-sectional household survey in eight districts of mid-Western Uganda. The iCCM interventions were costed using the micro-costing (ingredients) approach, with costs expressed in US dollars. Cost and effect data were linked together using a decision tree model and analysed using the Amua modelling software.
Results: The costs per 100 treated U5 children were US$591.20 and US$298.42 for the iCCM trained-drug seller and iCCM trained-CHW models, respectively, with 30 and 21 appropriately treated children in the iCCM trained-drug seller and iCCM trained-CHW models. When the drug seller arm (intervention) was compared to the CHW arm (control), an incremental effect of 9 per 100 appropriately treated U5 children was observed, as well as an incremental cost of US$292.78 per 100 appropriately treated children, resulting in an incremental cost-effectiveness ratio (ICER) of US$33.86 per appropriately treated U5 patient.
Conclusion: Since both models were cost-effective compared to the do-nothing option, the iCCM trained-drug seller model could complement the iCCM trained-CHW intervention as a strategy to increase access to quality treatment.

3.1.18.12 Uptake of HIV post-exposure prophylaxis, completion rates and self-reported reasons for non-completion among health care workers at Mbarara Regional Referral Hospital

Musiime Dan Muzoora, Daniel Atwine, Tadele Mekuriya Yadesa

Introduction: Approximately, 1,000 HIV infections are transmitted annually to health care workers (HCWs) worldwide from occupational exposures. 19.2% of HCWs experience exposure to HIV per year yet the use of post-exposure prophylaxis (PEP) is largely undocumented. We assessed PEP initiation rates and self-reported reasons for non-completion of PEP among HCWs following occupational exposure to HIV.
Methods: A cross-sectional study was conducted at Mbarara Regional Referral Hospital, from March 2020 to October 2020 with a sample size of 206 HCWs. Participants were randomly selected from a list of eligible HCWs that included Medical staff, Cleaners and Medical students at MRRH and all eligible HCWs were enrolled. Information regarding PEP initiation and completion was obtained using a self-administered questionnaire. Chi square test was done to determine proportions in gender, cadre and age among participants who reported to have ever been initiated on PEP for PEP using Epi Info 3.5.1 and Stata version 15 at 95% confidence interval.
Results: Of 206 HCWs who participated in the study, 77 (37.4%) reported to have ever been initiated on PEP of these 56(72%) reported to have completed their PEP while 21(28%) never completed their PEP dose. Exposure was highest among medical staff and there was no significant difference in PEP initiation and completion observed across gender. Self-reported reasons for non-completion was mainly side effects 17(80.9%)
Conclusion: Despite the observed rate of occupational exposure to HCWs at Mbarara Regional Referral Hospital, a reasonable number of Health care workers do not complete their PEP dose due to side effects of drugs. Effective counselling on side effects of PEP Medicines is therefore needed to enable all care workers to complete their PEP after exposure to HIV pathogen.

3.1.18.13 Antibacterial Prescription and the associated factors among Outpatients Diagnosed with Respiratory Tract Infections in Mbarara Municipality, Uganda

Muwanguzi Timothy, Amon G. Agaba, Tadele Mekuriya Yadesa

Background: Respiratory tract infections (RTI) are the second most frequent diagnosis after Malaria amongst Outpatients in Uganda. Majority are Non pneumonia cough and flu which are self-limiting and often do not require antibacterials. However, antibiotics are continuously prescribed for these conditions and are a major contributor to antimicrobial resistance and wastage of health resources. Little is known about this problem in Uganda hence the impetus for the study.
Objectives: To determine the antibacterial prescribing rate and associated factors among RTI outpatients in Mbarara municipality
Methodology: This was a retrospective cross-sectional study on records of RTI outpatients from 1st April 2019 to 31st March 2020 (prior to the corona virus disease pandemic) in four selected public health facilities within Mbarara municipality. A pretested data caption tool was used capture prescribing patterns using WHO/INRUD prescribing indicators. We used logistic regression to calculate factors associated to antibacterial prescribing.
Results: A total of 780 encounters were studiedwith adults (18-59 years) forming the largest proportion of age categories at (337, 43.15%) and more females (444, 56.85%) than men (337, 43.15%).The antibacterial prescribing rate was 77.6% (606) with Amoxicillin the most prescribed 80.4% (503). The prescribing pattern showed an average of 2.47 (sd 0.72) drugs per encounter and the percentage of encounters with injection at 1.5% (24). Drugs prescribed by generic (1557) 79% and drugs prescribed from essential medicine list (1650) 84% both not

conforming to WHO/INRUD standard an indicator of possible irrational prescribing. Female gender (adjusted odds ratio [aOR] = 1.51, 95% confidence interval [CI]: (1.06 -2.16); 18-59 years age group (aOR = 1.66, 95% CI: 1.09 - 2.33) and Individuals prescribed at least three drugs were significantly more likely to have an antibacterial prescribed (aOR= 2.72, 95% CI: 1.86-3.98).

Conclusion: The study found a high antibacterial prescribing rate especially among patients with URTI pointing to possible misuse, polypharmacy and non-conformity to both essential medicine list and generic name prescribing. This prescribing pattern does not comply with rational drug use policy and the discrepancy needs to be addressed through interventions such as prescriber education on rational drug use as well as carrying out more research to determine the appropriateness of antibacterial prescribed.

3.1.18.14 Incidence of Surgical Site Infections and Antibiotic Use among Caesarean Section Mothers at Mbarara Regional Referral Hospital

Mwandah Daniel Chans, Joseph Ngonzi, Tadele Mekuriya Yadesa.

Background: Cesarean Sections carry a risk of infection 5 to 20 times that of normal delivery and it is the single most important risk factor for postpartum maternal infection which account for approximately 10% of pregnancy-related mortality. MRRH has more than 11,000 deliveries annually, with more than 15-20% being by Caesarean delivery mainly due to emergency reasons, and this rate is higher than as recommended by WHO. There is no recent study done to determine the incidence rate of SSIs at OBG ward of MRRH, comparative length of stay and antibiotics use among caesarean mothers, therefore a retrospective cohort analysis was done to determine the incidence of surgical site infections among 1093 post cesarean mothers, their length of stay and antibiotic use at Mbarara Regional Referral Hospital between 1st January 2019 and 31st December 2020.

Methods: A retrospective cohort analysis study was conducted in the OBG ward at MRRH using patient records from January 2019 to December 2019, in which all files during this study period were included. Key focus was on diagnosis of SSI, the length of stay and the antibiotic use by the patient. The data was entered into Epi Data software (version 3.1) and analyzed using STATA version 15. Length of hospital stay was compared between mothers that developed SSIs and those that did not develop SSIs.

Results: The incidence rate of SSIs was at 7.90% with a 95% confidence interval of 6.3-9.6. The mean length of stay for 1,083 participants (12 participants had no data on hospital length of stay) was 4.45 days (SD = 4.41) while that for participants with surgical site infection was 13.4 days (SD = 11.82) and that for participants with no surgical site infection was 3.71 (SD = 1.55). Analysis showed a statistically significant difference in mean length of hospital stay between participants with and without surgical site infection (t-test = 23.6, df = 1079, $p<0.0001$). The most commonly prescribed prophylactic antibiotics was Ampicillin at a percentage of 88.3%, followed by Ampiclox (6%) and Ceftriaxone (4.8%) which were all given intravenously as a single dose. From all the 1,702 antibiotic orders reviewed after caesarean section, it was found that the highest of them had metronidazole (48.0%), followed by Ceftriaxone at 46.7%. Most prescriptions actually contained a combination of ceftriaxone and metronidazole (94.7%).

Conclusion: The incidence rate is higher than reported in developed countries but in range for studies in Sub-Saharan Africa. The length of stay of caesarean mothers who developed SSIs was significantly longer than those that did not develop SSIs. Ampicillin is most used

prophylactic antibiotic, while a combination of Ceftriaxone and Metronidazole is most prescribed post-caesarean antibiotic regimen.

3.1.18.15 Assessment of Adherence to the Malaria Test and Treat Policy among Health Workers at the Out-Patient Department of Mbarara Regional Referral Hospital

Nabaggala Phiona, Jonans Tusiimire, Juliet Sanyu Namugambe.

Background: The Ministry of Health in Uganda rolled out a 'test and treat' malaria policy in 2011, in which prescription of antimalarial medicines was to be based on positive malaria test results and this has been implemented in the country. However, adherence to this policy has not been explicitly investigated. This study assesses health worker adherence to the test and treat policy at Mbarara Regional Referral Hospital.
Methods: Data was collected from patients, patients' prescriptions and laboratory registers at Mbarara Regional Referral Hospital for a period of four months from July to October 2020. A cross-sectional study among 169 patients was conducted. A data collection tool was used to collect patient information, tests done, test results, prior self-medication and drugs prescribed.
Results: Adherence was measured in terms of presence of a parasitological diagnosis of malaria and the subsequent treatment with anti-malarial medication. Only 66.3% of the patients were recommended for malaria (laboratory) testing. On the other hand, 23.7% of those who tested had a negative result but received an ACT drug/prescription and 0.59% had prior exposure to an antimalarial taken in the last one week prior to their hospital visit. Overall adherence to the T& T policy was only 42.6%.
Conclusion: Health worker adherence to the test and treat policy was low and requires improvement. There's need to constantly train and support supervise health workers.

3.1.18.16 Prevalence and Factors Associated With Adverse Drug Events among Patients on Dolutegravir-Based Regimen at the Immune Suppression Syndrome Clinic of Mbarara Regional Referral Hospital, Uganda

Namulindwa Angella, Robert Tamukong, Muyindike Winnie, Joseph Oloro

Background: Highly Active Antiretroviral Therapy is efficacious in suppression of Human Immunodeficiency Virus. However, it is associated with numerous toxicities hence great effort has been put into development of antiretrovirals with better tolerability. The World Health Organization recommended dolutegravir-based regimen as first-line antiretroviral therapy however, recent studies have raised concerns regarding its safety in real-clinical settings due to adverse drug events (ADEs).
Objective: To establish the prevalence and factors associated with adverse drug events among patients on dolutegravir-based regimen
Methodology: A retrospective cross-sectional study was conducted at ISS Clinic-MRRH among 375 randomly selected patients who had been exposed to DTG-based regimen for at least 12 weeks. The patients were interviewed to obtain data on sociodemographics, dietary habits and thereafter their files reviewed to obtain data on ADEs. Data entry was done using Epi-data 3.0 and exported to SPSS version 25.0 for analysis. The prevalence of ADEs was determined as a percentage, and ADE associated factors were assessed using bivariate

analysis, those found significant were further subjected to multivariate logistic regression model and were considered significant at P<0.05.
Results: The prevalence of adverse drug events among patients on DTG-based regimen was found to be 33.1% (124/375) with 5.6% (7/124) participants discontinued from treatment due ADEs, 4 of which were due to hyperglycemia and 3 due to liver toxicity. The commonly experienced ADEs included abdominal pain, hyperglycemia and liver toxicity each at 7.3%, headache at 11.3%, and allergy at 36.3%. Male sex (AOR 1.571, 95% CI 1.433- 1.984), WHO stage one at entry to care (AOR 4.586, 95% CI 1.649-12.754), stage two (AOR 4.536, 95% CI 1.611-12.776), stage three (AOR 3.638, 95% CI 1.262-10.488), were significantly associated with ADEs. Patients with undetectable viral load at initiation of DTG-based regimen were less likely to experience ADEs (AOR = .324, 95% CI .1167-.629).
Conclusion: Up to a third of patients on DTG-based regimen experienced ADEs. Male sex, WHO HIV disease stage and a detectable viral load at initiation of DTG-based regimen were significantly associated with ADEs. It is crucial to actively monitor patients with these characteristics for ADEs.

3.1.18.17 Cancer Chemotherapy Side-Effects and Coping Mechanisms by Adult Patients at the Mbarara Regional Referral Hospital

Nasaazi Claire Rebecca, Robert Tamukong, Barnabas Atwiine

Background: Cancer medicine is associated with a number of side effects and different sites i.e hospital groups and websites are available with information on how to cope through the process. There is no documented or known information on how the patients at MRRH cancer unit cope with the side effects they experience while they go through the process of beating cancer.
Objective: This study aimed to describe the coping mechanisms to side effects used by adult patients receiving cancer chemotherapy at the Mbarara Regional Referral Hospital.
Methods: The study was a qualitative descriptive study carried out at the cancer unit of Mbarara Regional Referral Hospital, Southwestern, Uganda. The study included 40 adult participants receiving chemotherapy. The study was carried out for a period of five months from June to November 2020. An interview was conducted against a guide to identify and probe the patient to share their experiences of how they cope with the side effects of the medication.
Results: Of the 40 participants, 17 were female and 23 were male. Most of the patients were well aware of their medication and its side effects, nausea and vomiting was recorded to be the most reported side effect and three themes were adopted as coping mechanisms discovered by this study i.e, consolation from health worker, self-encouragement and denial.
Conclusion: The two main coping mechanisms by patients at the cancer unit of MRRH are self-encouragement and consolation from the health worker.
We recommend that pictures and testimonies of patients that have obtained complete cancer remission, with their consent, be kept at the cancer unit with pictures of before so as to improve the coping mechanisms of self-encouragement.

3.1.18.18 Prevalence and factors associated With Inappropriate Anti-Diabetic Medication Therapy among Type 2 Diabetes Mellitus Patients at Medical and Surgical Wards of Mbarara Regional Referral Hospital, Uganda

Nigussie Konjit Abebe, Tadele Yadesa Mekuriya, Juliet Sanyu Namugambe, Obwoya Paul Stephen

Background: Drug related problem (DRP) is any undesirable event experienced by a patient that involves, or is suspected to involve, drug therapy, and that interferes with achieving the desired goals of therapy. Globally, many studies have shown DRPs to be very common in primary care and in hospital settings and that substantial proportion of DRPs are related to patients with diabetes. The occurrence of a DRP among diabetic patients could prevent or delay patients from achieving desired therapeutic goals; contributing to poor glycemic control, leading to poorer treatment outcome. Inappropriate anti-diabetic medication therapy (IADT) refers to a drug related problem and includes ineffective drug therapy, unnecessary drug therapy, dosage too high and dosage too low. Identifying contributing factors of Inappropriate Anti-diabetic Medication Therapy (IADT) makes it possible for better control of diabetes and associated complications and can lead to significant reduction in morbidity, mortality and health care costs. To the best of our knowledge, there is limited published study from Uganda on inappropriate anti-diabetic medication therapy. Therefore, the present study assessed the prevalence and factors associated with inappropriate anti-diabetic medication therapy among hospitalized type 2 diabetes mellitus patients (T2DM) at Mbarara Regional Referral Hospital (MRRH), Uganda.

Objective: The aim of this study was to determine the prevalence and factors associated with inappropriate anti-diabetic medication therapy among T2DM patients at medical and surgical wards of MRRH.

Methods: A prospective cross sectional study was conducted at the medical and surgical wards of MRRH from November 2021 to January 2022, Mbarara, Uganda. One hundred and thirty eight adult patients aged 18 years and above, with T2DM were recruited using consecutive sampling. Patient file reviews and interviewer-administered questionnaire was used for data collection. The data was entered into and analyzed using SPSS version 25. Descriptive analysis was employed to describe the population and determine the prevalence of IADT. Types of IADTs were identified using Cipolle's DRP classification tool. A univariate and multivariate logistic regression analysis was used to identify factors significantly associated with IADT. The P-value of < 0.05 was considered statistically significant to study the association between independent variables and IADT at 95 % confidence interval (CI).

Result: A total of 138 T2DM patients from the medical and surgical wards of MRRH were studied. Eighty (58.0%) were females, and 70 (50.7%) were ≥ 60 years of age with a mean age of 58 ± 16.1 years. Out of a total of 138 participants, 97 experienced at least one IADT, with an estimated prevalence of 70.3% (95% CI, 62.3-77.5%). Each patient experienced an average of 1.7 ± 0.46 IADTs. 'Dosage too high' (72, 29.2%) and 'dosage too low' (69, 27.9%) were the most common type of IADTs out of 247 IADTs identified. Age ≥ 60 years (AOR, 8.44; 95% CI, 2.09-10.90; P-value = 0.003), T2DM duration of < 1 year (AOR, 0.37; 95% CI, 0.11-0.35; P-value = 0.019), and HbA1c of < 7% (AOR, 9.97; 95% CI, 2.34-13.57; P-value = 0.002) were significantly associated with the occurrence of IADTs.

Conclusion: The overall prevalence of inappropriate anti-diabetic medication therapy among T2DM patients admitted at medical and surgical wards of MRRH was 70.3%. The prevalence of IADT in our study setting is comparable with the prevalences reported by most of the

previous studies. The most common type of IADT in this study was 'dosage too high', accounting for almost one third followed by 'dosage too low' accounting for a quarter of total IADTs. Age greater or equal to 60 years, T2DM duration of < 1 year and HbA1c of < 7% during the current admission were found to be factors significantly associated with the occurrence of IADTs in hospitalized T2DM patients. Our study highlights the need for improvements in patient monitoring and review by healthcare professionals such as clinical pharmacist to recognize and prevent IADTs in T2DM patients.

3.1.18.19 Poor Glycemic Control and the contributing factors among Type-2 Diabetes Mellitus Patients attending the Outpatient Diabetic Clinic at the Mbarara Regional Referral Hospital, Uganda

Nsheka Bonny Patrick, RoseMuhindo, Tadele Mekuriya Yadesa, Stephen Lutoti

Background: Glycemic control is associated with long term complications in Type 2 diabetes management. However, updated reports on glycemic control that is crucial to reducing diabetes mellitus complications, remain scarce.
Objective: The objective of this study is to evaluate glycemic control and contributing factors among type-2 Diabetes Mellitus patients, attending outpatient diabetic clinic at Mbarara Regional Referral Hospital.
Methods: A cross sectional study was conducted at Mbarara Regional referral hospital outpatient diabetes clinic between July and October, 2020. Participants were subjected to a questionnaire-based interview and glycosylated hemoglobin (HbA1C) was determined as a marker of glycemic control among participants. Collected data was entered into and analyzed by Stata version 13. The odds ratio was used to determine the strength of association between variables. The cut-off value for all statistical significance tests was set at $p < 0.05$ with CI of 95%.
Results: A total of 223 participants were interviewed, and majority (188, 84.3%) had poor glycemic control (HbA1C $\geq$ 7%). Importantly, 81.7% (49/60) and 90.0% (99/110) of those who did not adhere to diet and physical exercise recommendations respectively, had poor glycemic control. Multivariate logistic regression revealed that poor glycemic control was more prevalent among participants aged 25-60 years (AOR = 4.48, 95 % CI: 1.56 – 14.50, p-value=0.009) and those aged above 60 years (AOR = 4.28, 95% CI: 1.18-15.58, p-value= 0.03) compared to the youth, 18-24 years of age.
Conclusion: The prevalence of poor glycemic control among type 2 diabetes patientsin this study is high and it is determined by patient's age. Designing an intervention that promotes diabetes education, lifestyle modification recommendation adherence and benefits of good glycemic control especially for adult patients is recommended.

3.1.18.20 Experiences in Implementing Clinical Pharmacy Services at Jimma University Specialized Hospital (Jush), South West Ethiopia

Nyirankusi Eleth, Robert Tamukong, Esayas Kebede Gudina

Background: Clinical Pharmacy (CP) services are a patient-centered care developed to promote the rational use of medicines and more specifically, to maximize therapeutic benefits, minimize risk, & reduce cost.

Objectives: To explore the experiences in implementing clinical pharmacy services at Jimma University Specialized Hospital, Southwest Ethiopia.
Methods: The study was carried out among heads of departments particularly the doctors, clinical pharmacists and the hospital administrators from May to October, 2020 at Jimma University Specialized Hospital (now renamed as Jimma Medical Center). The study design was a cross sectional study where descriptive, qualitative methods were employed to collect data, analyse and present over a period of six (6) months by an independent research assistant. The thematic analysis method described by Bruan and colleagues was used for qualitative data analysis to make deductions of the study.
Results: A total of 20 participants were enrolled and interviewed in this study between the months of May to October 2020 at Jimma University Specialised Hospital. The participants were predominantly male (80%), and with 1-10 years of work experience (95%). Overall, information was collected from Clinical Pharmacists (n=9), Resident doctors (n=4), Specialists Doctors (n=3), Ward pharmacist (n=1), senior nursing officer (1) and hospital administrator (n=2). The participants narrated the steps taken during the implementation of the clinical pharmacy services at JUSH as being procedural and engaged them in different training. *"My engagement was on attending workshop and training (Hospital Administrator #1)."*Participants share different perspectives about their knowledge of the role of CPs. One participant clearly noted that they could not differentiate between the role of a CP and that of a dispenser before. *"My knowledge about clinical pharmacy service was so limited to the extent that I couldn't demarcate their scope of service with the dispenser (Hospital administrator #1)."* Medical doctors expressed a favorable attitude towards clinical pharmacy services and admitted to their fundamental role in: improving patient care; supporting clinicians in prescribing *up-to-date medications."To be honest there is no perceived threat I learn many things from them and they also learn from us. Both medical care and pharmaceutical care complement each other." (Doctor #6).*
Conclusions: This study revealed CP service is a cost-effective approach because it promotes rational use of medicines, helps contain antimicrobial resistance and improves quality of healthcare. Thus, important lessons have been highlighted in this study that could guide the integration of CP service in Uganda. Particularly, the set-up and implementation of CP services requires early multiple stakeholder engagements and pharmacists should receive proper training to deliver this service. The loopholes are mainly administrative and could be addressed through a national policy or framework that would guide and form a basis for the integration of CP services in the existing health service delivery system.

3.1.18.21 Prevalence and contributing factors to prescribing errors at the medical wards of Mbarara Regional Referral Hospital

Ochieng Salim Otieno, Twinomujuni Silvano Samba, Juliet Sanyu Namugambe, Adrian Kayanja

Background: Prescribing errors range from harmless to severe adverse drug effects. Thefrequency of these errors is high in developing countries, although current literature has notcompletely described the prevalence of these errors in Uganda and specifically the Mbarara region.
Objective: To determine the prevalence and factors associated with prescribing errors at the medical wards of Mbarara Regional Referral Hospital (MRRH).
Method: Thisstudywas retrospective cross-sectional.Datawascollectedbyinterviewing the Key

personnel and review of patient medical files at the medical wards ofMRRH. Patient medical files from 1st January to 30th April 2021were included in this study. Descriptive statistics were analyzed using STATA. The prevalence and types of prescribing errors arepresented as proportions (with confidence intervals) in tabular and graphical formats. Factors associatedwithprescribingerrors are presented as frequencies in tabular format.
Results: The prevalence of prescribing errors was 49.3%; 95% CI (43.3-55.2). The types of prescribing errors were: drug error 18.5%; 95% CI (14.3-23.6), dose error 8.9%; 95% CI (6.0-12.9), duration 22.6%; 95% CI (18.0-23.6), route error 3%; 95% (1.5-5.8), and frequency error 10.0%; 95% CI (6.9-14.2). The identified predictors associated with prescribing errors were: inadequate number of prescribers, high patient volume, ineffective communication, and inadequate medication management reviews.
Conclusion: The prevalence of prescribing errors at the medical wards of Mbarara Regional Referral Hospital was determined to be 49.3%; 95 CI (43.3-55.2) while the factors associated with the errors were as mentioned above.

3.1.18.22 Prevalence and factors associated with Adverse Drug Reactions among Heart Failure Patients Hospitalized at Mbarara Regional Referral Hospital

Shegena Efrata Ashuro, Robert Tamukong, Tadele Mekuriya Yadesa, Boniface Lumori

Background: Globally, heart failure (HF) has been recognized as one of the major cardiovascular disorders with high morbidity, mortality and rising costs. Even though adverse drug reaction (ADR) of the medications remains an obstacle to achieve optimal disease outcomes, the management of HF mainly relies on lifelong therapy with multiple medications. The aim of this study was to assess the prevalence and associated factors of ADR among HF patients hospitalized at Mbarara Regional and Referral Hospital (MRRH).
Method: A prospective observational study was conducted among hospitalized HF patients from October 2021 to January 2022. All HF patients hospitalized in adult medical and pediatric ward during the study period were the source population. Each study participant was followed daily from the time of enrolment until discharge. The statistical data analysis was carried out using SPSS version 21. Descriptive statistics were presented using median with interquartile range and percentages (%). Univariate and multivariate logistic regression was employed to determine factors associated with the ADR.
Result: Overall, 118 HF patients were included in the study with a median age of 43 years. It included pediatrics (22%), younger adults (40.7%) and elderly (37.3%). A total of 164 ADRs were identified during the follow up period of 1011 days. The incidence of new ADRs was 106 ADRs/1000 person-days. The prevalence of ADR was 59.3%. Of the 164 ADRs, 118 (71.9%) wereprobable. Gastrointestinal system was the most frequently (27.5%) affected system. Over half (86, 52.4%) of the ADRs were mild and 96 (58.5%) were preventable. Age group 19-59 (AOR 0.15 [0.03 – 0.35] at 95% CI, p=0.013), herbal use (AOR 3.07 [1.01 – 9.32] at 95%CI, p=0.048), poly-pharmacy (AOR 8.7 [2.4 – 15.77] at 95% CI, p<0.001) and drug-drug interaction (AOR 6.06 [2.79 – 12.5] at 95% CI, p=0.004) were significantly associated with ADRs among HF patients.
Conclusion: This finding showed that more than half of the hospitalized HF patients experienced at least one ADR during their hospital stay, whereas more than one in ten patients experienced a new ADR per day during hospitalization. Over two-thirds of the ADRs were rated asprobable. Gastrointestinal system was the most frequently affected system. Over half of the ADRs were mild and preventable. The use of herbal medicines, poly-pharmacy,

and drug-drug interaction were associated with high risk of ARDs whereas age group 19-59 years was less likely to experience ARDs.

3.1.18.23 Prevalence and Factors Associated with Bacterial Resistance to Cephalosporin among patients with Infected Chronic Wounds at Mbarara Regional Referral Hospital

Wangoye Khalim, Martin Tungotyo, Twinomujuni Silvano Samba

Objective: To determine the prevalence and factors associated with resistance to the third-generation cephalosporins among patients with infected chronic wounds at the surgical ward of MRRH in Uganda

Methods: This was a mixed study design which involved interviewing health workers on the surgical word of MRRH using an interview guide and cross-sectional survey of bacterial isolates from infected chronic wounds. The study participants were selected using convenient sampling technique. Dependingon the nature of samples; each specimen was inoculated on chocolate, blood, mannitol salt sugar, xylose lysine decarboxylated agar, and MacConkey Agar and incubated at 35^0C-37^0C in the incubator. Bacterial identification was performed based on morphological, cultural characteristics, changes in physical appearance on differential agar and motility test. Broth microdilution was used to study the susceptibility of wound isolates.

Results: The most prevalent pathogens isolated were *Staphylococcus aureus* (40.6%, n=28/69) and *Klebsiellaspp* (29%, n = 20/69) while the least prevalent pathogens included *Providenciaspp* (1.4%, n=1/69) and *Enterobacteragglomerans* (2.9%, n=2/69). Overall, the studied bacterial isolates from chronic wounds were most resistant to Cefopodoxime 200mg and Cefixime 400mg with overall resistance rates ranging from 90-100% and 70-100% respectively. Generally, all isolates had complete susceptibility (100%) to Cefoperazone+Sulbactam 2g except 7.1% of *proteusspp*that were resistant. With respect to each brand of third generation cephalosporin, isolates with mean lower MIC values were more susceptible than isolates that exhibited higher mean MICs. However, the differences in Mean MIC observed across various groups were not statistically significant (p= > 0.05). Based on the observed crude odds ratio, participants with prior exposure to the third generation cephalosporins (OR, 2.22, 95% CI, 0.80 – 6.14), comorbidities (OR, 1.76, 95% CI, 0.62 – 4.96) and those who had more than two hospitalizations in a year (OR, 1.39, 95% CI 0.46 – 4.25) were more likely to have isolates resistant to more than 2 third generation cephosprins. However, multivariate logistic regression was not performed since no factor was significantly associated with resistance to more than two brands of third generation cephalosporins (p >0.05).

Conclusion: The most prevalent pathogens isolated from infected chronic wounds on the surgical ward of MRRH were *staphylococcus aureus, klebsiella species* and *proteus species* and the most effective antibiotics were cefoperazone+sulbactam, ceftriaxone and cefotaxime while cefixime and cefpodoxime were the most ineffective antibiotics against infected chronic wound isolates. All the factors investigated were not significantly associated with bacterial resistance to third generation cephalosporins. Finally, Health workers reported low level of antibiotic stewardship practices in the surgical ward of MRRH.

3.1.19 MASTER OF PUBLIC HEALTH

3.1.19.1 Factors associated with late initiation of ART among refugees and non-refugees at Nakivale Refugee settlement: A comparative study

Arijuna Davis, Fred Norman Bagenda

Introduction: Despite late Antiretroviral therapy initiation being a public health concern among migrant populations in developing countries, there is yet a high influx of refugees and limited documentation of the comparative late Antiretroviral therapy initiation. This study determined the prevalence and factors that influence late initiation of ART among refugee HIV positive and non-refugee HIV positive patients living in Nakivale refugee settlement.
Methods: This was a descriptive retrospective study that considered data of HIV positive clients in Nakivale refugee settlement. Consecutive samplingmethod was used to recruit 264 clients with CD4 cell count less than 350 cells/mL or those diagnosed from 2013 to 2016 and with CD4 cell count less than 500cells/mL recommended for ART but took six months or more without starting.
Record review was then done using a pretested checklist (Socio-demographic characteristics, Medical history and health facility characteristics). Data was entered into Microsoft Excel version 10 and exported into Stata 15 for data analysis. Summary statistics were used to describe the socio-demographic characteristics and prevalence of late ART initiation.
Results: The factors associated with late ART initiation among refugees were compared with those of non-refugees using the Chi-square test followed by logistic regression analyses.Of the 264 late ART initiators, majority were non-refugees, 211(79.9%). All independent variables with *p*-values <0.05 were entered into a multivariable model. Being a refugee client seeking health care services at Nakivale health centre III (aOR = 14.1, 95%CI: 5.61-35.18, $p<0.01$) and presence of comorbidities (aOR = 1.9, 95%CI: 1.11-4.55, $p<0.05$) influenced increased late ART initiation in Nakivale refugee settlement.
Conclusion: Majority of non-refugees reported late for ART initiation and comorbidities were the key determinants of increased late ART initiation in Nakivale Refugee Settlement.

3.1.19.2 Prevalence and factors associated with Sexual Harassment among Secondary School Students of Mbarara City, Southwestern Uganda

Doreen Musiime, Edgar Mugema Mulogo

Background: Sexual harassment (SH) in institutions of learning in Uganda has been a public health concern until 2019 when the parliamentary select committee set anecdotal inquiries. However, there was limited information on the factors associated with sexual harassment in various settings, including Mbarara City. This study, therefore, assessed the prevalence and factors associated with sexual harassment among Secondary school students of Mbarara City, Southwestern Uganda.
Methods: A school-based analytical cross-sectional study design was conducted among secondary school students in Mbarara City between February and March 2021. A total of 384 students from Senior 3 to Senior 6 were randomly selected based on the proportion to size technique. Self-administered questionnaires were used to obtain the data. SH was defined as

experience of either verbal, physical, or both. Data were analyzed using Stata 15. Descriptive statistics, chi square tests, and binary logistic regression were used.
Results: Of the 384 participants, the majority were females, (52.60%), Senior Four, (58.59 %), and aged 15-17 years (68.75%). The prevalence of sexual harassment stood at 35.4%. Female students reported a higher likelihood of sexual harassment than counterpart males (AOR: 1.8, 95% C.I: 1.04-3.17, $p = 0.036$). Also, Students who reported unequal power relations had a higher likelihood of sexual harassment than counterpart males (AOR: 64.8, 95% CI: 9.86-425.85, $p<0.001$). Students who reported no limited law enforcement indicated a higher likelihood of sexual harassment (AOR: 4.2, 95% CI: 2.04-8.64, $p<0.001$).
Conclusions: Differences in gender, unequal power relations and limited law enforcement influence sexual harassment.

3.1.19.3 Prevalence of HIV serostatus disclosure to a sexual partner and association with adherence to antiretroviral therapy among HIV positive postpartum mothers in Lwengo district, central Uganda

Yasiini Nuwamanya, Francis Bajunirwe

Background: Adherence to antiretroviral therapy (ART) is crucial for elimination of mother-to-child transmission (eMTCT) of HIV through ensuring sustained maternal HIV viral load suppression. Disclosure of HIV serostatus to a sexual partner remains one of the major challenges to the effectiveness of the eMTCT program. This study aimed at assessing the prevalence of HIV serostatus disclosure and adherence to ART among postpartum mothers, the methods used to disclose and factors associated with adherence.
Methodology: We conducted a health facility-based, cross-sectional study using quantitative methods over a period of 6 months in Lwengo district, Uganda. Data were collected using a pretested interviewer-administered structured questionnaire to HIV positive postpartum mothers receiving HIV care at 14 eMTCT sites. The data were entered into EPI data version 3.1 and analyzed in STATA version 12, using descriptive statistics for continuous variables, and bivariate and multivariate analysis using logistic regression with adherence as the primary outcome.
Results: We enrolled 495 participants. Overall, 85% had disclosed their HIV serostatus to their sexual partners. The disclosure rate was lower for mothers diagnosed with HIV for the first time during pregnancy (80%) compared to those diagnosed before (87.3%), p-value <0.059. The most common methods of disclosure were self-disclosure (58.7%), couple counseling and testing (32%) and Assisted Partner Notification (7%). The majority (94.7%) were adherent to ART but the adherence rate was lower (84.6%) for mothers that had not disclosed compared to those that had disclosed (96.3%), p-value <0.0001. Disclosure of HIV serostatus to a sexual partner (aOR=11.46, 95% CI (4.66, 28.15)), duration on ART between 13-24 months (aOR=8.31, 95% CI (1.30, 53.11)) and severe internalized stigma (aOR=0.03, 95% CI (0.002, 0.48)) were significantly associated with adherence.
Conclusion and recommendations: Disclosure is significantly associated with adherence and should be encouraged. Leverage of improved male involvement should be used to intensify couple counselling and testing and facilitate disclosure by HIV positive mothers. Assisted partner notification should also be intensified, and all mothers should receive routine psychosocial assessment and support. There is also need for continuous adherence support and monitoring even, among treatment experienced mothers to sustain good adherence.

3.1.19.4 Prevalence and Factors Associated with Hepatitis B Infection in Bugoye Sub County, of Kasese District in Western Uganda

Brian Turigye, Edgar Mugema Mulogo, Ross M Boyce

Background; A hepatitis B infection is a disease of public health significance that has remained a challenge in Uganda's health care. There is very limited data on the burden of the disease in Kasese district, western Uganda. This study therefore sought to determine the prevalence and factors associated with hepatitis B in Bugoye subcounty, Kasese district.

Methods; Secondary data from an earlier studyin Bugoye subcounty was used todetermine two villages (one with a high prevalence and the other with a low prevalence) for data collection in this study. We conducted a descriptive cross-sectional study employing a mixed methods approach. Quantitative data was collected first followed by qualitative data aimed at getting follow- up explanations for the quantitative data obtained in the 2 selected villages. Quantitative data was collected at household level using structured questionnaires. Qualitative data was obtained using Focus group discussions from community members and Health workers. Quantitative data analysed using STATA version 14 and qualitative data using Microsoft Excel A bivariate and multivariate analysis using logistic regression were conducted to assess the factors associated with HBsAg. Results were presented in tables.

Results; We enrolled 287 participants. We analysed complete data from 286 participants with whom 50.3% (144/286) were from Muramba 2 village and 49.7% (142/286) from Kanyamingho village; 125 individuals aged ≥ 15 years, and 161 children < 15 years. Overall. The median age w.as 6 years among children <15 years and 32 years among adults ≥ 15 years, with 73.6% being females**.** The overall prevalence of hepatitis B among adults ≥ 15 years was 4.8%. Prevalence of hepatitis B among adults ≥ 15 years in Muramba 2 was about 9.5% and 0% in Kanyaminigo village. There was an overall prevalence of 0% among children < 15 years. The multivariate model indicated that having one sexual partner (aOR = 0.35, 95%CI 0.276-0.44, P value <0.001), ever tested for HB (aOR = 1.10, 95%CI 1.08-1.12, P value <0.001), ever received blood transfusion (aOR = 3.23, 95%CI 2.70-3.86, P value <0.001) and ever used IV drugs (aOR = 8.08, 95%CI 6.89-9.47, P value <0.001) were independently associated with Hepatitis B infection. For qualitative data, three main themes were identified: (1) knowledge and perception and (2) myths and misinformation and 3) practices around hepatitis B; its spread and control,

Conclusions and Recommendations; Our findings indicate that Bugoye Subcounty has an intermediate-high prevalence of hepatitis B in adults 15 years and above and zero prevalence in children less than 15 years. This may suggest that the infection probably happens later in life and also underscores the role of vaccination in reducing hepatitis B. This points to the need to boost hepatitis B vaccination services among adults.

3.1.19.5 Measles Outbreak Investigation in Bugoye Sub-County, Kasese District

Walekhwa Abel Wilson, Edgar Mugema Mulogo, Ross Mathew Boyce

Background: Measles outbreaks are prevalent throughout sub-Saharan Africa despite the preventive measures like vaccination that target under five-year-old children and health

systems strengthening efforts like prioritizing the supply chain for supplies. Measles immunization coverage for Kasese district and Bugoye HC III for 2018 was 72% and 69% respectively which is below the national target. This is always marked red in the Red categorization the national league table indicators (regarded poor performing). The aim of this study was to assess the scope of the 2018-2019 measles outbreak and the associated risk factors among children aged 0-59 months in Bugoye sub-county, Kasese district, western Uganda.

Methods: We conducted a retrospective unmatched case-control study among caregivers of children aged 0-59 months. A total of 70 measles cases (either a clinical presentation or a laboratory confirmation,IgM positivity) and 100 controls were selected in this study. The cases were categorized into two; (1) facility based cases (children were presented at Bugoye Health Centre III (BHC)) or (2) community based cases (cases who were identified in communities through the support of VHTs and were taken to neighbouring health facilities. Data collection exercise took place in July – August 2020. A modified CDC case investigation form, Key informant /focus group discussion (FGD) guide were used in data collection. Due to ethical procedures the children under five years provided assent and caregivers provided consent by signing or putting their thumb on the informed consent form and consequently the caregivers who accepted were interviewed. Quantitative was collected and analysed using Microsoft Excel and STATA version 13. Qualitative data was collected through recording on smart phones and later transcribed verbatim. Deductive thematic analysis was later conducted.

The children's immunization cards and health registers at BHC were reviewed to ascertain the immunization status of the children before the outbreak. Purposive sampling technique was used to identify the 7 key informants (KI) and 5 FGD participants using Ministry of Health (MoH) guidelines. These people identified play a critical role in planning, executing and responding to epidemics in the district. In addition, they play a role in Immunisation activities in the district at large and Subcounty in particular. Seven KIs were Resident District Commissioner who also doubles as chair of District Epidemic Response Committee, District Health Officer, Assistant District Health Officer in charge of Maternal Child Health, District Surveillance Focal person, In charge of BHC, Expanded Programme on Immunisation (EPI) in-charge at BHC, Subcounty Village Health Team (VHT) coordinator.

The FGD participants included the staff directly involved in immunization activities at BHC. These were both vaccinators (trained volunteers) and technical health workers working in maternity and Outpatient department (OPD). Univariate, bivariate and multiple logistic regression were performed during data analysis for quantitative data while inductive thematic analysis for qualitative data.

Results: An extended measles outbreak occurred in Bugoye, Uganda between December 2018 and October 2019. All 34 facility-based measles cases were documented to have maculopapular rash, conjunctivitis, and cough. In addition, majority of the measles cases had fever (97%), coryza (94.1%), lymphadenopathy (76.5%), arthralgias (73.5%) and Koplik Spots (91.2%) as documented in the clinical registers. Similar symptoms were reported among 36 community-based cases.

Approximately two-thirds of all cases (48 of 70, 68.6%), including 23 (67.7%) facility-based cases and 25 (69.4%) of community -based cases, had documentation of measles vaccination prior to clinical illness, while one-third (22 of 70) were not previously vaccinated. Among cases who were vaccinated, the median duration between vaccination and disease onset was

885 days (IQR 575-1340). A higher proportion of controls (80 of 100, 80%) reported receiving vaccination (p= 0.09).

The risk factors associated with the outbreak included; history of being unvaccinated and being a female aged 4 years and above, inconsistency in vaccine stocks, unreliable transport means.

Conclusion: Measles is still a significant problem. This study showed that this outbreak occurred between December 2018 to October 2019 and it was associated with under-vaccination. Implementing a second routine dose of measles-rubella vaccine at 4 years of age would boost the immunity of the children.

3.1.19.6 Prevalence and factors influencing Primary School Dropout in Muramba Sub County, Kisoro District, South Western Uganda

Uragiwenimana Vallence, Ntaro Moses

Background: Dropout rate in the primary schools highly affects the attainment of the Universal Primary Education goals and objectives. This study determined the prevalence of primary school dropout rate and its contributing factors in Muramba Sub County, Kisoro District Southwestern Uganda.
Methods: A cross-sectional study involving randomly selected primary school children in Muramba Sub County, Kisoro District was conducted. Interviewer's administered questionnaires were used to obtain data from pupils on dropout rate.
Discussions were used to obtain data from school management committee members, teachers and head teachers, to obtain factors affecting dropout of pupils.
Data from pupils were analyzed using Stata 15.0. The prevalence of dropout rate was determined as a proportion whereas binary logistic regression was used to determine factors associated with dropout rate at p-value <0.05.
***Results*:** Of the 359 children studied, 57 (15.1%) were dropouts. Pupils who were in boarding [aOR (95%CI): 0.2(0.03-0.76), p<0.05)], with access to meals at school [aOR (95%CI): 0.3(0.11-0.58), p<0.01) and access to constant water supply (no: aOR: 2.9, 95% CI: 1.31-6.37, p<0.01) were less likely to dropout
Conclusions and recommendations: Given the high prevalence of dropout rate associated with pupil type, access to meals at school and constant water supply at school, it is imperative that there is a need for school authorities to carefully monitor for meal and water hygiene access among primary school children, particularly day pupils.

3.1.20 MASTER OF PUBLIC HEALTH WITH RESEARCH ETHICS

3.1.20.1 Voluntary Consent to Research among Parents of Children in the CHAPAS-4 and ODYSSEY HIV Clinical Trials

Shafic Makumbi, Francis Bajunirwe, Victor Musiime, Imelda K Tamwesigire

Introduction: Voluntary consent is a prerequisite for research involving human subjects. Investigators have a responsibility to ensure that prospective research subjects make voluntary informed consent decisions so as to be enrolled in research. For their decisions to be meaningful, the subjects must perceive themselves to have made a voluntary choice. However, the voluntariness of consent remains a significant challenge to the meaningfulness of consent in research involving children. This study aimed at assessing the voluntariness of consent in on-going Paediatric HIV clinical trials and the factors associated.

Methods: We conducted a mixed methods cross-sectional study among parents of children enrolled in the CHAPAS-4 and ODYSSEY clinical trials at the Joint Clinical Research centre Mbarara Regional Centre of Excellence. Data were collected over a period of 4 months using an interviewer administered tool and an in-depth interview guide. The tool included items adopted from the voluntariness ladder and survey of influences questionnaire. The data from quantitative and in-depth interviews were triangulated at interpretation. The quantitative data was analysed using STATA IC 16 while the qualitative data was analysed using Nvivo-12.

Results: We enrolled 151 parents (15.9% males and 84.1% females). Their median age was 40 years (range: 18-69). Overall, 39.0% of the respondents read the entire consent documents whereas 50.3% read only part of the document and 10.6% reported not reading the consent documents at all. Only 47.0% fully understood the trial whereas 48.3% understood some parts of the trial and 4.6% reported not understanding the trial at all. On the other hand, about 95% reported that they received enough information about the study. At least 67% gave a voluntary decision for their children to participate in the trial. Trust in medical researchers [aOR=10.41(1.15-93.91), p=0.037], male parent/guardian [aOR=3.82 (1.05-13.87), p=0.042] and prior research experience of the child [aOR=0.32(0.13-0.77), p =0.011] were significantly associated with voluntariness of consent. Consulting others was negatively associated with voluntariness of consent [cOR=0.25 (0.11-0.58), p-value=0.001)]. Majority of the respondents in the in-depth interviews reported that the child's health condition forced them to participate in the parent trial whereas some reported manipulative influence from the referring health workers. Advice was the main form external influence and came from referring health-workers (36.4%), spouses (29.1%), other family member (26.5%), friend (15.2%), members of the study team (6.6%) and community member (4.6%) that were consulted about participating in the trial**.**

Conclusions: The study demonstrated that comprehension and voluntariness of consent in paediatric HIV clinical trials in this population were low and also identified problematic areas. Health workers and family members are the main sources of external influence on the voluntariness of consent.Femaleparents/guardians may need interventions to enhance voluntary participation in HIV paediatric clinical trials. **Funding:** Mbarara University Research Ethics Education Program (**MUREEP***;* R25TW010507, PI: Associate Professor Gertrude Kiwanuka)

Key words: voluntariness, voluntary, consent, parents, research

3.1.20.2 Decisional capacity and coercion among patients enrolled in research at health facilities in resource-limited settings

Gladys Nakalema, Gad Ndaruhutse Ruzaaza, Gertrude N. Kiwanuka

Background: Questionable decisional capacity and coerced participation compromise ethical research. In contrast to many studies which have focused on psychiatry patients, the aim of this study was to assess decisional capacity and coercion among patients enrolled in medical research at two research intensive facilities in South-Western Uganda

Methods: We conducted a cross sectional study at Mbarara Regional Referral Hospital, and Mbarara Epicentre Research Base. We administered 185 semi-structured questionnaires and 7 individual in-depth interviews using items adopted from the University of San Diego, Brief Assessment of Capacity to Consent, and the Coercion Assessment Scale (CAS) tools.

Results: Of the 185 participants, 78.4% were female, 53.4% had attained primary education, while 84.9% had no prior research experience. The overall mean score for decisional capacity was 12.24 (SD 3.12). Over two-thirds (75.14%) of the participants had inadequate capacity to consent to study participation. Participants in interventional studies had a higher mean score 13.43 (SD 2.80) than those in observational studies 11.09 (SD 3.01). On the CAS, 93.5% of the participants felt joining the parent study would please the doctor/nurse. Most participants (97.3%) experienced coercion from the possibility of accessing better healthcare services.

Conclusion: We recommend assessment of decisional capacity of potential participants' prior study participation coupled with full disclosure of study information. **Funding:** NIHGrant No.5R25TW010507, Mbarara University Research Ethics Programme (MUREEP)
Keywords: Decisional capacity, Coercion

3.1.20.3 Trust in Medical Research among Patients at a Regional Referral Hospital and Community Members in Lira District, Northern Uganda

Jafesi Pulle, Francis Bajunirwe

Introduction: Globally, historical events such as the Tuskegee Syphilis Study shaped how the public perceives and trusts medical research. In the modern day, epidemics are accompanied by misinformation which may further erode the public trust in research. Prior to COVID-19, Uganda was an epicentre of epidemics including Ebola. The country has recently experienced a growth in the volume of medical research; however, few studies have been done to examine levels of trust in medical research.

Objectives: This study aimed to compare the level of trust in medical research among hospitalized patients and community members, identify other associated factors and explore prevailing community perceptions of trust in medical research.

Methods: Between August and September of 2021, we conducted a cross-sectional study in the Lira District of northern Uganda and administered structured interviews to community members and hospitalized patients. Community members were selected at the household level using a multistage sampling procedure and hospitalized participants were selected using systematic sampling at the general adult wards of Lira Regional Referral Hospital. We also conducted Focus Group Discussions with purposively sampled community members to ascertain in-depth perceptions of trust in medical research and recent contact with health care workers. The primary outcome variable was trust in medical research and was measured and indexed to a 100-point scale using a validated 12-item questionnaire. We conducted correlation analyses to explore relationships between trust and several variables. Multiple linear regression analysis was done to examine whether community members versus

hospitalised patients was associated with medical trust after adjusting for several potential confounding variables. We also conducted focus group discussions to gain in depth understanding of community perspectives of trust for medical research. Quantitative analyses were done using Stata version 12 while qualitative Atlas ti software version 9.

Results: We enrolled 306 participants. We analysed complete data from 296 participants with 148 (50%) from the community. Overall, 192 participants (65%) were female with an average age of 29.5 years (SD 9.2). The mean level of trust in medical research was higher among hospitalized persons 68.68 (SD 4.1) compared to community members (60.3 (SD 9.6)**,**p=0.0001. Multiple linear regression indicated that hospitalized patients (Coeff 0. 1214, 95% CI0. 0867393, 0.1559811, p=0.0001), willingness to participate in research (Coeff 0.0947, 95% CI 0.0387596, 0.1507104, p=0.001), previous research participation (Coeff 0.0403,0. 0038377, 0.0767686, p=0.03), previous and reported fair health status (Coeff 0.0668, 95% CI 0.0003017, 0.1332552, p=0.05) were positively associated with level of trust. The final model explained 26.7% of the variation in level of trust. Community engagement, proper community entry and researcher experience and researcher experience and previous involvement with community were important perceptions of trust from qualitative analysis.

Conclusion: Our findings suggest that trust in medical research is higher among hospitalized patients compared to community members. Interactions with medical personnel may explain the higher levels of trust and such interactions should be encouraged for persons in the communities. This research was funded by the Mbarara University Research Ethics Education Program (MUREEP), an NIH-FIC funded project.

Keywords: Trust, medical research, research ethics, community engagement

3.1.21 MASTER OF MEDICAL LABORATORY SCIENCE

3.1.21.1 Physico- Chemical and Bacteriological Quality of Water Sources and Household Drinking Water in Bubaare Sub County, Mbarara District, Southwestern Uganda

Besigye Denis, Ampaire Lucas, Atwebembeire Jeninah

Background: Water is indispensable for human health and wellbeing as it constitutes 60% of human body. Water Contamination increases along the water chain starting from the source to stored drinking water in households. Waterborne diseases constitute a major public health burden in developing and underdeveloped countries. Objective of the study was to determine the Physico-chemical and bacteriological analyses of water sources and household drinking water in Mugarutsya parish Bubare sub county Mbarara district Uganda.

Methods: This was a cross-sectional study which 126 water samples were collected randomly and analyzed for both physico-chemical and bacteriological contamination. The Inclusion criteria was household heads, Water sources and water stored for use in households in Mugarutsya parish by the community members. Water samples were collected from water sources and household drinking water. Water samples collected were transported in a cool box and were examined in less than 6 hours at national water and sewerage cooperation laboratory for physicochemical parameter tests while for bacteriological tests were done at Mbarara regional referral hospital microbiology laboratory. The physical parameters were measured in-situ at the time of sample collection in order to avoid the alteration/changes that were likely to occur in their values during transportation and storage.

Results: Males were many as household heads with 78.13%. The most age groups of household heads was 50-69yrs and 46.88% were married. Most of the household heads stopped in primary school level with 71.88%. . Most households take long to clean their water containers p-value 0.057 and the Confidence interval was (0.9825508, 3.331723) and this was significant to cause water contamination. The most used Transport means to fetch water from water sources was walking with 75% and the p-value was 0.046 and the confidence interval was (0.1282908, 0.9826412) and very significant to cause water contamination. Many households boil water for drinking with (67%) showing that 33 % do not treat drinking water well with p-value of 0.793 and confidence interval of 0.5985429,1.479658. Many households store water in jerry cans with 78.89%. The 18.75% households had no toilets. Physical chemical parameters were tested and Mutumo cell was found with acid water in some water sources at a pH of 4.38. The 41.935% water sources were having total coliforms but with no *E.coli* present and 14.286% water samples had *E.coli*. The 100% of household drinking waters samples had total coliforms and they had increased presence of *E.coli*with 21.875% compared to water sources 6.45% of *E.coli*.
Conclusion: The 25% people were still taking drinking water that was not boiled. Also 71.88% household heads were not so educated as most of them ended at primary level of education. The 56.25% households were found with very dirty containers for keeping drinking water. The colour of water sources was higher than that water sources. The total alkalinity of the household sources was slightly higher than that of water sources. Water samples from water sources were more turbid than household water sources. The pH of household water sources was slightly higher that of water sources. Household water sources were more contaminated with E. coli than water samples from water sources.

3.1.21.2 Diagnostic Utility of HemoTypeSC Point of Care Test and Prevalence of Sickle Cell Heamoglobin Variants among Children 6 months to 5 Years In Kamuli District, Uganda

Kadhumbula Sylivestor**,** Muwanguzi Enoch, Niyonzima Nixon

Background: Timely diagnosis of sickle cell disease among patients is very important for the management of affected patients. We describe results of a laboratory based research project that was conducted to evaluate the diagnostic utility of hemotypeSC point of care test in detection of heamoglobin variants.
Objective: To determine the diagnostic utility of HemoTypeSC POCT in diagnosis and prevalence of Sickle cell Hb variants among children aged 6 month to five years in Kamuli district.
Methods: In a cross-sectional design, 227 participants were recruited using a consecutive sampling procedure used till the required sample size was achieved. Specimens were analyzed in the laboratory using the HemotypeSC POCT considering the HB electrophoresis as the standard of care.
Results: There wasa slightly bigger proportion of males (52.4%) and their average age was 2.3 years. When using the Hb electrophoresis the most prevalent variant was SS (16.3%) followed by AS (15.0%).Using the hemotypeSC,, the most prevalent variant was AS trait (17.2%) and then SS (14.1%). For hemoglobin type AA, the sensitivity, specificity, positive predictive value and negative predictive values were all 100%. For the AS trait, the sensitivity of the hemotypeSC was 100% (95% CI=89.7%, 100%), specificity was 97.4%, positive predictive value at 87.2%, negative predictive value, at 100% and the positive likelihood ratio at 35.7. For the SS trait, the sensitivity of the hemotypeSC was 86.5%, with

positive predictive value 95%. The negative predictive value was 97.4% and the negative likelihood ratio being 0.135.

Conclusion: In conclusion, the prevalence of sickle cell disease in Kamuli among children 6 months to 5 years is 16.3% using the Hb electrophoresis and 14.1% using the HeamotypeSC. The HeamotypeSC has a good accuracy with sensitivity above 85% for all the genotypes and specificity above 97% for all the genotypes when compared to Hb electrophoresis hence can be used as point of care for testing for hemoglobin variants.

Recommendation: The study recommends that more, performance studies can be carried out in other places that are not endemic to sickle cell heamoglobin variants to ascertain whether the same pattern of sensitivity and specificity can be reproduced. In the wake of limited access to diagnostic facilities, hemotypeSC can be rolled out as a screening test in areas with poor electricity coverage and areas where turn around time is critical for testing for sickle cell disease.

3.1.21. 3 Prevalence of Bovine Trypanasomiasis and Anaplasmosis, Farmer's Knowledge and Control Practices in Rwampara District

Kalembe Solome, Michael Nyende Kakaire

Livestock plays a pivotal role in the livelihoods of communities in rural Africa and thus factors affecting the health and productivity of livestock are important constraints in the development and wellbeing of such communities. The impact of tick-borne diseases and animal Trypanosomiasis in Uganda is most felt through costs incurred in efforts to control the disease vectors that transmit the diseases.

The study major aim was to carry out a farm survey of the prevalence of trypanosomiasis and anaplasmosis in Rwampara District and the other objectives focused on farmers' knowledge of vectors and, attitudes and practices used to control trypanosomiasis and anaplasmosis.

It was a cross sectional study where one hundred eighty-three (183) heads of cattle were selected randomly from farms in parishes that had been selected by stratified sampling. Venous blood was collected in EDTA vacutainers. Thin and thick blood smears were prepared and examined for anaplasmosis and trypanosomiasis respectively. Questionnaires were administered to collect data on acaricides used, farmer's knowledge, attitudes, anaplasmosis and trypanosomiasis control practices. Data was entered excel and analyzed using Stata statistical package version 12.

The prevalence of trypanosomiasis and anaplasmosis was 0.6% and 31.2% respectively. The most used acaricides were Amitraz used by 21 out of 44 farmers (47.73%) and Duodip used by 14 out of 41 farmers (31.82%). The least used acaricides included Decatix, Tacktic, Baytical and Supona, each used by 1 (2.27%) of the farmers. Farmers were knowledgeable about disease vectors and symptoms (93.18%), but lacked knowledge on acaricides that kill ticks, tsetse flies and other biting flies since only 6 farmers were using acaricides that integrate.

It was concluded that there was high anaplasmosis prevalence (31.15%) in Rwampara and a low prevalence of trypanosomiasis (0.55%). The most used acaricide was Amitraz (Amidines) followed by Duodip. Farmers had excellent knowledge about the vectors but low about acaricides used. Generally, farmers had good attitude towards the acaricides used in

prevention, but some farmers thought they did not need integration technology. There is need to enhance farmers knowledge on acaricides through community sensitization. There is need to encourage and support farmers to have access to acaricides that integrate the control of Ticks, Tsetse flies and other biting flies.

3.1.21.4 Expression of P53 and KI-67 proteins in specimens with Cervical Intraepithelial Neoplasia and Cervical Cancer at the Department of Pathology Makerere College of Health Sciences

Kato Herman**,** Okwi Andrew Livex, Raymond Atwine, Frank Ssedyabane

Introduction: Cervical cancer is one of the four most frequent types of cancer in females. It develops from premalignant to invasive stages in a multistep process of carcinogenesis. The differentiation between cervical intraepithelial neoplasia LSIL, HSIL and early squamous cell carcinoma (SCC) of the cervix could be difficult to diagnose in certain situations unless we see the invasion.

Objective: To determine the level of expression of p53 and Ki-67 Proteins and their association with various grades of cervical intraepithelial lesions and malignancy.

Materials and Methods: This was a cross-sectional study, where 82 formalin-fixed paraffin-embedded (FFPE) cervical biopsies were selected by initial diagnosis (Normal cervix n=10; LSIL n=4; HSIL n=13; SCC n=50 and Ad n=5) from the files of the Pathology Department of Makerere College of Health Sciences (MakCHS) diagnosed between August 2020 and December 2020. All cases were evaluated by immunohistochemistry using Ki67 & p53 monoclonal antibodies. Data analysis was performed by use of STATA version 15.0 and a Pearson's Chi-square test was used to determine the association.

Results: In the 72 abnormal cases studied, Ki67 protein presented expression in 69 (95.8%) and absence of expression in 3 cases (4.2%). p53 protein presented expression in 44 (61.1%) and absence of expression in 28 cases (38.9%). The difference of Ki-67 protein expression and intensity between HSIL and SCC was statistically significant (p-value <0.001). There was statistically significant association between histological type of cervical cancer (SCC) and p53 over-expression and intensity (p-value <0.001). There was no statistical difference of p53 expression between LSIL and HSIL.

Conclusion: Over expression and intensity of Ki67 was found to be significantly associated with SCC and HSIL.p53 over expression and intensity of staining was also observed in Squamous cell carcinoma (SCC). In our study, the expressions of Ki-67and p53 gradually increased as the lesion progressed from LSIL, HSIL to SCC. The two markers complemented each other effectively, which may improve test sensitivity and specificity when used jointly.

3.1.21.5 Etiology, prevalence and susceptibility profiles of bacteria isolated from hospitalised surgical patients in Kasese District, Western Uganda

Bwalhuma Abraham Muhindo , Lucas Ampaiire

Background: Surgical site infection(SSIs) are difficult to treat and are often associated with much higher long stays, morbidity and mortality, higher treatment costs especially when the causative agent is Multidrug-resistant (MDR). This study was designed to determine the prevalence of nosocomial infections and susceptibility profiles of bacteria isolated from hospitalised surgical patients from Kasese District hospitals in Western Uganda.
Methods: A prospective cohort study was conducted from January to September 2016 involving 303 patients with SSIs in the obstetrics & gynaecology; and general surgery wards in three health facilities. Clinical-demographic characteristics of patients were obtained using structured questionnaires before surgery. Bacterial analysis of air and floor of the theatre room was done using the standard culture method. Wound swabs from patients with signs of SSIs were also cultured using standard microbiological methods.
Results: Of the 303 patients enrolled with SSIs (median age 34 years), 217 (71.6 %) were female and 86 (28.4%) were males. Only 44(14.5%) developed surgical site infection with predominant isolates being *Staphylococcus aureus* 15(33.33%) and *Escherichia coli* 11(24%). Majority of recruited participants underwent caesarian sections 178(58%) and least amputations 1/303(0.3%). Gram-negative bacteria was found resistant to ampicillin, gentamycin and ciprofloxacin the commonly used post-operative drugs of choice.
Conclusions: Hospital-acquired infections are common with emerging antibiotic-resistant strains isolated in most SSIs in Kasese District hospitals. The development of resistance to commonly used antibiotics such as ampicillin, gentamycin and ciprofloxacin than previously reported calls for laboratory guided SSIs therapy and strengthening infection control policies.

3.1.21.6 Prevalence of High-Risk Human Papilloma Virus-Treponema Pallidum Co-Infection and associated factorsamong women with Cervical Pre-Cancerous Lesions at Masaka Regional Referral Hospital.Uganda

Harriet Nambozo, Frank Ssedyabane, Rogers Kalyetsi, Nixon Niyonzima

Background: Globally, eight million new cases of cervical cancer are diagnosed, out of which 300,000 die from the disease each year. Cancer of cervix has increased taking a lead among other types of cancers. Although the causative agent is the human papilloma virus (HPV), its predisposing factors like *Treponema Pallidum,* and how this interplays to accelerate precancerous lesions has not been extensively explored.
Method: A Cross-Sectional study on 110 women with precancerous lesions (positive VIA), 21 years and above of age were tested for High risk-HPV DNA/PCR, PAP and *Treponema Pallidum* for two (2) months at the gynecology clinic of Masaka RRH.
Results: The prevalence of *Treponema Pallidum*-High risk HPV co-infection was 18.18% (20/110). 49.09% had HPV, 27.27% had *T.pallidum,* HPV 16 were 20.91% and a pool of HPV 'other genotype' (31,33,35,39,51,52,56,58,59,66,68) made up to 49.09%. 20% had at least CIN I, CIN II, or CIN III. HPV as a whole and HPV 16 showed a strong relationship with CIN (P-value 0.013 and < 0.001 respectively). HPV 16 showed a significant relationship with CIN I, and CIN III (p value < 0.001 and <0.001) respectively. Sexual debut at ⩽ 14 years of age was found to be associated with CIN, P-value 0.0210. However other factors did not show any relationship with CIN.
Conclusion: The prevalence of HPV-*T.pallidum* co-infection was high. The HPV-*T.pallidum* co-infection did not have a significant association with CIN. HPV 16 and sexual debut at less than 14 years showed a significant relationship with CIN.

Recommendation: With the raised burden of HPV- T pallidum coinfection, there need to provide one service point for differentiated examination of potential STIs and cervical cancer screening unit with modern testing technologies, e.g., PCR for STIs. The revision of the age bracket for cervical cancer screening from 14 years and above (sexually active) coupled with improved, simplified and accessible information packages on HPV, STIs, and cervical lesion awareness, will curb down the burden.
Keywords: HPV, CIN, PCR

3.1.21.7 Prevalence, Morphological Classification and factors associated with Severe Anemia among Children Under Five Years in Ntungamo District, Western Uganda

Umukwiye Adjira, Natukunda Bernard

Anemia in children continues to be a major public health challenge in most developing countries, particularly in Africa. Anemia during childhood adversely affects mental, physical and social development of the children. The study was carried out to establish the prevalence, morphological classifications and factors associated with severe anemia among children under 5 years at Itojo hospital, Ntungamo District. A hospital based cross sectional study design was used in this study in which children under 5 years of age and attended at Itojo hospital during the study period were recruited. Data on socio demographic characteristics and clinical conditions of the study individuals were collected using a data collection form after seeking appropriate written informed assent from parents/ guardians. Then 4 ml of blood were collected for complete blood count analysis. Thick and thin blood films and stool samples were examined microscopically the data were coded, cleared and entered into SPSS version 20 for analysis. A total of 296 children under 5 years were involved in the study with 152 males and 144 females. The prevalence of severe anemia was 13.9% with majority of the participants (50.7%) having microcytic anemia followed by normocytic anemia (32.8%) then macrocytic anemia (16.6%). In this study, anemia was positively associated with age of the child, and history of hematologic diseases of SCD and leaukemia. Children aged between 3-5 years were less likely to have severe anemia compared to those aged 0-2 years (P= 0.037). Age of the child (0.037) and history of chronic hematologic diseases (P = 0.001) were also strongly associated with anemia. The prevalence of severe anemia among children under five years of age was found to be relatively high (13.9%), hence it is increasingly becoming a public health problem in the study area especially among children under 5 years of age and are more likely to be anemic. The most common morphological type of anemia was microcytic anemia among the children under 5 years suggesting iron deficiency as a possible etiological factor. It was evident that the age of the child, and history chronic disease were the factors significantly associated with severe anemia. Thus there is a need for age specific interventions as well as chronic hematologic diseases. Provision of health education programs to mothers should also be another option to help improve the general health of children under 5 years of age.

3.1.22 MASTER OF NURSING SCIENCE IN CRITICAL CARE

3.1.22.1 Nurses' knowledge and practices on prevention of central line associated blood stream infections at Mulago national referral hospital

Amanya Lilian, Wanyenze Eva

Background: Central line-associated bloodstream infections (CLABSI) are largely preventable when evidence-based guidelines are followed. However, it is not clear how well these guidelines are followed in ICU, HDU and dialysis units in Uganda. This study aimed to assess nurses' knowledge and practice of evidence-based guidelines for prevention of CLABSIs issued by the Centers for Disease Control and Prevention, US and the Department of Health UK.

Methods: A cross-sectional study was conducted at Mulago national referral hospital between June and July 2020. The target was nurses working in the ICU, HDU and dialysis units. The knowledge was assessed using a structured study questionnaire that also included demographic characteristics and practices were assessed using a checklist, data was entered in Epi-info 7 and statistically analyzed with STATA 14.The university research ethics committee approved and cleared the proposal and administrative clearance was sought from the hospital before data collection.

Results: The current study focused on assessing the knowledge and practices of nurses working in the ICU, HDU and Dialysis unit about the prevention of CLABSI, a total of 50 nurses participated in the study and we found out that 80% nurses generally had a low level of knowledge on prevention of CLABSI and overall mean knowledge score was 34.5%. the mean score for practices was 44.2 % with SD of 12.8, majority of the participants showed satisfactory good practice on complying with hand washing requirements with 84%, also 61% showed good practice in using sterile devices to access catheters,

Conclusion: The results of this study indicate that nurses have low levels of knowledge and inadequate practice of evidence-based guidelines for the prevention of CLABSIs. These results suggest that national health administrations adopt policies to provide on job trainings for nurses regarding the evidence-based guidelines and practices to prevent CLABSIs.

Keywords: Central line-associated blood stream infections, Evidence-based guidelines, Nurses, knowledge and practices

3.1.22.2 Outcomes and their predictors in Post Intensive Care Patients admitted with Traumatic Brain Injury at Mbarara Regional Referral Hospital, Southwestern Uganda

Evas Atuhaire, Betty Kinkihaire

Background: Traumatic Brain Injury (TBI) is a major cause of morbidity and mortality globally. In Uganda, TBIs are on the rise, but little is known about the outcomes and their predictors in post intensive care patients. This study assessed the outcomes and their predictors in post intensive care patients admitted with TBI at Mbarara Regional Referral Hospital (MRRH), southwestern Uganda.

Methods: This was a retrospective study that reviewed hospital medical records of patients who were admitted in the intensive care unit (ICU) at MRRH with TBI, Glasgow Coma Scale (GCS) score <15 and with the history of injury from October 2012 to October 2020. Data was captured into an abstraction tool, entered into a Microsoft Excel spread sheet and analyzed using the Stata version 14.0. Post-ICU outcomes data was presented as mean (standard deviation) or median (interquartile range) and count (percentage), while chi-square test and multinomial logistic regression was considered for the predictors of post-ICU outcomes.

Results: A total of 90 patients' medical records were reviewed with mean age 34 (±16.27) years. Male sex dominated with 73%, while 81% were in the working age bracket (15 – 64 years). The prevalent injury mechanisms were road traffic accident (83%), and 59% exhibited focal injuries. The median length of ICU was 9 (IQR = 4-8) days, the mean GCS at admission and ICU discharge was 7.7 (±2.65) and 10 (±3.27) respectively. Sixty-eight (76%) of the patients had neurosurgical intervention, of whom, 43(63%) had craniotomy. Fifty-seven of the patients (63%) were discharged home, with 42 (73%) reporting good recovery GOS at hospital discharge. Twenty-three (26%) died, and 10 (11%) were re-admitted to ICU. Bivariate analysis showed only GCS at ICU discharge was associated with Post ICU outcomes ($X^2 = 26.338, p < 0.001$).

Conclusion: This study established the prevalent mechanism of injuries as road traffic accident, median length of ICU was 9 days, and mean GCS at admission and ICU discharge was 7.7 and 10 respectively. GCS at ICU discharge was the only statistically predictor of patient outcomes at bivariate analysis.

Keywords: Traumatic Brain Injury, post intensive care patients, outcomes and predictors

3.1.22.3 Effect of Educational Intervention on Nurses Knowledge and Practices of Delirium assessment at Mbarara Regional Referral Hospital

By Baluku Eric Murungi, Esther Beebwa

Background: Delirium is an acute loss of consciousness, and cognitive ability which poses an impact on the patient, family and the hospital. It is associated with increased mortality rates, prolonged hours in mechanical ventilation, stress to the patient and family and prolonged hospitalization. Early identification of delirium in intensive care units is crucial for patient care. Hence, nurses require adequate knowledge and competency to enable appropriate evaluation of delirium using standardized practice and delirium assessment tool.

Objective: To assess the effect of an educational intervention on nurse's knowledge and practices of implementing delirium assessment using the CAM–ICU tool, noting any perceived barriers to confusion assessment method

Design: This study used a single-group pretest–posttest study design to assess the effect of educational interventions on nurses' knowledge and practices of delirium assessment at Mbarara regional referral hospital (Accident and emergency unit and the intensive care unit ICU).

Methods: A convenience sample of twenty nine (29) nurses participated in educational intervention sessions, including face to face sessions, demonstrations and hands-on practices on the Confusion Assessment Method-Intensive Care Unit. Data were collected using self-administered questionnaires for the pre- and post-Intervention assessments.

Results: There were statistically significant differences between the mean scores on the knowledge and practices test from pre- to post –intervention, (t (28) =17.32, p<0.001), (t (28) =25.04, p<0.001 respectively. The three most common perceived barriers to the use of the delirium assessment tool were "delirium assessment tools are too complex to use and "difficult to interpret delirium in intubated patients" and consumption of time in using it.
Conclusions: Educational intervention increased nurses' knowledge and practices of delirium assessment. Teaching is essential for a successful implementation of intensive care unit delirium assessment practice.
Relevance to Clinical Practice: This study supports existing evidences, indicating that education and training could increase nurses' knowledge of delirium and delirium assessment. Improving nurses' knowledge could potentially lead to better delirium management practice and improve ICU patient care. Thus, continuous efforts to improve and sustain nurses' knowledge become relevant in ICU settings.

3.1.22.4 Frequency of Ward Rotations and Nurses' Competence: Perspectives from the Nurses providing Critical Care at Mbarara Regional Referral Hospital

Josephine Nabulime, Fortunate Atwine

Introduction: Job rotation is viewed as a professional cross training plan that helps nurses to expand their knowledge and skills while broadening work experiences and skills. Therefore the aim of this study was to explore the variations of how nurses perceive frequent ward rotation and understand their reflective self-assessment on competencies while providing care to patients in CCUs.

Methods: This was a qualitative study with a phenomenographic approach to describe different variations experienced by nurses working in emergency and intensive care unit of MRRH. Semi-structured interviews were used to collect data and interviews were audio recorded, transcribed verbatim.

Results: Three descriptive categories merged from data that explored different variations of perceptions reported by participants regarding frequent ward rotations of nurses providing critical care. Negative attitude of ward rotations was described by the following subcategories; feeling incompetent on job, experiencing emotional forces/ pressure, wishing to remain, demands adjusting to new environment and feeling demotivated in a new work place.

Conclusion & recommendations: This study highlighted positive and negative perceptions on experiences of frequent ward rotations by nurses working on Intensive Care Unit/ Emergency ward(ICU/EW). The negative perceptions are seen to compromise competence of nurses as they feel demotivated and pressured in new work place because of the nature of work in ICU/EW. There is need to formulate guidelines to provide a framework to be used by nurses especially for new nurses on the ward.

3.1.22.5 Nurses' Knowledge in Management of Patients with Sepsis using the Surviving Sepsis Campaign Guidelines at Mulago National Referral Hospital

Nakiganda Catherine, Niyonzima Vallence

Back ground: Sepsis is a severe blood stream infection that claims more than 5.3million people annually. Sub-Saharan African accounts for a significant proportion of the sepsis syndrome. Internationally, surviving sepsis campaign (SSC) guidelines have been developed to improve the outcome of patients with sepsis. Prior to this study, however, nurses at Mulago Hospital still used the systemic inflammatory response syndrome criteria to identify patients with sepsis despite the low predictive effect of the latter. There are also no documented in hospital protocols on sepsis management for nurses. This study sought to evaluate the effect of training nurses on their knowledge of iSSC guidelines in management of patients with sepsis.
Methods: A descriptive quantitative, quasi experimental study design was conducted on the neuro-surgical ward and ICU of the study site hospital in Uganda. Pre and post intervention assessments were conducted using a self-administered questionnaire. The mean knowledge scores were calculated out of a set maximum score of 11 points from the 11 knowledge tool items for both pre and post-test evaluation. The data were analyzed in Stata version 12 using descriptive statistics and a paired t –test.
Results: The study enrolled 40 nurses, 23 from ICU and 17 from the neurosurgical ward. Of the total, 67.7% were females and 70% were diploma holders while the overall median age was 32 (IQR= 21.5-35.5) years. In the post test all nurses were able to score above the preset acceptable score of 50% on the current sepsis guidelines. Total sum score of pretest knowledge, post-test knowledge and differences in total sum score of knowledge nurses on SSC guidelines were normally distributed. The mean (±SD) total score of pretest knowledge, post-intervention knowledge and differences in total score of the knowledge was 3.6 (1.8), 8.4 (1.2), and 4.9±1.9 (95% CI 4.2-5.5) points respectively.
Conclusions: These results show that in service training of nurses significantly improved their knowledge of the current sepsis guidelines. Accordingly, regular trainings of the kind could improve quality of service delivery for patients with sepsis.
Keywords: Sepsis, surviving sepsis campaign guidelines, knowledge, Mulago Hospital

3.1.22.6 Practice and Compliance to Protocol-Based Triage among Healthcare Workers at Mbarara Regional Referral Hospital: A Quality Improvement Study

Ssemanda Bosco, Florence Beinempaka

Background: Triage is a process of sorting patients based on the level of acuity to ensure that the most severely injured and ill patients receive timely care before their condition worsens. Patient safety within emergency settings is directly related to the effectiveness of triage. To increase triage effectiveness, hospitals follow a specific triage system to prioritize care for the severely ill patients. This also ensures that patients with more severe conditions and increased risk of death are identified resulting in faster service with minimal waiting time. Most hospitals in low income countries lack triage services, and this may account in part for the higher rate of morbidity and mortality from acute injury and disease.

Objective: To assess practice and compliance to protocol-based triage and associated barriers and enablers at Mbarara Regional Referral Hospital

Method: This was a cross-sectional, descriptive study using a mixed methods approach to answer the study questions. The study was conducted at Mbarara Regional Referral Hospital (MRRH) in units prone to formation of queues, making triage a necessity (Emergency

Department, Pediatric Ward, Outpatient Department and Maternity Ward). Data on practice and compliance to protocol-based triage was collected by observations using a checklist while data on barriers and barriers and enablers to PTB was collected from 10 healthcare workers using an interview guide. Triage practices outlined on the aforementioned checklist were observed as "Done" or "Not done" and scored using frequencies and percentages. P values were used to assess compliance to PBT between professional cadres, and between the study units. A logistic regression was done to predict relationship between triage practice and compliance. Qualitative data to determine barriers and enablers to PBT was analyzed using thematic content analysis.

Results: There was a health worker at the triage site in almost all observations, n=245(99.19%) but in a few instances, patients were left to judge for themselves who deserved to be seen first, n=4(1.62%) and the most performed practice was prioritizing patients with priority signs and re-assessment of regular patients, n=247(100%). Pain assessment was not done at any of the wards n=0(0.00%). Binary logistic regression revealed that the only statistically significant triage practices complied to by the health workers at the different wards are skin temperature assessment (95%CI=1.87-5.31, P<0.001) with an odds ratio of 3.10 and kin color assessment with odds ratio 3.66 (95%CI=1.75-7.66, P=0.0006). Doctors and medical students were found to be more compliant to PBT than nurses and midwives (P>0.0001). Lack of a triage protocol, inadequate staffing, lack of training, lack of triage equipment and language barrier were barriers to PBT while administrative support, presence of students, availability of a triage protocol were enablers to PTB.
Conclusion: There is need to develop triage protocols that meet the needs of units that currently have no objective basis for triage. More of good will from the hospital administration is needed to address concerns of inadequate staffing and essential triage equipment.

4.0 FACULTY OF SCIENCE

4.1 MASTER OF SCIENCE IN BIOLOGY

4.1.1 Diversity and prevalence of Schistosoma and Fasciola in snail and livestock hosts in and around Lakes Kachera and Kijanebalola, Uganda

Ainomugisha Naboth, Grace Kagoro, Christian Albrecht

Lakes Kachera and Kijanebalola in Rakai District of Uganda are connected to Lake Victoria, a highly endemic hotspot of schistosomiasis with pastoral communities potentially grappling with fasciolosis. However, there is scanty information about the diseases in these high-risk communities. A study was thus carried out to determine the diversity of freshwater snails and to identify trematodes parasites in snails at the lakes. The prevalence of *Schistosoma* and *Fasciola* parasites eggs in livestock, and socio-ecological drivers of *Schistosoma* and *Fasciola* infestation around the lakes were also assessed. Freshwater snails were collected from selected sites in 2019 and 2020 and examined for patent trematode infections after collection, and after two weeks forprepatent infections using the cercarial emergence method. Faecal samples were also randomly collected from livestock that graze around the two lakes and examined for *Fasciola* and *Schistosoma* eggs using a light microscope. Water

physicochemical parameters were monitored *in situ* using appropriate meters. A self-administered questionnaire and direct observation were used to determine the social drivers of possible *Schistosoma* and *Fasciola* infestation in vertebrate hosts in the region. The diversity of snails was analysed using Simpson 1-D diversity index, Chi-square test was used to test for significant difference in snail abundance between the two lake and within different sites, Spearman's rank order correlation coefficient (rho) was used to correlate between snail abundance and water physical-chemical parameter. A total of 4,109 snails, belonging to five families, seven genera and eight species were collected during the study. Among the collected snails, the ones that harbour cercariae of medical/veterinary were *Biomphalaria sudanica* 1338(32.6%), *Bulinus forskalii* 279(6.8%), *Lymnaea natalensis* 201(0.5%), and *Bulinus truncatus* 23(0.6%). There was a significant correlation between snail abundance and physical chemical parameters like Temperature and TDS ($p<0.05$). The overall prevalence of cercariae in snails was 2.75%, with *Biomphalaria sudanica* (19.2%) and *Lymnaea natalensis* (12.1%) being the most infected snail species. Brevifurcatepharyngeatediastome cercariae, and Gymnocephalus cercariae were cercariae of medical and veterinary importance obtained in the study respectively. *Fasciola* eggs were detected in about 19% cattle faecal samples, while no infection was detected in goats and sheep. The major drivers of *Schistosoma*and *Fasciola* parasites infestation were lack of knowledge, and predisposition as a result of economic and domestic activities. The findings of this study indicate presence of *Fasciola* and *Schistosoma* parasites in study area which calls for attention of the infected hosts. Further studies in molecular identifications of snail hosts and parasites is recommended.

Keywords*:* Prevalence, Driving factors, Infestation, Schistosoma parasites, Fasciola parasite

4.1.2 Tree gap dynamics and their influence on Chimpanzees' Food Tree Regeneration: a case of Musanga Leo-Errerae in Kalinzu Forest Reserve, Southwestern Uganda

Kato Humphrey, Grace Kagoro Rugunda

Kalinzu's tourism potential relies on the existence and sustenance of chimpanzees that inturn rely on the sustainable existence of various chimpanzee food trees. Studies have documented that there are about 414 tree species of which about twenty one species provide food to chimpanzees in Kalinzu forest with *Musanga leo-errerae* being a significant food tree for chimpanzees because of its perennial fruiting. Kalinzu forest has a lot of gaps due to timber harvesting and other disturbances. However,it is not clear how the introduced gaps affect regeneration of chimpanzee food trees and *Musanga leo-errerae* in particular, whose fruit is a significant fallback food for chimpanzees. This study showed the extent of regeneration of chimpanzee food trees and their distribution within the chimpanzee M-ranging group of Kalinzu forest. The study was carried out using 5km long parallel transects and Global Positioning System to document forest gap dynamics and regeneration of chimpanzee food trees in forest gaps and understory. Results indicated an occurrence of 115 gaps ranging from $8.45m^2$ to $855.10m^2$ within the chimpanzee M-group ranging area. The gaps were distributed throughout the habitat. The leading causes of forest gaps in Kalinzu forest were single or multiple tree falls and or branch falls (34.8%), charcoal burning and gold mining (18.3%), selective logging (15.7%) and other causes (13%). Gaps located in the production zone were medium in size (518.86-8.45 m^2) and were mainly caused by tree falls and branch falls, timber harvesting and charcoal burning. Gaps in the M-ranging research zone were bigger in size (855.10-13.58 m^2) and were mainly a result of gold mining and tree falls. Most of the bigger gaps in the research zone were mainly concentrated along river valleys. Generally the

regeneration in gaps were mainly dominated by *Celtisdurandii*, *Craterispernumlaurinum*, *Musanga leo-errerae* and *Beilschmeidaugandensis* at seedling level and at sapling level. Regeneration of *Ficus spp* was poorest in all gaps encountered. Regeneration in gaps is much higher than in the forest understory, an indication that gaps favour regeneration of most chimpanzee food trees at Kalinzu. This study concludes that in both production zone and research zone in Kalinzu forest, the population structure of all chimpanzee food tree species and *M. leo-errerae* in particular is dominated by juveniles and therefore actively regenerating.This implies that in Kalinzu forest chimpanzees will continue to have a sustainable food resource base and since there is no documented human wildlife conflict in Kalinzu forest, ecotourism should be further promoted and strengthened.

Keywords: Chimpanzee, gap dynamics, Kalinzu forest,Musanga leo-errerae, regeneration

4.1.3 Impact of Processing and Storage Practices on Microbiological Safety of Sorghum and Millet Beverage (Obushera) Vended in Mbarara City, Uganda

Kiprotich Amos, Grace Kagoro, Jeninah Atwebembeire

Sorghum and millet beverages locally known as *Obushera* are traditional-based beverages locally processed and consumed in Uganda. The unconventional manner in which *Obushera* is processed in Uganda prompted the need to establish microbial safety of the drink consumed. A cross-sectional study was conducted in Mbarara City, Uganda, from which a total of 96 samples of the locally processed and vended *Enturire*, *Obwenkiga*, *Ekitiribita*, and *Obutiire* types of Obushera beverages were obtained. The microbial contamination of the samples was determined through enumeration of total viable counts (TVC) of bacteria and fungi with storage time. The nutritional components, pH, and storage conditions were determined and related to microbial contamination of the beverages. A standardized observation checklist was used in obtaining information related to the handling and hygiene practices of *Obushera* processors and vendors. Antibiotic-susceptibility of the isolated bacteria was performed using a modified Kirby-Bauer method following clinical laboratory standards institute guidelines. A high percentage of samples (63.5%) contained gram negative bacteria, followed by gram positive bacteria at 31.3 %. About 93.8 % of the samples contained yeast while molds were identified from 52.1% of the samples. Coagulase-positive *Staphylococci* (24%) was the dominant bacteria while *Pseudomonas* spp. (3.1%), *Enterobacter aerogens* (3.1%) were the least abundant bacteria in the samples. Fungal contaminants were *Saccharomyces cerevisiae* (65.6%) and *Candida* spp. (28.1%), *Mucor* spp. and *Aspergillus niger* which accounted for 52.1% of samples. *Ekitiribita* was the most contaminated beverage with the highest total viable counts (TVC) of 4.62 log10 CFU/ml while *Enturire* was least contaminated with a median of 3.49 log CFU/ml. The common contaminant in *Ekitiribita* and *Obutiire* was *Escherichia coli*, with the highest average at 4.94±0.2 and 5.48±0.71 log CFU/ml, respectively. *Escherichia coli* was the most persistent bacteria throughout the 14-day storage time of both *Ekitiribita* and *Obutiire*. *Enterobacter cloacae* with the highest mean of 4.45±0.35 log CFU/ml was the most persistent bacteria for 14-day storage time in Enturire, while coagulase-positive *Staphylococci* was dominant in *Obwenkiga* with the highest mean at 5.37±0.53 log CFU/ml. Factors such as lack of sufficient toilet facilities, absence of handwashing facilities, presence of garbage near processing booth

contributed to contamination of the beverages. Similarly, practices such as packaging *Obushera* in used recyclable bottles, handling money at the same time beverages, not wearing protective equipment such as gloves and aprons and irregular handwashing while handling *Obushera* contributed to the microbial contamination of the beverages. There was a positive significant correlation between microbial contamination and amino acid, carbohydrate, and reducing sugar concentration in *Obushera* (*p*-value <0.05). Further, there was a positive significant correlation between microbial contamination and the pH of *Obushera* (*p*-value <0.05). Temperature conditions, and storage time was found to affect microbial persistence in *Obushera*. The isolated bacteria were found to be sensitive to ciprofloxacin (44.4 %) and ceftriaxone (40.7%) and least susceptible to penicillin, erythromycin, tetracycline and ampicillin. Overall, this study revealed that *Obushera* produced and vended in Mbarara city, Uganda, is a high-risk beverage due to the high rate of microbial contamination and presence of antibiotic resistant strains. Provision of food safety training and provision of adequate sanitary facilities at processing sites are recommended to improve safety of the beverages.

4.1.4 Livestock Waste Management in Confined Livestock Feeding Operations and Pollution with Potential Human Bacterial Pathogens: A Case Study of Bugembe Town Council, Jinja District

Luwangula Ismail, Grace Kagoro, Morgan Andama

Land scarcity alongside the desire to improve livelihoods has led to intensive agricultural practices in urban areas. In animal husbandry, the trend is towards rearing animals under Confined Livestock Feeding Operations (CLFOs). However, the burden of waste accumulation and potential of Bacterial pollution is high in CLFOs. This makes livestock waste management necessary. Furthermore, the connection between manure management practices in CLFOs and the prevalence of human bacterial pathogens in residential areas around CLFOs is not well documented particularly in Bugembe Town Council – Jinja District. Therefore, the main objective of this study was to establish the livestock waste management practices in CLFOs and their implications for environmental pollution with potential human bacterial pathogens in human residential areas near such CLFOs in Bugembe Town Council, Jinja District. This was achieved by answering the question "what are the livestock waste management practices in CLFOs and what is their implication for environmental pollution with potential human bacterial pathogens in human residential areas near such CLFOs in Bugembe Town Council, Jinja District?
The study was divided into two parts. The first part was a descriptive survey of CLFOs using observation and questionnaire to obtain information about manure management practices and risk factors for environmental pollution with human bacterial pathogens. In the second part, an experimental design was employed to isolate, identify and determine the prevalence of selected potential human pathogenic bacteria in environmental samples.
The results revealed that the burden of waste production was higher with cattle farms than with other types of farms. Simple mechanical methods such as use of hand equipment were being used to collect solid waste that was generally never treated at all farms. Meanwhile lot runoff at cattle and swine farms would generally simply be scooped/swept off, an act that posed risk for bacterial pollution for non-farm families. The results of the descriptive survey further showed that most practitioners (55.6%) in most cases (100%, 75% and 58.3% for swine, cattle and poultry respectively) dumped untreated livestock waste such as excreta and

carcasses in open spaces. The experimental part of the study revealed that *E. coli* (36.9%) was the most prevalent type of bacteria followed by *S. aureus*(12.6%) while *Salmonella spp.* (9.9%) was the least detected. The risk of exposure of non-farm families closer to CLFOs to bacterial pathogens was significant ($p < 0.001$). Seasonal variation was also shown to influence the prevalence of the pathogenic bacteria significantly ($p = 0.002$ for *E. coli*, 0.035 for *S. aureus*and 0.008 for *Salmonella spp.*) with the bacterial pathogens being more prevalent in the wet season compared to the dry season.

It was concluded that there was enormous faecal contamination and if most of the *E. coli* detected in the study area is virulent, then an enormous number of lives is at great risk of suffering ailment from the *E. coli* pathogens. The livestock industry was still small and thus producing little waste but was likely to grow especially given government initiatives such as NAADS and OWC and that this would eventually raise the amount of waste that could be accumulated in CLFOs, hence increase the likelihood of pollution. It is thus recommended that Government policy should be instituted to direct livestock farming in residential areas in the urban and peri-urban areas particularly with regard to land holding, location of waste storage sites, standards for waste treatment, utilisation and disposal.

Keywords: Confined livestock feeding operations, livestock waste management, potential human bacterial pathogens, environmental pollution

4.1.5 Assessment of the risk of Fasciola and Schistosoma SPP. infections among Livestock and Wild Mammals in Kagadi and Ntoroko Districts, Western Uganda

Daisy Namirembe, Wangalwa Raphael, Tumusiime Julius, Casim Umba Tolo, Tine Huyse

Fasciola and *Schistosoma* spp. infections are highly associated with the distribution of their intermediate snails and definitive mammalian hosts, animal behavior, and management practices. Therefore, a longitudinal and the first kind of study in Uganda was conducted between November 2019 to August 2021 to establish the prevalence of *Fasciola* and *Schistosoma* spp. infection among livestock and free-ranging wild mammals; *Radix*and*Bulinus* species.Socio-ecological risk factors associated with the spread of *Fasciola* and *Schistosoma* spp. were also documented. Livestock mainly cattle, goats and sheep, and wild mammals including hippos, baboons, warthogs, monkeys, and elephants were followed, and freshly dropped faecal samples were collected and fixed in 10% formol saline solution. Parasite eggs were concentrated by formal ether sedimentation and identified morphologically. Pre-identified drinking points for livestock were sampled monthly by scooping for 30 minutes collecting *Radix* and *Bulinus* snails. Shedding experiments were set to determine the prevalence of *Fasciola* and *Schistosoma* cercaria in the snails. Additionally, a questionnaire was administered to 110 stakeholders to document the risk factors associated with the parasite infection in animals. Data was analyzed using Chi-square and Kruskal Wallis tests performed in SPPS version 20 at a 5% level of significance. The study revealed that *Fasciola* spp. were more prevalent in livestock and wild mammals than *Schistosoma* spp. Cattle presented the highest prevalence (56%) of *Fasciola* spp. followed by sheep (50%) and the lowest among goats (28.2%). For the wild mammals, hippos (66%) had thehighest prevalence of *Fasciola* spp. followed by warthogs (8%) and baboons (6%) ($P<0.001$, $\chi^2=25.98$). However, *Fasciola was* not detected in elephants (n=21) and monkeys (n=02). *Schistosoma bovis* was detected in cattle from Mpeefu (2.6%) and Ndaiga (4.3%), while *S. mattheei*was detected in both goats (1.4%) and cattle (0.39%) at Ndaiga. None ofthehuman *Schistosoma* parasites was detected among the non-human primates. The highest abundance

of snails was obtained at Mpeefu (5923) and the lowest at Kanara (343). Only snails collected from Mpeefu sites shed cercariae; 2% (n =701) of the *R. natalensis*shed *Fasciola* while 2.56% (n =351) and 33.6% (n =122) of *B. tropicus and B. nasutus* respectively shed *Schistosoma* cercariae. It was revealed that up to 100% of the respondents practiced free-range grazing on communal land and their livestock drank water from the available natural water sources. A total of 62.7% of the respondents knew about fasciolosis while 6.5% knew about schistosomiasis in animals. In conclusion, both livestock and wild mammals host *Fasciola* spp. and are sympatry in Kanara and Ndaiga posing a risk of parasite exchange, which is exacerbated by the community's lack of knowledge about *Fasciola* and *Schistosoma spp.*

Keywords: Fasciola, Schistosoma, Parasites, Mammals, Kagadi, Ntoroko, Western Uganda

4.1.6 Historical aspects and effects of Land- Use and Land Cover Change on Soil Organic Carbon Content in the Sanga Rangeland Ecosystem, Uganda

Shadrack Murithi Njagi, Julius B. Lejju, John Bosco Nkurunungi

Data on land use and land cover pattern, and soil organic carbon content for rangelands are important because they help in proper land management.This study examined the effect of land use and land cover changes on soil organic carbon content in Sanga rangelands in Uganda and its implication on carbon sequestration in that region. Specifically, the study examined historical drivers of land use and land cover, mapped land use and land cover patterns and assessed soil organic carbon content. Data on historical events were documented from literature while data on land use and cover change were provided by Landsat images. Soil organic carbon content was investigated in eight blocks, with sampling plots represented by; farmland (FL), grassland (GL), woodland (WL), and bare land (BL) as control at 0-15 cm and 15-30 cm depths. The colorimetric method was used to estimate soil organic carbon (SOC). The core method was used to determine the bulk density using a core ring of 110 cm^3. Other soil physical-chemical properties analyzed included: soil pH, soil moisture content, soil porosity, and soil texture. Non-parametric tests were applied for Kruskal-Wallis, Mann-Whitney U, and Spearman's rho correlation coefficients at $p \leq 0.05$ significance. The main historical perspectives identified were; political influence, government policies, and social-economic changes. The overall accuracies for 1987 and 2020 classified maps were 80.36% and 89.81%, respectively. Generally, built-up areas increased the most, followed by farmlands and woodland. Political decisions and government policies related to land tenure and reforms, socioeconomics, and demographic changes were noted as underlying drivers of land use and cover changes. SOC content was higher in grassland (*Mdn*=31. 55 Mg C ha^{-1}) and woodland (27.89 Mg C ha^{-1}) compared to bare land (*Mdn*=16.17 Mg C ha^{-1}), p=0.005 and p=0.028 respectively. This study concludes that land use and land cover change resulted from political and policy decisions on ranches, park management, and land tenure restructuring. It also concludes that the changes in land use and land cover influenced SOC and other soil physical-chemical properties. Additionally, land use and cover change affect carbon sequestration. It was recommended that agro-pastoralists should observe the correct livestock stocking rate, increase agroforestry, especially on slopes and practice sustainable crop production to enhance carbon sequestration.

Keywords: Park, cultivation, conservation, encroachment, grazing, pastoralists, socio-ecological, bulk density, sequestration

4.2 MASTER OF SCIENCE IN CHEMISTRY

4.2.1 Oxytetracycline Residue Concentrations in beef of Cattle Slaughtered from Ntungamo, Kiruhura and Mbarara Districts in Western Uganda

Kebirungi Pheonah, Ntambi Emmanuel, Adaku Christopher

Globally, oxytetracycline (OTC) are used in food producing animals for prophylaxis and treatment of various bacterial infections because of continued high disease burden due to poor animal health service delivery. The use of OTC and other drugs is often done by farm workers who lack knowledge about drug administration and do not follow extra label instructions on the drug container. This potentially leads to presence of drug residues in animal products when the withdrawal periods are not followed and due to improper doses of the drugs given to the animals. This study therefore aimed at determining the oxytetracycline residue levels in muscle, liver and kidney of slaughtered cattle from Mbarara, Kiruhura and Ntungamo districts during dry and wet seasons. A total of 318 samples were collected from gazetted slaughter slabs and abattoirs during dry and wet seasons from September 2018 to March 2019. Samples of muscle, liver and kidney were extracted with Mcllvaine-EDTA buffer, cleaned by solid phase (SPE) and analyzed using HPLC-UV to obtain the OTC residue levels. The study revealed that 80% of the samples in the three districts had detectable OTC residue levels while 74% of the samples had OTC residue levels above the acceptable limits for muscle (200µg/kg),liver(600µg/kg),and kidney (1200µg/kg)asset under the Food and Agriculture Organization/World Health Organization, 2014. A change in the seasons did not cause a significant change in the liver OTC residue content of the animals for Ntungamo (Z=-1.195,p=0.232), Kiruhura (Z=-0.714,p=0.475) and Mbarara (Z=-1.886, p =0.059). The results of this study reveal the extent to which OTC residues have entered into the food chain with unacceptably high levels in muscle, liver and kidney for both dry and wet season from the three districts hence a public health threat.

4.3 MASTER OF SCIENCE IN MATHEMATICS

4.3.1 Bounds on the Discrete Spectrum of Two-Dimensional Quantum Waveguides

Baguma Enock, Martin Karuhanga

The celebrated Cwikel-Lieb-Rozenblum (CLR) inequality gives an upper estimate for the number of negative eigenvalues of Schrodinger operators in dimension $n \geq 3$. However, the case $n = 2$ is quite problematic. Significant progress has been made in obtaining upper estimates for the number of negative eigenvalues of two dimensional Schrodinger operators on the whole plane and also on part of the plane (strip). In this dissertation, we present upper estimates of the CLR-type for the number of eigenvalues (counted with multiplicities) of two-dimensional Schrodinger operators in waveguide subject to Neumann and Dirichlet boundary conditions imposed on opposite parts of the boundary. The estimates involve weighted L_1 norms and Orlicz norms of the potential. We consider two cases, the first one is when the

quantum waveguide is straight and other case is when the waveguide is curved but asymptotically straight.

4.3.2 On Factors, Bounds and General Form of Odd Perfect Numbers

Elima Emmanuel, Feresiano Mwesigye

Odd perfect numbers have been a subject of interest in the field of number theory since antiquity. This is primarily because none has been discovered and yet all attempts to prove their existence or non-existence have been futile. So far, all studies that have been conducted regarding odd perfect numbers have achieved listing the properties that these numbers should have, but none has sufficed for a complete solution. We do not hope to completely resolve this enormous problem, but just as other scholars who have worked on the problem before, we prove some results regarding the general form of odd perfect numbers that could provide a way for constructing a complete proof in the future.
In this dissertation, known results regarding properties of odd perfect numbers are discussed, delving deeply into the mathematical notions and proofs of the major results. These include the general form, the number of distinct prime divisors, the number of prime factors, the lowest and the largest prime divisors and the lower and upper bound of odd perfect numbers. By use of elementary number theoretic techniques, we derive some new results regarding the existence of odd perfect numbers.
Specifically, we prove that odd perfect numbers have an associated quadratic equation. By further applying the Einsenstein criterion to the derived equation, we show that for the special prime $p$of the Eulerian odd perfect number, the component$\left(p^{4\beta+1}-1\right)$must be a powerful number for some positive integerβ.

4.3.3 Modelling Transmission and Control of Rotavirus with Vaccination and Breast-feeding among Children

Kamusiime Issah, Martin Karuhanga

Rotavirus is a contagious virus that causes inflammation of the stomach and intestines (gastroenteritis). Severe rotavirus infection mostly affects babies and young children below 5 years and causes fever, diarrhea (loose bowl movements) and vomiting. This can lead to hospitalisation and even death. There are seven groups of rotaviruses, but group A has been found to cause severe diarrhoea in infants and young children worldwide. Rotavirus infection has been responsible for over 600, 000 children deaths annually worldwide. Different control measures have been put in place to fight rotavirus infection such as proper hygiene, treatment and vaccination. However, the infection has persisted in both developed and developing countries.
This study aims at investigating the effect of vaccination and breast-feeding on rotavirus infection. A rotavirus model with vaccination and breast-feeding of children below five years is formulated and analysed for steady states. The basic reproduction number R 0 is obtained using the next generation method. Analysis of the system in the presence of vaccination and breast-feeding shows the presence of both the disease free and endemic equilibrium points. The disease free equilibrium point is locally asymptotically stable if R0 < 1 and unstable if R0 > 1. It is also shown that the disease free equilibrium point is globally stable when R0 < 1.

For R0 > 1, there exists an endemic equilibrium point which is locally and globally asymptotically stable.
The model is further extended to incorporate the effect of absence of vaccination. This model is shown to have both the disease free and endemic equilibrium points. Numerical simulations show that vaccination has an effect on the spread of the disease indicated by a fall in the infected human populations when the rate of vaccination is increased. However breast-feeding alone has no significant effect on the infection, it needs to be combined with vaccination if infection is to be completely wiped out of the children population.

4.3.4 Group Divisible Designs of Block Size Four on Three Groups of Different Sizes

Balaam Tomanya, Kasifa Namyalo

The construction of group divisible designs is a basic problem in design theory. While there have been some methods concerning the construction of uniform group divisible designs, the construction of non-uniform group divisible designs remains a challenging problem. In this dissertation, the researcher illustrates the results on group divisible designs of block size four on three groups of different sizes *4*, *n* and *n + 1* where *n > 4*. The problem here is to study the existence of GDD(*4; n; n+1; 4;* λ_1,λ_2) with particular emphasis on establishing the necessary conditions for its existence and constructing the existing GDDs. A group divisible design, GDD(*4; n; n+1; 4;* λ_1,λ_2), is an ordered pair *(V;B*) where V is a (*2n + 5*)-set of symbols and *B* is a collection of *4*-element subsets (called blocks) of V satisfying the following properties: the (*2n + 5*)-set is divided into three groups of sizes *4*, *n* and *n + 1*; each pair of symbols from the same group occurs in exactly$\lambda_1$blocks in *B*; and each pair of symbols from different groups occurs in exactly λ_2 blocks in *B*. The necessary conditions for the existence of the GDDs are established and several GDDsare shown to exist. Combinatorial tools such as relationships between parameters are used toestablish the necessary conditions while graph decomposition and balanced incomplete block designs (BIBDs) are used to construct the existing designs. The existing designs are generalised,incomplete block designs used in rank-ordering using the case of a university lecturer selectionattributes. The study proposes that in future group divisible designs of block size *k > 4* on threegroups of different sizes can be studied and that the problem of GDD($n_1, n_2, n_3; 4; \lambda_1,\lambda_2$) canstill be studied taking $n_1 > 5$.

4.3.5 Numerical Solution to Two-point Boundary Value Problems with Neumann Boundary Conditions using Galerkin Finite Element Method

Tuhimbise Dominic, Ronald Mwesigwa

In this study, Galerkin FEM has been developed to approximate the solution of both second order linear with constant and non-constant coefficients, and nonlinear second-order two point BVP of ordinary differential equations with Neumann boundary conditions. Lagrange linear piece-wise polynomials have been used as basis functions. Linear second order two point BVP of ODEs with non-constant coefficient was solved by applying Gauss quadrature 3-point rule in the Galerkin FEM. For the nonlinear BVP, the Newton's method was used with the Galerkin FEM. The errors in approximations have been studied, noting that for this method, errors in the approximations reduce with decreasing element or step size. The convergence and consistency of Galerkin FEM applied to the linear and nonlinear second-

order boundary value problems of ordinary differential equations have been discussed. The results have been presented in a number of tables and illustrated using graphs, all generated using MATLAB. Basing on the results from the simulations, it was found that the method was stable, convergent and consistent since further reduction of element or step sizes produced significant reduction in the error of all test problems. Thus, the developed method performs well with linear and nonlinear two point BVPs.

4.4 MASTER OF SCIENCE IN PHYSICS

4.4.1 Estimation of astrophysical stellar parameters of solar-like oscillating long period variables in the large Magellanic Cloud

Batya Daniel, Edward Jurua, Tom Mutabazi

The space missions like *kepler* and TESS have played an essential role in identifying solar like oscillations for asteroseismology. In the case of long period variables (LPVs), ground based observations are still relevant. This study focused on estimating astrophysical stellar parameters for LPVs in the Large Magellanic Cloud (LMC). The data used in this study was obtained from the Optical Gravitational Lensing Experiment (OGLE). The period-wesenheit function diagram and line of best fit were first plotted. The standard deviation (σ) of the fitted line was determined, and stars that were within $\pm 1\sigma$ were selected. Their power spectra was then generated using period04 and comb-like structures identified using visual inspection. A total of 817 OGLE small Amplitude Red Giants (OSARGs) and 657 semiregulars(SRVs) were selected from the period wesenheit function diagram. The power spectra of 432 of the 817 (53%) OSARGs and 180 of the 657 (27%) SRVs had the comb-like structures. These are features characteristic of Solar-like oscillations. Astrophysical stellar parameters of the stars were estimated, for OSARGs, the radius R was obtained in the range 4.458 - 15.37 R , luminosity log(L⁇/L) in the range 0.495 - 4.224 and mass M in the range 0.965 - 5.43 M . For SRVs, the radius R was obtained in the range 9.857 - 25.971 R , luminosity log(L⁇/L) in the range 0.984 - 4.768 and mass M in the range 0.766 - 4.955 M . The luminosities for 36 SRVs that had been observed by GAIA data release 2 and had parallaxes were compared by getting difference in the luminosities. The luminosities for the two methods agreed up to $\pm 3\sigma$.

4.4.2 Instantaneous Mapping of the ionospheric Total Electron Content over the East African low−latitude region

Cele Geoffrey, Geoffrey Andima, Valence Habyarimana

Ionospheric behaviour is often monitored using total electron content (TEC) measurements from Global Navigation Satellite System (GNSS) receivers distributed globally. However, the GNSS receivers are sparse over the East African low-latitude region resulting in spatio-temporal gaps. In an attempt to address this challenge, the possibility of constructing East African ionospheric maps using Kriging method was investigated in this study. Prior to constructing the maps, the behaviour of the low-latitude ionosphere over this region was characterised using TEC data for 2014 and 2018 during quiet and disturbed conditions. The results show that the highest values of TEC exist at about 12:00 UT and the minimum values

exist around 03:00 UT. The seasonal trend reveals that the highest values of TEC occur during March equinox and the lowest during June solstice. The existence of seasonal assymmetry in TEC over the region was revealed. This is justified by the values of TEC being higher during March equinox than September equinox. Similarly, December solstice exhibited higher values of TEC than June solstice. The post-sunset TEC often show enhancements between 18:00 UT and 21:00 UT. The enhancements were more pronounced in 2014 than in 2018 especially during the equinoctial months for stations at the crest of the equatorial ionisation anomaly region. The spatial variation of TEC over the East African region was analysed by fitting the different semivariogram models. The results of the analysis reveal that the best semivariogram that describes the spatial variation of TEC over the East African low-latitude region is the gaussian semivariogram. The correlation of TEC over the region is better along the polar direction than in all the other directions, suggesting that the variation of TEC over the low-latitude region is anisotropic. The gaussian semivariogram model was then used to construct the TEC maps over the region. The constructed regional TEC maps were compared with the Global Ionosphere Maps (GIMs) from the Centre of Orbit Determination in Europe (CODE). The Kriging and CODE's TEC maps have Root-Mean-squared Errors (RMSE) from $0.0 - 0.04$ TECU and $3.0 - 4.0$ TECU respectively. This implies that the kriging maps predicted TEC over this region with smaller errors than the CODE's maps. The TEC maps were further validated by comparing with the GPS TEC. The results show very high positive correlation with correlation coefficients between 0.9360 and 0.9970. This suggests that TEC maps generated by kriging interpolation method can be used as a good estimate of the GPS-derived TEC at the unmeasured grid points over the region.

4.4.3 Determination of Atmospheric Parameters and Chemical Abundances of B-A Type Stars

Katusiime Grace, Jurua Edward, Trust Otto

The previous missions (e.g., Kepler space mission) and numerous previous methods provided atmospheric parameters and chemical abundances of B-A type stars, which can be used inasteroseismology. However, it was found out that the accuracy of the determined atmosphericparameters is too low for asteroseismic modelling. Also, information on their stellar chemicalcomposition is lacking. For successful seismic modelling, it is important to have accurate stellaratmospheric parameters and chemical abundances which were not achieved previously due touse of low resolution data. Therefore, use of high-efficiency and high-resolution data is needed.This study determined atmospheric parameters and chemical abundances for B-A type stars.The synthetic spectral fitting technique was used on the availed spectroscopic HERMES data.The data consisted of four main sequence stars which were classified as B8 IIIe, B8 IIIe, B4Ve, and A0 IV. The atmospheric parameters obtained were compared with those from theliterature, and indicated that the effective temperature values are higher than those in theprevious studies. The reasons for the differences could be due to the use of high resolution datain this study which reduces the effect of blending of spectral lines in the spectra, and applyingthe synthetic spectral fitting technique which uses all the information contained in the shapeof the absorption-line profiles. Basing on these corrective measures, the results obtained fromthis study would be considered more reasonable. Most of the determined chemical abundanceswere found to be closer to solar values within 0.2dex for all the 4 stars. This confirms that allthe studied targets are chemically normal.

4.4.4 Determination of Joint Statistics of Scintillation on Multiple Satellite Links

Oleni Paschal, Emirant Bertillas Amabayo, Edward Jurua

Ionospheric scintillation is a frequent phenomenon over the low latitude regions. Ionospheric Scintillation degrades the quality of signals sent on the different satellite receiver links, compromising quality of GPS applications. The impact of ionospheric scintillation on GPS applications has been studied by a number of researchers in Equatorial region. In this particular research, the joint statistics of scintillation on multiple Satellite links was presented, for the period 2011-2012, in the low latitude equatorial region of Uganda.
The Scintillation Network Decision Aid (SCINDA) data obtained from Makerere (0.34° N, 32.60°E) and Mbarara (-0.62°N ,30.66°E), and data from two dual frequency GPS receivers at Mbarara (-0.60°N, 30.74°E) and Entebbe (0.04°N, 32.44°E) were used in this study.
Scintillation indices s4 and σ_φ derived from the SCINDA data together with the line of site total electron content derived from the GPS data were used to characterize the joint statistics of scintillation on the multiple satellite links.
The results showed that fluctuations in TEC values closely relate to amplitude and phase scintillation. The results also confirmed that scintillation is primarily a nighttime phenomenon with relatively high values of S4 and σ_φ rising from 19:00-23:00 local time (LT) as was shown by many other previous researchers. The diurnal pattern further revealed that the pre-midnight occurrence of scintillation was predominant in most of the months with a peak in September, while the post-midnight occurrence was predominant in the months of July, August and maximized in December. The seasonal pattern is characterized by intense scintillation in the equinoctial months compared to that of the solstice season. Multiple satellite links encountered scintillation events of categories $0.2 \leq (s4, \sigma_\varphi) < 0.4$, $0.4 \leq (s4, \sigma_\varphi) < 0.6$ and $0.6 \leq (s4, \sigma_\varphi) < 1.0$, mostly at an azimuth range of 135° - 360° and elevation range of 30° - 80°.
Amplitude scintillation was more dominant than phase scintillation in all the seasons during the two-year period of this study.
Keywords: ionospheric scintillation; joint statistics; multiple Satellite links

4.5 MASTER OF EDUCATION

4.5.1 Use of Learner Centered Teaching Methods and Academic Performance of Pupils in Selected UPE Schools in Kashari County, Mbarara District

Namusoke Edith, Aloysius Rukundo

Thestudy aimed at examining the effect of learner centered teaching methods on pupils' academic performance among UPE schools in Kashari County and was guided by the following specific objectives; To explore the effect of cooperative teaching methods on pupils' academic performance, to establish the effect of role play on pupils' academic performance and to examine the effect of demonstration on pupils' academic performance. The study adopted quasi-experiment design based on English subject and a quantitative research approach. The study targeted pupils of P.7 class in two UPE schools in Kashari (control group and experimental group) and hence making sample size of 180 pupils. Observation checklists and classroom tests specifically for English were used to collect data. The study findings revealed; that cooperative teaching has a large statistically significant effect (Mean difference = 5.07, Cohen's d=1.84, p <.01) on the pupils' performance in UPE

schools in Kashari County, role play also has a large statistically significant effect (Mean difference = 5.01, Cohen's d=1.81, p <.01) on the pupils' performance in UPE schools in Kashari County and demonstration has a moderate statistically significant effect (Mean difference = 2.07, Cohen's d=.65 p <.01) on the pupils' performance in UPE schools in Kashari County. The study concludes that; cooperative teaching has a large statistically significant effect on the pupils' performance, role play also has a large statistically significant effect on the pupils' performance and demonstration has a moderate statistically significant effect on the pupils' performance in UPE schools in Kashari County. The study recommends that policy makers, education officers, owners of Primary schools and other stakeholders in education especially in Kashari County, should emphasize cooperative teaching method by administering both group and individual home/class work, the study also recommends that policy makers, education officers, owners of Primary schools and other stakeholders in education especially in Kashari County, should emphasize role play teaching method by organizing the study content in form of play and finally the study recommends that policy makers, education officers, owners of Primary schools and other stakeholders in education especially in Kashari County, should emphasize demonstration teaching method by making lessons more practical through use and improvisation of available resources and apparatus.

4.5.2 Teacher Supervision and Job Performance in selected Secondary Schools in Mbarara Municipality, Mbarara District

Oliver Kyomuhendo, Imelda Kemeza

The study was carried out to establish the role of teacher supervision on job performance in selected Secondary Schools in Mbarara Municipality, Mbarara District so that supervison is improved when it is proved to play a positive role. The study was guided by the following objectives; to determine the level of teacher supervision carried out in Mbarara Municipality Secondary Schools, to establish the level of teacher performance in Mbarara Municipality Secondary Schools, and to assess the effect of supervision on the teacher performance in Mbarara Municipality Secondary Schools.The study used a cross-sectional survey research design.
Mbarara Municipality has 38 secondary schools inclusive of both government aided and privately owned with 1144 teachers. 10 schools were considered in total, where 5 schools were selected from government aided and 5 from privately owned schools. The study was conducted from October 2019 to February 2021.Teachers reported receiving moderate levels of supervision while supervisors reported giving higher levels of supervision. Females and diploma teachers reported receiving higher levels of supervision. Performance levels reported were high and independent of age, experience, gender, academic qualification. Performance levels were less dependent of supervision levels as confirmed by Pearson correlation coefficient, $r = .15$ (very weak) and the association not significant ($p = .18$).

Therefore, it was recommended that; Focus should be made on the frequency, quality of feedback, nature of interaction between the supervisor and supervisee. The level of supervision should be equal for all genders to avoid bias about competence and more factors like motivation that influence teacher performance need to be examined as well.

4.5.3 Perceived School Culture and Teachers' Job Performance in Government Aided Secondary Schools in Sheema Municipality

Nkwatsibwe Innocent, Sudi Balimuttajjo

The purpose of the study was to explore the influence of perceived school culture on teachers' job performance in government aided secondary schools in Sheema municipality. The study adopted a cross-sectional survey research design. A self-administered questionnaire was used to collect data from 252 respondents using census sampling. Data was analyzed using percentages, frequencies and means. Pearson Correlation Coefficient was used to test the relationship between perceived school culture and teachers' job performance. The study findings revealed that schools exhibited strong cultures and high levels of job performance among teachers. It was concluded that there is a statistically significant relationship between perceived school culture and teachers' job performance in government aided secondary schools in Sheema municipality. The study recommended that school administrators, Board of Governors and other stake holders should clearly define school goals, involve teachers in defining goals, develop a rewards system based on how well teachers achieve goals and encourage trainings for female teachers so that they are fully involved in the process of goal achievement to enhance job performance. It was also recommended that a study of this nature needs to be conducted in private secondary schools, on non-teaching and support staff in secondary schools.

4.5.4 Parenting Styles, Self-Efficacy and Academic Performance of Secondary SchoolStudents in Ibanda North, Ibanda District, Uganda

Noel Japheth, Imelda Kemeza, Esther Njeri Kiaritha

Parenting plays a vital role in children's life and learning. It is noticed worldwide that different parenting styles pose different effects on students' efficacy and academic performance at school. This study investigated the association of parenting styles and self-efficacy on academic performance of secondary school students in Ibanda North, Ibanda district. In order to firmly find answers for hypotheses and research questions, a concurrent triangulation mixed methods strategy was employed. A total of four hundred and twenty-seven (427) participants were sampled from the target population to participate in the study from all government-aided secondary schools of Ibanda North County. Simple random sampling was used to select students and teachers for questionnaire survey, purposive sampling was used to select 30 students and 15 teachers for interview sessions and convenience sampling was used to select 15 parents for interview sessions. Quantitative data were generated using a questionnaire which included scales and was analyzed using both descriptive and inferential statistics with the help of the SPSS 21.0 version. Qualitative data were generated using interviews and analyzed thematically. A pilot study was carried out to test the validity and reliability of instruments. The findings of this study revealed that secondary school students experience authoritative, authoritarian and permissive parenting styles. Although uninvolved parenting style was also experienced, it was not common. Authoritative parenting style and students' academic performance had a positive significant relationship ($r = .277$, $p<0.01$). Authoritarian parenting style and students' academic performance had a positive significant relationship ($r = .189$, $p< 0.01$). Uninvolved parenting

style and academic performance had a negative significant relationship (r = -.135, P > 0.05). Permissive parenting style had no statistically significant relationship with students' academic performance (r =0.002, p > 0.01). Although permissive parenting style did not have a statistically significant relationship with academic performance, it was revealed in qualitative findings that it negatively affected students' performance in Ibanda district. Findings also revealed that Self-efficacy had a positive statistically significant relationship with students' academic performance in Ibanda North, Ibanda District (r = .192, p < 0.01). The regression model was also significant in predicting students' academic performance (F (5, 284) = 6.280, p (.004) < .05). It was concluded that parenting styles and self-efficacy is significant in contributing to students' academic performance. Recommendations were made to parents to adopt authoritative and authoritarian parenting practices in combination; to teachers to always spare some time and give counselling to students depending on their needs; to schools to set strategies for students whose parents are uninvolved but have a potential to perform well and to Ministry of Education and Sports to put a policy that will ensure that all schools have school counsellors due to the fact that teachers find it difficult to spare time to guide students beyond academics because of fixed timetables.

4.5.5 Mindset, Grit, and Academic Achievement among Undergraduate Science Teachers at a University of Science and Technology

Tugabirwe Irine, Aloysius Rukundo

Mindset and grit are non-cognitive factors that have received increased attention lately, since research indicates that they play a significant role in influencing academic achievement in various settings. Using correlational design employing quantitative method the relationship between grit, mindset, and academic achievement was investigated among 381 undergraduate science teachers at Mbarara University of Science and Technology (MUST). Data were collected using a self-reported questionnaire. Data analysis was aided by SPSS Version 25. Linear regressions were used in predicting the association between mindset, grit and academic achievement. Significance was considered at p<.05. There was a positive statistically significant association between mindset and academic achievement (*B*=.136, *p*<0.01). Further, grit was significantly associated with academic achievement (*B*=.231, *p*<.001). Mindset and grit have a positive association with academic achievement and thus there is a need for strategic intervention focused on improving students' mindset and grit among Undergraduate science teachers at MUST.

5.0 FACULTY OF BUSINESS & MANAGEMENT SCIENCES

5.1 MASTER OF BUSINESS ADMINSTRATION

5.1.1 Credit Accessibility, Financial Empowerment and Welfare of Wazalendo SACCO Members in Mbarara City

Abicilama Oyar Tonny, Nsambu Kijjambu Frederick

The study sought to establish the relationship between credit accessibility and financial empowerment with Wazalendo SACCO members' welfare in Mbarara city. It was also guided by the objectives which included; to examine the relationship between credit accessibility and Wazalendo SACCO member's welfare in Mbarara city, to examine the relationship between financial empowerment and Wazalendo SACCO members' welfare in Mbarara city and to examine the relationship between credit accessibility, financial empowerment and Wazalendo SACCO members' welfare in Mbarara city.

The study used a cross sectional design and quantitative approach using a sample size of 344 WSACCO members and 3045 WSACCO members were arrived at using the statistical table of Krejcie and Morgan (1970) using WSACCO members as the respondents or the unit of inquiry. The data were tested for reliability and validity, analyzed using SPSS version 26 and results presented based on the study objectives.

The correlation coefficient analysis revealed positive and significant relationships between credit accessibility and Wazalendo SACCO member's welfare, financial empowerment and Wazalendo SACCO members' welfare which implies that when one variable is improved it leads to improvement of the other. Furthermore, the multiple regression analysis indicates that credit accessibility combined with financial empowerment have a greater influence on the Wazalendo SACCO members' welfare (Adj R^2 of 0.31). However, it was further revealed that credit accessibility has a more direct effect on the Wazalendo SACCO members' welfare.

It can be concluded that both credit accessibility and financial empowerment are significant predictors of WSACCO members' welfare as it was confirmed by regression analysis.

There is a need for WSACCO management to ensure that they have proper procedures which are well-known to all the members on how to access credit, this can be through laying down procedures and they should be displayed on notice boards, so that members can have free access to information before they apply for the credit.

5.1.2 Audit Quality, Managerial Competence and Profitability of Commercial Banks in Uganda: Evidence from Kampala City

Ahimbisibwe Martin**,** Atwine Daniel Wanito

The study sought to establish the relationship between audit quality, managerial competence and profitability of commercial banks in Uganda.

The study adopted across sectional and correlation quantitative design using a sample size 24 was obtained using Managers, auditors, financial analyst, managing directors and accountants as the unit of inquiry. The data were tested for reliability and validity, analyzed using SPSS version 26 and results presented based on the study objectives.

The correlation coefficient analysis revealed positive and significant relationships between managerial competence and profitability of commercial banks which implies that when one variable is improved it leads to improvement of the other while audit quality was not confirmed by regression analysis to have a significant relationship with profitability of commercial banks. Furthermore, the multiple regression analysis indicates that managerial competences combined with audit quality have a greater influence on the profitability of commercial banks (Adj R^2 of 0.507). Therefore, more emphasis should be put on improvement of all the activities related to increasing the abilities, knowledge and skills of the employees since this will improve the profitability of commercial banks

To improve managerial competencies, there is the need for personal development by bank owners/managers in the area of education and training since the findings indicated the majority of an improvement in the skills and abilities which can be acquired through education and training will result in to an improvement in profitability of commercial banks.

5.1.3 Rewards and Performance of Support Staff at Mbarara High Court Circuit

Akampa Rukundo, Adrian R. Mwesigye

The study sought to establish the relationship between rewards and performance of support staff at Mbarara High court circuit. The objectives of the study were To examine the relationship between monetary rewards and performance of support staff at Mbarara High court circuit and the second one was to examine the relationship between non-monetary rewards and employee and performance of support staff at Mbarara High court circuit and the last one was to established the combined effect of monetary and non-monetary rewards on performance of support staff at Mbarara High court circuit.
The study adopted a correlational research design using a sample size 82 support staff in Mbarara High Court circuit were considered and this circuit include chief magistrates courts of Ibanda, Isingiro and Mbarara Districts(Mbarara High court Annual Report 2017, 2018)from whom the researcher generated primary data. The correlation coefficient analysis revealed positive and significant relationships between monetary, non-monetary rewards on performance of support staff at Mbarara High court circuit which implies that when one variable is improved it leads to improvement of the other. In addition, the regression analysis indicates that monetary combined with non-monetary rewards have a better influence on the performance of support staff at Mbarara High court circuit 45.4% (AdjR Square =.454) The researcher therefore recommends that the Judiciary and other stakeholders should promote monetary rewards among projects since its crucial in improving performance of the support staff. This can be achieved through increasing the salaries and bonuses; this will improve performance of support staff at Mbarara high court circuit.

The Judiciary and the management of the support staff in high courts should promote by all means increasing the recognition of the support staff, appreciate them and praise them since it found out in the findings that it's more significant compared to monetary rewards in terms of the contribution.

5.1.4 Attitude towards E-Tax System, Adoption of E-Tax System, Tax Awareness and Tax Compliance among Small and Medium Enterprises in Mbarara City

Amutuhaire Rodgers, Naster Tumwebembeire

The study sought to establish the relationship between attitude towards e-tax system, adoption of e-tax system, tax awareness and tax compliance among SMEs in Mbarara city.
The study adopted across sectional and correlation quantitative design using a sample size 372 SMEs obtained from Mbarara City using SME owners/managers as the respondents or the unit of inquiry. The data were tested for reliability and validity, analyzed using SPSS version 21 and results presented based on the study objectives.

The correlation coefficient analysis revealed positive and significant relationships between attitude towards e-tax system and tax compliance, attitude towards e-tax and adoption of e-tax system, adoption of e-tax system and tax compliance and tax awareness and tax compliance. Furthermore, the multiple regression analysis indicates that the three independent variables explain 50.7 (Adj R^2 of 0.507) of the variations in Tax compliance implying the remaining 49.3 is explained by other variables not considered in this study. Therefore the government of Uganda through Uganda Revenue Authority should train the SME owners on how to use the e-tax system, this can be through allocating enough budget towards the training of these businesses, this will improve on their attitude towards the use of e-tax system and this will in turn improve on the tax compliance among SMEs in Mbarara City

5.1.5 Assessing the Determinants of Wholesale Traders' Participation in Purchasing Consortium in Mbarara City

Amwikirize Annah, Sarah Nabachwa

Wholesale businesses world over are facing business operation challenges that necessitate adopting new mechanisms especially in their buying and selling strategies. Purchasing consortium among wholesale business traders is not well conceived and adopted especially in developing countries yet it presents greater benefits for business growth. This study therefore focused on establishing the determinants of wholesale traders' participation in purchasing consortium in Mbarara City. Specifically, the study examined the precursors of purchasing consortium, the barriers to participate in purchasing consortium and the opportunities available for wholesale traders to participate. The study was based on a qualitative approach using exploratory, phenomenological and narrative research designs. Data was collected from wholesale traders, city authorities and association leaders using interview method. Results show that the uptake of purchasing consortium in Mbarara city is limited yet it presents greater business opportunities as long as groups are organized. Results show that socio-demographic factors compared to economic and institutional greatly determine purchasing consortium. The current capitalistic approach and various internal barriers to wholesale business greatly explain limited uptake of purchasing consortium. Wholesale traders who participate in purchasing consortium focus mostly on collective pooling of resources that can support those with a limited capital base. The increasing costs of business operations especially with COVID-19 pandemic have also forced most traders to participate in purchasing consortium. It was also revealed that internal barriers greatly influence purchasing consortium compared to the external barriers. Furthermore, the long-term opportunities compared to short term opportunities influence wholesale traders to participate. It is concluded that much as purchasing consortium presents great opportunities, most traders are not aware of this and should therefore be sensitized to uptake it since it brings business growth among traders. It is recommended that Mbarara City authorities should create enabling institutional arrangements and enabling environment that can create an enabling environment that can boost purchasing consortium as a business strategy. Wholesale traders should be supported to organize themselves to participate in purchasing consortia in order to reduce business burden and promote business growth and development in Mbarara city.

5.1.6 Debtors Management and Financial Performance of Small and Medium Scale Enterprises in Mbarara City

Atukunda Sarah, Atwiine Daniel Wanito

The study was about debtors' management and financial performance of small and medium scale enterprises (SMEs) in Uganda using evidence from SMEs in Mbarara city. The study was carried out from Mbarara City targeting SMEs operating from the central business area of the city because of its large concentration of SMEs. The main purpose of the study was to analyze the relationship between debtors' management and financial performance of SMEs. Debtor's management was assessed in terms of debt extension policy, debtors monitoring and Debt Collection Policy while financial performance was assessed in terms of profitability, liquidity and sales growth. The study used a cross-sectional research design exploiting a quantitative approach where frequencies, percentages, correlations and regression coefficients were used to interpret the relationship between debtor's management and financial performance. The study population comprised of licensed Small and Medium Scale Enterprises in Mbarara city. The unit of analysis included 2,400 SMEs operating within the main town (central business town) of Mbarara city while the unit of inquiry were the managers of trading businesses within the central business town of Mbarara city. The sample size included 342 businesses selected using simple random sampling. A questionnaire survey method was used to collect data where 5-point Likert scale questionnaire whose validity and reliability were tested were used to collect data. The collected data was analysed using SPSS version 26.0 and correlations and regressions were used to interpret the findings.
The study findings revealed that there is a strong positive relationship ($r=.611^{**}$, P=.000) between Debt Extension Policy and financial performance of SMEs. In addition, the findings show that there is a strong positive significant relationship ($r=.711^{**}$, P=.000) between debtors monitoring and financial performance of SMEs. The findings further revealed that there is a strong positive significant relationship ($r=.632^{**}$, P=.000) between Debtors Collection Policy and financial performance of SMEs. The above findings imply that if the business establishes a Debt Extension Policy, conducts regular monitoring and establishes a clear Debt Collection Policy, financial performance would improve significantly.

The study concludes that there is a positive significant relationship between debtor's management and financial performance of small and medium scale enterprises in Mbarara city. All the dimensions of debtor's management; Debt Extension Policy, debtors monitoring and Debt Collection Policy are significantly and positively related with financial performance of SMEs.

5.1.7 Inventory Management System, Managerial Competences and Financial Performance of Fuel and Gas Filling Stations in Ankole Sub Region, South Western Uganda

Atukwatse Sharon, Kamukama Nixon

The study aimed at examining the relationship between inventory management system, managerial competences and financial performance of fuel and gas filling stations in Ankole sub region, south western Uganda. The study adopted a cross sectional research design and a quantitative research approach. The population was 61 fuel and gas filling stations in Ankole sub region from which a sample of 53 fuel and gas filling stations was selected. The study used simple random sampling to select the fuel and gas filling stations and purposive

sampling was used to select the employees from the stations. A self-administered questionnaire was used to collect data. The study findings revealed a statistically significant moderate positive correlation between inventory management system and financial performance ($r=0.552^{**}$, P<.01), study results also revealed there is a statistically significant substantial positive correlation between managerial competences and financial performance ($r=0.613^{**}$, P<.01) and finally, the study results also indicated the effectiveness of the inventory management system used by fuel and gas filling stations in Ankole sub region was moderate (mean=2.8846, std deviation= .51133). The study concludes that inventory management system is a key driver of financial performance, as indicated by a moderate positive and significant relationship between it and loan performance. Also, managerial competences significantly influence financial performance, as revealed by a substantial positive and significant relationship between it and financial performance. Additionally, the study concludes that the inventory management system used by fuel and gas filling stations is moderately effective. The study recommends that policy makers, the management and other stakeholders of fuel and gas filling stations in Ankole sub region: should improve their financial performance by improving their inventory management system through; increasing their stock monitoring rates, ensuring good stock planning and increasing the frequency and quality of stocktaking, they should also improve their financial performance by improving the competences of their managers through enhancing their knowledge, skills and abilities through training and providing professional development courses and workshops and finally, they should improve inventory management system by doing effective stock planning, increasing the frequency of stock taking and doing more stock monitoring.

5.1.8 Job Satisfaction and Employee Commitment at Mbarara Regional Referral Hospital Southwestern Uganda

Aturinda Isaac, Asaph Katarangi Kaburura

The study established the relationship between job satisfaction and employee commitment at MRRH. It was guided by four objectives namely; to examine the relationship between Salary and employee commitment at MRRH, to examine the relationship between Interpersonal relationship and employee commitment at MRRH, to examine the relationship between Organizational policy and employee commitment at MRRH and to examine the relationship between Supervision and employee commitment at MRRH. This study used explanatory research design. It collected by the use of questionnaire method and during data analysis quantitative research methodology was used as a sample of 145 respondents were selected from the study. The response rate was 153 out of 145 which accounts for 94.7% the respondents for the research instrument. Results established that there is a positive significant relationship between salary and employee commitment. In addition, that there is a positive significant relationship between Interpersonal relationship and employee commitment at MRRH. In addition, there is a positive significant relationship between organizational policy and employee commitment. The regression results indicate that if other factors are held constant, organizational policy explains 53.1% of the variations in employee commitment at MRRH. Lastly, there is a positive significant relationship between Supervision and employee commitment at MRRH. In general, the study revealed that there is a positive significant relationship between Job satisfaction and employee commitment. The regression analysis also indicates that Job satisfaction has a strongly significant influence on employee commitment at 0.05 significance level with the coefficient of determination R square

indicates that 50.1% of the variation in employee commitment at MRRH as follows is attributed to the Job satisfaction used.The study recommended that it is very important to reinforce them by applying the right human resource policies. In addition, study recommended supportive management style, demonstrated through open communication, respect and recognition in order to greatly improve the satisfaction of health workers on the job. Also, managers should spend more time learning more about human behavior, communication, and how their attitudes and behaviors impact employee's performance.

5.1.9 Cost of Credit, Working Capital Management and Financial Performance of Medium Enterprises in Mbarara City

Ayebazibwe Abious, Kahangane Geoffrey

The study sought to establish the relationship between cost of credit, working capital Management and financial performance of MEs in Uganda, using Mbarara city as a case study. It was guided by objectives which included; to establish the relationship between cost of credit and financial performance of MEs in Mbarara City, to establish the relationship between working capital management and financial performance of MEs in Mbarara City and to establish the predictive power of cost of credit and working capital management on financial performance of MEs in Mbarara City

The study adopted across sectional design using a sample size 169 MEs was arrived at using Crecy& Morgan (1970) and was distributed in the different business categories of trade and commerce, manufacturing and services that operate with in Mbarara city and the owners/managers of these 169 were randomly selected and these formed the unit of inquiry

The correlation coefficient analysis revealed positive and significant relationships between cost of credit and financial performance of MEs in Mbarara City, working capital management and financial performance of MEs in Mbarara City which implies that when one variable is improved it leads to improvement of the other. Furthermore, the multiple regression analysis indicates that the independent variables combined, have a greater influence on the financial performance of MEs (Adj R^2 of 0.459)

Therefore, the government and other stakeholders should promote affordable credit among financial institutions, this will enhance the accessibility of the affordable loans to the MEs, it can be done through lowing the bank rate, setting the interest rates below equilibrium and also persuading credit institutions to extend loans to the ME owners and this will improve on their financial performance.

5.1.10 Financial Management Practices and Financial Performance of SACCs in Mbarara District

Ayebazibwe Ivan, Rennie Bakashaba

The study sought to establish the relationship between financial management practices and financial performance of SACCOs in Mbarara district. It was based on three objectives which were to examine the relationship between internal controls and financial performance in SACCOS in Mbarara district, to examine the relationship between budgeting practices and financial performance of SACCOS in Mbarara district and to examine the relationship

between accounting information system management and financial performance of SACCOS in Mbarara district. This was guided by cross-sectional design and a sample of 53 SACCOS in Mbarara district was determined using Taro Yamane (1967) formula of sample size determination. The data were collected using self-administered questionnaires. The correlation coefficient analysis revealed positive significant relationships between internal controls and financial performance in SACCOS in Mbarara district, there was also a significant positive relationship budget practices and financial performance in SACCOS in Mbarara district. It was found out that accounting information system has a significant positive relationship with financial performance in SACCOS in Mbarara district Furthermore, the results in the model summary indicate that accounting Information System management, internal control practices and budgeting practices explain 46.9% (Adjusted R Square=.469) of the changes in the financial performance of SACCOs in Mbarara district. This means that the remaining 53.1% of the changes in the financial performance is explained by other variables not considered in this study. Therefore, the management of the SACCOs should ensure that there are proper internal controls in terms of having a controlled environment and there should be a proper monitoring tool to assess the performance of the SACCO and this can also help to monitor the performance and also mitigate the challenges that may arise from any threat that is detected.

5.1.11 Bid Protest Behavior, Stakeholder Involvement and Value for Money among Public Procurement and Disposal Entities in Southwestern Uganda

Bataringaya Denis, Wilbroad Aryatwijuka

The study sought to establish the relationship between bid protest behaviour, stakeholder involvement and value for money among public procurement and Disposal entities in South Western Uganda.

The study adopted across sectional and correlation quantitative design using a sample size 39 PDEs in western Uganda where 2contracts committee, 2 technical department and 1 chairman LC1 and 1 councilor from where the PDE were selected as unit of inquiry. The data were tested for reliability and validity, analyzed using SPSS version 21 and results presented based on the study objectives.

The correlation coefficient analysis revealed positive and significant relationships between bid protest behaviour and value for money among public procurement and Disposal entities, stakeholder involvement and value for money among public procurement and Disposal entities which implies that when one variable is improved it leads to improvement of the other. Furthermore, the multiple regression analysis indicates that bid protest behaviour combined with stakeholder involvement have a greater influence on the stakeholder involvement and value for money among PDEs (Adj R^2 of 0.446).

Therefore, there is need by a firm's management to ensure that they have the right and the required knowledge, skills and abilities to undertake contracts being awarded by the PDEs.

The managers under PDEs should try by all means to make sure that the full stakeholder participation and proper communication to bidders; this will improve the value for money for the PDEs.

5.1.12 Financial Management Practices and Financial Accountability in District Local Governments in Southwestern Uganda

Bugembe Patrick, Agume Anthony

This study is about financial management practices and financial accountability in local governments in Southwestern Uganda. The study sought to establish the relationship between financial management practices and financial accountability in local governments in Uganda. Financial management practices were operationalized in terms of financial planning, financial monitoring and financial control while financial accountability was operationalized in terms of transparency, disclosure and fiscal compliance. The study was underpinned by the agency theory, the stewardship theory and the information asymmetry theory which describe the need for proper financial management practices to reduce the information gap between stewards/agents and principal/citizens. The study used a cross-sectional research design which employed a quantitative approach to establish the relationships between variables and prove whether the hypotheses hold true or false. The study population included 644 local government officials involved in financial management and financial accountability in local governments in southwestern Uganda. A sample size of 560 respondents was selected using stratified and purposive sampling techniques. Data was collected using close-ended questionnaires whose validity and reliability were tested before data collection. The collected data was analysed using SPSS Version 26.0 and presented in form of Pearson correlations and regressions to analyze the relationships between financial management practices and financial accountability.

The study findings revealed that there is a strong positive significant relationship between Financial planning and financial accountability of Local governments ($r=.773^{**}$; $p\leq0.01$). The correlation coefficients also indicate that there is a strong positive significant relationship between financial monitoring and financial accountability of local governments in Southwestern Uganda ($r=.774^{**}$, $p\leq0.01$). The correlation coefficients further revealed that there is a strong positive significant relationship ($r=.892^{**}$; $p\leq0.01$) between financial control and financial accountability of local governments in Southwestern Uganda. The findings indicate that all the financial management practices were positively and significantly related with transparency, disclosure and fiscal compliance.

The study concludes that all the financial management practices; financial planning, financial monitoring and financial control have a strong positive significant relationship with financial accountability in Local governments in Southwestern Uganda. Financial management practices therefore play a big role in ensuring transparency, disclosure and fiscal compliance in district local governments in Southwestern Uganda. The study recommends district local governments to do proper financial planning, ensure constant monitoring of funds and ensure proper control of funds in order to improve transparency, disclosure and fiscal compliance.

5.1.13 Reward Management System and Employees' Performance in Local Governments in Kasese District

Bwambale Alice Thabulhakyolho**,** Asaph Katarangi Kaburura

The study aimed at establishing the relationship between reward management system and employees' performance in local governments in Kasese District and was guided by the specific objectives: to establish the relationship between non-financial rewards and employee performance, to establish the relationship between financial rewards and employee

performance and to establish the combined relationship between non-financial rewards, financial rewards and employee performance of local governments in Kasese District. The study adopted a cross sectional research design and a quantitative research approach. The population was from the 41 Local government entities from which all of them were selected. The study used purposive sampling to select the local government entities and simple random sampling for employees. A self-administered questionnaire was used to collect data. The findings revealed; a significant moderate positive correlation between non-financial rewards and employee performance ($r=0.512^{**}$, P<.01), a significant substantial positive correlation between financial rewards and employee performance ($r=0.738^{**}$, P<.01) and that the combination of non-financial rewards and financial rewards has a substantial statistically significant correlation (r= 0.755**, p<.01) with employee performance and all the combined variables explain 56.2% variation in employee performance. The study concludes that non-financial rewards is a key driver to improved employee performance since there is a significant moderate positive relationship between it and employee performance, it also concludes that financial rewards in another key driver of employee performance since there is a significant substantial positive relationship between them and employee performance of Local governments in Kasese district and it finally concludes that the combination of non-financial rewards and financial rewards has a substantial significant relationship with employee performance and the combination explains 56.2% of variation in employee performance. The study recommends that policy makers, the management and other stakeholders of Local governments in Kasese district; should give their employees improved salaries, allowances and allowances so as to enhance their performance, should recognize their employees, ensure workplace flexibility and create for them promotion opportunities so as to enhance their performance and finally they should simultaneously invest in enhancing both financial rewards and non-financial rewards since a combination of the two variables has a stronger association with employee performance than the individual separate variables.

5.1.14 Information Sharing, Managerial Competence and Service Delivery of Humanitarian Organizations Operating in Refugee Settlements in Western Uganda

Kawalya Ronald, Ruth Nyiramahoro

The study aimed at establishing the relationship between information sharing, managerial competence and service delivery of humanitarian organizations in Western Uganda and was guided by the objectives: to establish the relationship between managerial competence and service delivery, to establish the relationship between information sharing and service delivery and to establish the combined relationship between managerial competence, information sharing and service delivery. The study adopted a cross sectional design and a quantitative approach. The population was 61 Humanitarian organizations from which a sample of 53 was selected. The study used simple random sampling on organizations and purposive sampling was used to select the employees. A self-administered questionnaire was used to collect data. The findings revealed; a low positive significant correlation between information sharing and service delivery (358^{**}, P<.01), a substantial positive significant correlation between managerial competence and service delivery (0.682^{**}, P<.01) and the combination of information sharing and managerial competence has a substantial significant correlation (r= 0.735**, p<.01) with service delivery and the combination explains 53.1% variation in service delivery. The study concludes that managerial competence is a key driver to improved service delivery since there is a significant moderate positive relationship

between it and service delivery, it also concludes that information sharing in another key driver of service delivery since there is a significant low positive relationship between them and service delivery and it finally concludes that the combination of managerial competences and information sharing has a substantial significant relationship with service delivery and the combination explains 53.1% of variation in service delivery. The study recommends that humanitarian organisations of humanitarian organizations in Western Uganda; should improve their requirements, supplier and financial information sharing so as to enhance service delivery, they should also improve the technical, organisational and behavioral competences of their managers through training and organizing continuous professional development workshops and refresher courses and lastly they should concurrently invest in enhancing both information sharing and managerial competence since the combination of the two variables has a stronger association with service delivery than the individual separate variables.

Keywords: Information Sharing, Managerial Competence and Service Delivery

5.1.15 Stakeholder Involvement and Service Delivery in National Water and Sewerage Corporation, Sheema District

Kebirungi Christine, Agume Anthony

The study aimed at establishing the relationship between stakeholder involvement and service delivery in National Water and Sewerage Corporation (NWSC), Sheema district under the specific objectives:to establish the relationship between stakeholder involvement in planning and service delivery, to establish the relationship between stakeholder involvement in implementation and service delivery and to establish the relationship between stakeholder involvement in monitoring and evaluation and service delivery. The study adopted cross sectional research design and the population of 432 villages in Sheema districtwith NWSC projects and the 4 NWSC branches from which a sample size of 213 was computed. Simple random sampling was used to select the LCI chairpersons while purposive sampling was used to recruit all the 25 NWSC branch employees. Two similar questionnaires were independently administered to employees of NWSC and LC1 chairpersons. The study found that in NWSC of Sheema district; there is a significant substantial positive correlation ($r=0.601^{**}$, $P<.01$) between stakeholder involvement in planning and service delivery, there is a significant moderate positive correlation ($r=0.504^{**}$, $P<.01$) between stakeholder involvement in implementation and service delivery and there is a statistically significant moderate positive correlation ($r=.434^{**}$, $P<.01$) between stakeholder involvement in monitoring and evaluation and service delivery. The study concludes that in NWSC of Sheema district; stakeholder involvement in planning is a key predictor of service delivery since it has a significant substantial positive relationship with service delivery, stakeholder involvement in implementation is another predictor of service delivery since it has a statistically significant moderate positive relationship with service delivery and finally stakeholder involvement monitoring and evaluation also predicts service delivery since it also has a statistically significant moderate positive relationship with service delivery. The study recommends that: NWSC Sheema district should improve their stakeholder involvement in planning by engaging them in preliminary needs assessment, budgeting process and by making adequate documentation, also NWSC Sheema district should improve their stakeholder involvement in implementation by engaging them in supervision, controlling, organisation and coordination of their projects and finally NWSC Sheema district should

improve their stakeholder involvement in monitoring and evaluation by engaging them in evaluating indicators, providing feedback and in assessment of performance.
Keywords: Stakeholder Involvement and Service Delivery

5.1.16 Factors that Influence the Performance of Cooperative Societies in Kasese District

Kibaya Nicodemus, Adrian Rwekaza Mwesigye

This report presents factors that influence the performance of Cooperative societies in Kasese District. This study was guided by two objectives; to establish the extend at which social capital has influenced the performance of cooperative societies' in Kasese District; and to establish the correlation between social capital and human resources practices in influencing performance of cooperative societies in Kasese District. The study used both descriptive and correlation research design. Both quantitative and qualitative approaches were applied in order to get substantial results. The researcher utilized self-administered questionnaire in collecting data from ten Agricultural primary cooperative societies. Cooperative members enrolled in this study were 103 participants who filled self-administered questionnaire and 10 key informants presented verbatim and memos were scribed from interviews held at different time and space. Data was sorted, edited, coded and tabulated after being computerized using Statistical Package for Social Scientists (SPSS) version 16.0. Qualitative data was handled manually as short notes were written from the field and expended in rigorous manner so as to create excerpts to help in content and thematic analysis. The subscripts were put on the wall and highlighting the same matching texts was done. These themes taken after content analysis provided lived experiences of participants.
Both social capital and human resources practices were significantly positive as statistics show that Pearson correlation is as for social capital to performance r= -.042 correlation is significant .973, P-value 0.01 while human resource management practices to performance is r=-.042. Considering variable means the highest was 3.02 and lowest 1.6 signifying that distribution of variables was normal basing on responses. The harmonious working environment in cooperatives may result into profitability but this has not been the case for Kasese District.

5.1.17 Technology Acceptance and Adoption of Digital Banking among Stanbic Bank Customers in Mbarara City

Mirembe Dorothy, Nsambu Kijjambu Frederick

The study sought to establish the relationship between perceived usefulness, perceived ease of use, attitude, and adoption of digital banking among customers of Stanbic Bank Uganda in Mbarara City. It was guided by the following objectives; to establish the relationship between attitude and adoption of digital banking.To establish the relationship between perceived usefulness and attitude towards the adoption of digital banking, to establish the relationship between perceived ease of use and attitude towards the adoption of digital banking, to establish the relationship between perceived usefulness and adoption of digital banking and to establish the relationship between perceived ease of use and adoption of digital banking among customers Stanbic Bank Uganda in Mbarara City.The study adopted across sectional design using a sample size 378 respondents who comprise of a customers of Stanbic Bank

these formed the units of inquiry and analysis. The data were tested for reliability and validity, analyzed using SPSS version 26 and results presented based on the study objectives. The correlation coefficient analysis revealed positive and significant relationships between perceived usefulness, perceived ease of use, attitude towards adoption of digital banking, and adoption of digital banking which implies that when one variable is improved it leads to improvement of the other. Furthermore, the multiple regression analysis indicates that the independent variables combined, have a greater influence on the adoption of digital banking (Adj R^2 of 0.699). There is need for continuous training of the customers since this enhances their ability to increased perceived usefulness since it enhances the adoption of integrated reporting. There is also a need to put much emphasis on sensitizing the customers about the benefits of digital banking since increases the perceived ease of use thus enhancing the adoption of digital banking.

5.1.18 Pricing System, Managerial Competence and Performance of Dairy Farmer Cooperatives in Greater Mbarara

Ninsiima Judith, Nixon Kamukama

The study examined the relationship between pricing system, managerial competence and performance of dairy farmers' cooperatives in Greater Mbarara, Uganda. It was guided with the three objectives which include; evaluating the effectiveness of the pricing system used by dairy farmers' cooperatives in Greater Mbarara; to establish the relationship between pricing system and performance of dairy farmers' cooperatives in Greater Mbarara; and to establish the relationship between managerial competence and performance of dairy farmers' cooperatives in Greater Mbarara. The study adopted across sectional research design using a sample size 64 dairy farmers cooperatives in Greater Mbarara. The questionnaire data were tested for reliability and validity, analyzed using SPSS version 22 and results presented based on the study objectives. The results also indicated the overall effectiveness of the pricing system of dairy farmers cooperatives in Greater Mbarara was moderate since their mean (mean=2.9776, std deviation= .61012). The correlation coefficient analysis revealed positive and significant relationships between pricing system (0.442**), managerial competence (0.616**) and performance of dairy farmer cooperatives in Greater Mbarara Uganda which implies that when one variable is improved it leads to improvement of the other. Furthermore, the multiple regression analysis indicates pricing system, managerial competence has a better influence on performance of dairy farmer cooperatives in Greater Mbarara Uganda (Adj R 2of 0.499). However, it was further revealed that managerial competence attribute to experience, knowledge and skills has a more direct effect on the performance of dairy cooperatives. The cooperatives need to conduct continuing professional development trainings for managers to equip them with modern skills to accurately monitor and forecast the customer demands and abilities as well as supplier power in bargaining, research and development on management and pricing system to achieve performance.

5.1.19 Debt Management, Financial Innovation and Profitability of Commercial Banks in Kampala Uganda

Ninsiima Patience, Kahangane Geoffrey

The study sought to establish the relationship between debt management, financial innovation and profitability of commercial Banks in Uganda. It was guided by objectives which included; to examine the relationship between debt management and profitability of commercial banks in Kampala Uganda, to establish the relationship between financial innovations and profitability of commercial banks in Kampala Uganda and to examine the relationship between debt management, financial innovations and profitability of commercial banks in Kampala Uganda.
The study adopted across sectional and correlation quantitative design using a sample size of 24 commercial banks in Kampala division was determined using Krejcie and Morgan (1970). The head of digital banking, bank manager, finance managers and credit manager of the bank formed the unit of inquiry). The data were tested for reliability and validity, analyzed using SPSS version 21 and results presented based on the study objectives.
The correlation coefficient analysis revealed positive and significant relationships between debt management, financial innovation and profitability of commercial Banks in Uganda which implies that when one variable is improved it leads to improvement of the other. Furthermore, the hierarchical regression analysis indicates that debt management combined with financial innovation influence profitability of commercial Banks in Uganda (Adj R^2 of 0.531). From the findings and discussion, it can be concluded that debt Management is a predictor of Profitability of Commercial Banks in Uganda. This shows the need to improve on debt Management in terms of carrying out proper credit risk assessment, having clear periodic loan review, ensuring that there is enough collateral and having early warning signs will result in to an improvement in profitability of commercial banks.
There is need for continuous improvement in debt management by enhancing Credit Risk Assessment, having clear periodic loan review, ensuring that there is enough collateral and having early warning signs will result in to an improvement in profitability of commercial banks.

There is also a need to put much emphasis on financial innovations by continuously introducing and improving on the existing products/services, these will improve the way services are delivered to the customers and this will enhance the use of the services and this will improve the profitability of the commercial banks.

5.1.20 Electronic Tax System Adoption and Tax Compliance among VAT Registered Businesses in Mbarara City

Ninsiima Deogratias, Tumuhimbise Manasseh

This study examined the relationship between electronic tax system adoption and tax compliance among VAT registered business in Mbarara city. The study was guided by four objectives which included; establish the relationship between perceived usefulness and adoption of electronic tax system, to establish the relationship between attitude towards adoption of electronic tax system, to establish the relationship between perceived ease of use and adoption of electronic tax system and to establish the relationship between adoption of electronic tax system and tax compliance.

The study adopted a cross-sectional research design with a quantitative approach for data collection and analysis. The study involved a sample size of 242 SBEs in Mbarara city. Data from the field were processed and analyzed using Statistical Package for Social Scientists (SPSS v21). Given the nature of the research objectives and questions, inferential statistics

were used as the main analysis. Specifically, Pearson correlation was conducted to test the associations, while hierarchical regression was performed to test the contribution effect of each variable in explaining tax compliance.

The correlation results revealed positive significant relationships between perceived usefulness and adoption of electronic tax system, attitude towards adoption of electronic tax system, perceived ease of use and adoption of electronic tax system, a significant relationship between adoption of electronic tax system and tax compliance. While the regression analysis indicated that the independent variables under the study explain 38.4% ($AdjR^2$ = .384) of the variations in tax compliance.

Therefore, to improve tax compliance, there is need for personal development by small business owners/managers in the area of education and training since the findings indicated that majority of the respondents were diploma and certificate holders and may lack some perquisite knowledge as to why taxes need to be paid.

Keywords: Electronic tax system adoption, Tax compliance, Perceived usefulness, Attitude, Perceived ease of use.

5.1.21 Credit Management and Portfolio Performance of SACCOs in Sheema District

Nuwasasira Benson, Tumuhimbise Manasseh

The study was about credit management and portfolio performance of SACCOs in Sheema District. The objectives of the study were; to determine the relationship between credit appraisal and portfolio performance of SACCOs, to establish the relationship between monitoring effort and portfolio performance of SACCOs and to examine the relationship between loan recovery effort and portfolio performance of SACCOs in Sheema district. The study relied on cross sectional research design, the unit of analysis was the SACCOs while each of the board members, loans committee members and loans officers were treated as a unit of observation. Morgan and Krejcie (1970) sample table was used to determine the sample size while purposive and simple random samplings were used to sample respondents. Questionnaire was used as data collection instruments. Data analysis was done using inferential statistics in form of determining correlation and regression to determine the relationship between credit management and portfolio performance of SACCOs.

From the study findings, credit appraisal, monitoring effort and loan recovery effort were found to have a positive significant relationship with portfolio performance, which implies that any positive improvement in the independent variables would result in to a positive change in portfolio performance of SACCOs in Sheema district. The findings from the regression analysis also indicated that the variables under the study explain an overall 46.7% of the variations in the portfolio performance.

Therefore, the study recommends that as far as credit appraisal is concerned, there is need for the management of most SACCOs to step up efforts in performing credit appraisal towards clients. The line departments that do the appraisal should be empowered, facilitated and cautioned on the need to be transparent while doing the credit appraisal. While appraising the clients, issues of credit worthiness, liquidity available to the SACCOs, proposal and business plan submitted by the clients and reliance on checklist should be considered because they are among the key aspects. There is need for the SACCO management to put up standard

operating measures in terms of enhancing credit appraisal and these should be emphasized among the credit officers by demanding evidence of doing it before loan disbursement. By doing this, credit appraisal will be based on real performance indicators and increase chances of portfolio performance of SACCOs.

5.1.22 Income Tax Compliance, Tax Incentives and Financial Performance of Supermarkets in Mbarara City, Southwestern Uganda

Nyombi Amos, Tumuhimbise Manasseh

The study aimed at finding out the relationship between income tax compliance and incentives on financial performance in supermarkets in Mbarara City. The study was guided by objectives, which included; to assess the tax incentives given to supermarkets in Mbarara city, to examine the relationship between tax incentives and financial performance of supermarkets in Mbarara city, and to establish the relationship between income tax compliance and financial performance of supermarkets in Mbarara city. A sample size of 40 was selected basing on Krejcie & Morgan (1970) table for determining the sample size. The researcher managed to collect data from 37 supermarkets making a response rate of 93%
From the findings, it was revealed that there is a positive relationship between tax incentives and financial performance of supermarkets in Mbarara city ($r=.437^{**}$, Beta=.359, $p<.01$).). It was also revealed that there is a positive significant relationship between income tax compliance and financial performance of supermarkets in Mbarara city ($r=.495^{**}$, Beta=.430, $p<.01$). The findings indicated that the tax incentives given to the supermarkets include; wear and tear incentive, assessed loss that is carried forward, special zones incentive and Special CIT rate.There is need for the government through URA to come up with more tax incentives like tax holidays since these will relieve SMEs from paying high taxes and the income saved can be re-invested into the business, this in turn increases on the returns of the business and thus increasing the financial performance of the supermarkets. It is also recommended that there is a need to train the owners/managers of the supermarkets to comply with their tax obligations since once one fails to comply, this calls for penalties which their financial performance.

5.1.23 Managerial Competences, Internal Controls and Loan Performance of SACCOs in Mbarara District

Rwomushana Peter, Asaph Katarangi Kaburura

The study aimed at establishing the relationship between managerial competences, internal controls and loan performance of SACCOs in Mbarara District and was guided by the specific objectives: to establish the relationship between managerial competences and loan performance, to establish the relationship between internal controls and loan performance and to establish the combined relationship between managerial competences, internal controls and loan performance of SACCOS in Mbarara District. The study adopted a cross sectional research design and a quantitative research approach. The population was 60 SACCOs from which a sample of 52 SACCOs was selected. The study used simple random sampling to SACCOs and purposive sampling was used to select the Sacco employees. A self-administered questionnaire was used to collect data. The findings revealed; a significant moderate positive correlation between managerial competences and

loan performance (r=0.462** , P<.01), a significant substantial positive correlation between internal controls and loan performance (r=0.670** , P<.01) and that the combination of managerial competences and internal controls has a substantial statistically significant correlation (r= 0.708**, p<.01) with loan performance and all the combined variables explain 50.0% variation in loan performance. The study concludes that managerial competences is a key driver to improved loan performance since there is a significant moderate positive relationship between it and loan performance, it also concludes that internal controls in another key driver of loan performance since there is a significant substantial positive relationship between them and loan performance of SACCOs in Mbarara district and it finally concludes that the combination of managerial competences and internal controls has a substantial significant relationship with loan performance and the combination explains 50.0% of variation in loan performance. The study recommends those policy makers, the management and other stakeholders of SACCOs in Mbarara district; should improve the skills, abilities and knowledge of their managers through training and organizing continuous professional development workshops and refresher courses, they should also improve their control activities, control environment and control monitoring so as to enhance loan performance and finally, they should simultaneously invest in enhancing both internal controls and managerial competences since a combination of the two variables has a stronger association with loan performance than the individual separate variables.

5.1.24 Inspection Costs and Pre-Export Verification of Conformity (PVOC) Compliance among Importers of General Merchandize in Western Uganda

Sserwanga Andrew, Tumwebembeire Naster

This study was to assess the relationship between Inspection Costs and PVoC compliance among importers of general merchandize in Western Uganda. Specifically, the study sought to establish the relationship between Pre-Shipping Inspection Costs and PVoC Compliance among importers of general merchandize in Western Uganda, the relationship between Destination Inspection Costs and PVoC Compliance among importers of general merchandize in Western Uganda and the other external factors influencing PVoC compliance among importers of general merchandize in Western Uganda. The study used a cross-sectional research design employing mixed approaches to collect both quantitative and qualitative data from registered importers of general merchandize and key officials from URA, UNBS and Good Will Agencies Staff at Mbarara Customs Bonded Warehouse in Mbarara City. The sample size included 44 importers of general merchandize at Mbarara customs bonded warehouse and 10 key informants. The response rate was 81.8% and 50% for importers and key informants respectively. The data was collected using close-ended survey questionnaires and key informant interview guide. The collected data was analysed using IBMSPSS version 20.0 and presented in form of Pearson correlation and multiple regression statistics.From the analysis, the study revealed that both pre-shipping and destination inspection costs had a negative significant relationship with PVoC compliance, indicating that an increase in inspection costs results to a decrease in PVoC compliance. Besides inspection costs, the regression statistics indicate that the external environment factors such as the socioeconomic, technological and geographic environment have a significant influence on the cost element in inspection which creates a more significant influence on PVoC compliance. The study concluded that PVoC non-compliance among importers of general merchandize is majorly attributed to high inspection costs and macro-economic factors. Keeping inspection costs low and controlling the effect of other external factors can result to

a significant increase in PVoC Compliance. This requires the government, UNB S and inspection companies to regulate the cost of inspection and make the environment favorable for importers to comply. There is also need for massive sensitization of importers on the benefits of complying with PVoC and putting in place strong measures to enforce compliance among importers.

5.1.25 Procurement Planning, Managerial Competences and Service Quality in Mbarara Local Government Entities

Twikiriize Sheilla, Sarah Nabachwa

The study aimed at examining the relationship between procurement planning, managerial competences and service quality of local government Entities in Mbarara. The study adopted a cross sectional research design and a mixed methods approach. The population was 15 local government Entities in Mbarara from which a sample of 34 participants was selected. The study used census approach on local government Entities and purposive sampling was used to select the employees from the entities. A self-administered questionnaire and interview guide were used to collect data. The study findings revealed a statistically significant low positive correlation between procurement planning and service quality ($r=0.364^{**}$, $P<.01$), study results also revealed there is a statistically significant moderate positive correlation between managerial competences and service quality ($r=0.576^{**}$, $P<.01$) and finally, the study results also indicated the service users perception of the service quality by local government entities in Mbarara District was low (mean=2.2892, std deviation= .24638). The study concludes that procurement planning is a key driver of service quality since there exists a statistically significant positive correlation between it and service quality. Additionally, managerial competence is another predictor of service quality as indicated by the statistically significant moderate positive correlation between it and service quality. Lastly, the study concludes that service users perceived the quality of services offered by local government entities in Mbarara to be of low status. The study recommends that policy makers, the management and other stakeholders of local government Entities especially in Mbarara should improve their service quality; improving their procurement planning through emphasizing good procurement packaging, methods and scheduling, they should also improve their service quality by improving the competences of their managers through enhancing their knowledge, skills and abilities through training and providing professional development courses and workshops and finally, they should change the perception of their service users through delivering reliable, responsive, tangible and empathetic services.

6.0 FACULTY OF INTERDISCIPLINARY STUDIES

6.1MASTER OF ARTS IN CONFLICT ANALYSIS & INCLUSIVE DEVELOPMENT

6.1.1 Higher level of education of a spouse and Intimate Partner Violence among Banyankole married/ever-married partners: a case study of Kakoba ward Mbarara City South Division

Paul Ahimbisibwe, Viola Nyakato, Neema Murembe

The study was about Spousal higher level of education and Intimate Partner violence among the Banyankole Married/ever-married couples. The purpose of the study was to examine theimplication of spousal higher level of education on IPV among Banyankole married/ever-married couples, using a case study of Kakoba Ward Mbarara City South Division. Specifically, the study sought to find out forms of IPV experienced by spouses with higher level of education, analyze the causes, establish the role of spousal higher education level on IPV and examine spouse attitudes towards IPV among higher level educated Banyankole spouses.

The study employed a descriptive case study and explanatory research designs to collect both quantitative and qualitative data from Banyankolemarried/ever-married couples with higher level of education and key informants as well. A sample size of 100 respondents was used consisting of 100 Banyankole married/ever-married couples with higher level of education (50 males, 50 females) and 20 key informants.

The research as well used snowball and purposive sampling methods to select the main respondents (Banyankole marred/ever-married partners) and key informants respectively. Questionnaire and key informant interview methods were used to collect data from the target respondents and key informants respectively.

The findings found out psychological abuse as the major common form of IPV and adultery as the most common cause. They further revealed that spousal higher level of education plays a key role in reducing IPV including increasing intellectual reasoning and bolstering it through increased disrespect, inferiority and superiority complex. It was also discovered that different couples have different attitudes towards IPV but most couples had a negative attitude, seeing it as a total menace that causes negative consequences such as separation, divorce, diseases and death which affect not only the partners but their children as well.

Conclusively, the study found out that, regardless of the higher level of education, IPV is still a common habit that can hardly be avoided among Banyankole married/ever-married couples. While most causes of IPV are related to individual behaviors of partners, there is need for awareness, support and education on behavioral change. Hence, the study provided a framework for intervention against IPV consisting of Awareness, Support and Education.

6.1.2 Intimate Partner Violence against Married Men and the Welfare of Families in Ntungamo Municipality

Beinomugisha Elias, Clementia Murembe Neema, Cleophas Karooma Kansiime

This study focused on "Intimate Partner Violence (IPV) against married men and the welfare of families in Ntungamo Municipality, Ntungamo district". The objectives of the study were to investigate the forms and prevalence of IPV against married men in Ntungamo Municipality, to establish the factors that have resulted into increased IPV against married men in Ntungamo Municipality and to examine the consequences of IPV on the welfare of married men's families in Ntungamo Municipality.

The study used qualitative methods of data collection and analysis where information was obtained using interviews from a sample size of 145 respondents who included 80 married women, 57 married men, 5 LC1 leaders, 1 probation officer and 2 police officers of the Child and Family Protection Unit at Ntungmao Central Police Station. The collected data was analysed using thematic content analysis, the major research findings presented narratively and discussed accordingly.

The study found out that there are different forms of IPV against married men in families in Ntungamo Municipality and these included physical violence, emotional violence, sexual and economic violence. The study findings also established that the causes of IPV against married men in Ntungamo Municipality are alcoholism, poverty, sex denial, adultery that causes jealous to the house wife and personal character as some women are naturally aggressive. The study findings also established the consequences of IPV against married men on families' welfare in Ntungamo Municipality and these included economic consequences such as high expenditure on medical treatment, loss of employment and social consequences such as divorce and children's hatred of the IPV perpetrator.

The study concluded that IPV against married negatively affects the welfare of families. The researcher recommended that policy makers such as government and human rights organizations to strengthen the laws on Intimate Partner Violence most especially in following up the families affected by IPV so that logical conclusions to the cases of IPV are made and the culprits brought to book, whether husbands or wives. The study also recommended that there is need for government to increase the capacity of the police and law enforcement officers to respond to cases of IPV against married men throughout Uganda as most cases of IPV against men go unreported hence rarely recorded.

6.1.3 Assessment of the contribution of Household level Women's Decision-Making on Access to Maternal Health Services: A Case of Biharwe Division, Mbarara City

Ninsiima Deborah, Viola NilahNyakato, Charles Muchunguzi

Background: This study assessed the contribution of household level women decision-making on access to maternal health in Biharwe Division, in Mbarara City, Southwestern Uganda. Access to maternal health services is an essential component of reproductive health among pregnant mothers. Factors such as education level, socioeconomic background, cultural factors, geographical locations have been found to be underlying factors for maternal health care service utilization. Little studies have been drawn towards examining pregnant mothers' decision making towards access to maternal health services. This study sought to examine the key areas of women decision making in the households, position of women in making decisions regarding access for maternal health services in households and the effects of women in making decision on access for maternal health services in households in Biharwe Division.

Methodology: The study adopted a cross-sectional survey design with both quantitative and qualitative approaches of data collection and analysis. A sample size of 180 men and women with a child less than 5 years living together were enrolled in this study. Another set of key informants specifically health workers were purposively selected to give expert views through in-depth interviews. Participants selected through a cross-sectional survey were subjected to a questionnaire-based interviews. Data collected through questionnaires was analysed using SPSS and presented in form of descriptive statistics such as frequencies, percentage, mean and standard deviations. Qualitative data was analysed using content analysis and presented using verbatim quotations to back the quantitative data.
Results: We found out that a significant number of key areas on which women have limited decision making in the household including equal rights on land, cultivation, treatment of children, political decisions, family planning and financial control. The study further found that women have no powers on where to deliver their babies, have no resources to visit health centers for ANC, when to conceive, child spacing, treatment of newborn babies, and immunization of children. We further found that access to maternal health services in householdshas an effect on the rate of infant mortalities, numbers ANC visits, place of delivery, time of first ANC visit, maternal mortality, and health of children.
Conclusion: The study found out that household decision making has an influence on access to maternal health services. It was found that household decision making influences decision making on the first ANC visit, number of ANC visits, child spacing, immunization and where to deliver from. The study recommends that there is a need to streamline policies aimed at streamlining women empowerment in order to enhance women's rights towards decision making in the family which has a direct impact on access to maternal health services.

6.2 MASTER OF ARTS IN DEVELOPMENT STUDIES

6.2.1 Administrative Decentralization and Health Service Delivery in Public Health Facilities in Sheema District

Agababyona Collins, Roberts K Muriisa, Frank Ahimbisibwe

Globally, progress in improving health service delivery has been slow and uneven in all aspects of health care delivery; which are comprehensiveness, accessibility, quality, coverage, continuity, person-centeredness, coordination, accountability and efficiency (WHO, OECD & World Bank, 2018). In order to tackle this, the government of Uganda embarked on decentralization process to bring services closer to people. This research study under the title '*Administrative Decentralization And Health Service Delivery In Public Health Facilities In Sheema District'* aimed at describing the effect of administrative decentralization on health service delivery in public health facilities in Uganda and used Sheema district as a case study.
A total of 74 respondents that included 50 local community members, 12 health workers and 12 Sheema district authorities were selected using random and purposive sampling, the research findings presented thematically and discussed accordingly.
Large/high patient load in public health facilities, limited number of health workers, poor health physical infrastructure and less empowered lower health centres (IIIs and IIs), low government investment in the health sector which is generally too small (14%) and therefore insufficient to uplift the quality, geographical distribution of the population, uneven

distribution of public health centers and high cost of accessing public health facilities are some of the gaps existing in health service delivery which are not being addressed by the policy.
The study recommended that Sheema district and other districts should be granted more powers in health staff recruitment without necessarily seeking permission to recruit from the Public Service Commission so as to avoid delays in recruitment of health workers by the district.

6.2.2 Domestic Violence and Child Abuse in Uganda: a Case Study of households in Kajara, Ntungamo District

Biira Monica, Clementia Neema Murembe, Cleophas Karooma Kansiime

This study, Domestic Violence and Child Abuse in Uganda was conducted among households in Kajara County, Ntungamo District located in South Western Uganda. The study established the relationship between domestic violence and child abuse in Uganda. The major thematic areas in this study were finding out the effects of physical violence between intimate partners on children, exploring the effects emotional violence between intimate partners on children and discovering the effects of sexual violence between intimate partners and children among households in Kajara.
The study was qualitative in nature and adopted a narrative explanatory research design which helped the researcher to remain focused on explaining the aspects of the study in a detailed manner. This explanatory case study design which was best suited for a single point of data collection for each participant and investigated the phenomenon within its real life context, it was cheap to undertake and the results were inferred to the larger population. The study drew out a sample size of 60 from a sample population of 92 and data was collected from both primary and secondary sources. The study had two types of respondents that are the locals (Men and women who were married or were once married) and the local leaders (LC 1's). Interview guides and Questionnaire surveys were used to gather information from primary source. Qualitative survey data was analyzed using Atlas ti9. This software helped generate the codes, the themes, the meanings and the network of the transcripts.
The study revealed that there was a strong positive relationship between domestic violence and child abuse. In families that experience domestic violence in form of physical violence, emotional and sexual violence contribute to high levels of child The study came up with a strong need to put more emphasis on sensitizing households in Kajara and Uganda as a whole on the dangers of domestic violence on children.
These findings concur with the social exchange theory which suggests that the private nature of the family, the reluctance of social institutions and agencies to intervene in intimate relationships in spite of mandatory child-abuse reporting laws and mandatory arrest laws for partner violence and the low risk of other interventions reduce the costs that abusers face for using violence. In addition, the study demonstrated that the cultural approval of violence as both expressive and instrumental behavior raise the potential rewards for using violence, the most significant reward being social and interpersonal control and power using the social learning theory (Bandura 1977
From the findings the study concluded that domestic violence has led to an increase in child abuse. To address this, the study recommended harsh punishment for offenders, Sensitization of what constitutes domestic violence and child abuse and their dangers and empowerment of households to have a source of income.

6.2.3 Understanding the Gender Factor in the Spread and Control of Schistosomiasis: A Case of Kagadi District

Mugabi Faith, Nyakato Viola, Elizabeth Kemigisha

Schistosomiasis is a Neglected Tropical Disease (NTD) also known as Bilharzia and of public health importance yet people have little knowledge about it making its prevention and control complex. The gender factor focused on the roles, differences that predispose both men and women to bilharzia**.**
This was qualitative research where participatory and in-depth data collection methods specifically key informant interviews, observation and focus group discussions were applied in the study. A total of 250 respondents participated in the study that included community members, the District Health Officer, District Health Inspector, Health Assistants, Vector Control Officer, and VHTS. Both Purposive sampling and quota sampling methods were used to select the respondents.
Community perception differed from individuals and from area to area. Some people perceived Bilharzia as a form of witchcraft; others related it to HIV, whereas others believed it is connected to alcohol use. The gender differences were well defined for the two communities according to the economic and social roles for men and women. The gender differences were associated to economic activities as men who do fishing were more exposed to bilharzia compared to women in low land/fishing communities of Ndaiga as compared to upland/farming communities of Kyaterekera where women were perceived to be more at risk because of the gender roles. Gender roles such as cooking, washing utensils, and clothes made women vulnerable as it puts them in contact with water from contaminated sources. Both men and women receive treatment for Bilharzia through mass drug administration, however, there were major concerns about lack of health education about the disease were a major hindrance to treatment.
Therefore there's a need for the government through the health ministry to address the gender gaps such as in education and leadership, massive health education programs, empowerment and motivation of VHTs by government through the health ministry, the health centers should be equipped with essential medicines, especially for the treatment of schistosomiasis.

7.0 FACULTY OF COMPUTING & INFORMATICS

7.1 MASTER OF SCIENCE IN INFORMATION SYSTEMS

7.1.1 A Model for determining how the usage of Search Engines by University Students affects their Critical Thinking in Learning and Problem Solving

Aguti Suzan, Nabaasa Evarist

Today, universities prioritize providing students with the best skills that can render them competitive employees after university and one of these skills is critical thinking. Critical thinking has been highly rated as a skill sought most by employers while employing workers in the workplaces. The evolving and complex problems need critical thinkers to be able to

come up with solutions and making the best decisions. Search engines have evolved with the evolving technology and have been embraced by university students as a source of information and answers to questions. The commonly used search engines by university students include; Google, Bing, Yahoo and Ask.com.

In Uganda, more than 400,000 graduates are released annually to the job market. However, 83% of graduates remain unemployed partly because they are not skilled enough to take up roles in the workplaces despite graduating with good degrees since most employers seek to employ graduates who are able to critically think in order to solve complex problems and also come up with the right decisions. 63% of the graduates are however unable to meet these criteria because they are not critical thinkers and thought to be" half-baked". Many studies focused on how to teach critical thinking skills to university students. However, little research was done to determine the effects of search engines on students' critical thinking skills in learning and problem solving. This study developed a model that determines how the usage of search engines affects critical thinking of university students in learning and problem solving.

Waterfall methodology was followed to achieve the objectives of the study. A model was developed using Unified Modelling Language, and analgorithm for the model was developed using divide and conquer method. The study used questionnaires to collect quantitative data from 370 students and the data analyzed using Microsoft excel. The students sampled were from Mbarara university of Science and Technology, Bishop Stuart University and Kabale university The sample size was calculated using Krejcie Morgan formula. The study considered seven parameters to measure the effect of search engine usage on critical thinking.

This study developed a model that determines how the usage of search engines by university students affects their critical thinking in learning and problem solving using unified modelling language. An algorithm that supports the model developed was also developed to test the model. The model can be used by faculty staff to determine how critical thinking of students is affected by the usage of search engines. It is therefore recommended that search engines be used with consciousness to avoid their effects on critical thinking of students.

In conclusion, from the results of the study the effect of search engine usage on students' level of critical thinking is very high. It is noted that critical thinking levels of the biggest number of students are very highly affected by the usage of search engines. There is a need to check acceptability and feasibility of the model in a bigger sample other than just Universities of south Western Uganda which this study covered.

7.1.2 Internet usage awareness Framework for Higher Academic Excellence: a case study of Undergraduate Students at Mbarara University of Science and Technology

Peter Bambanza, Fred Kaggwa, Richard Ntwari

The 3rd millennium goal identifies the Internet as a crucial role in increasing educational quality by promoting advances in Information Communication Technologies (ICTs) as a new mode of teaching and learning that has revolutionized traditional teaching methods. Using electronic learning management systems (e-LMS) to conduct electronic learning (e-Learning)

has been facilitated by the use of Internet. Despite the ease and benefit of using internet, educational practitioners examine the implications of its use to the world of education.,

Due to a lack of awareness, Jordan University undergraduate students use the internet for academic reasons 50.7% of the time for academic purposes, while 52% use it for other purposes. According to literature, Internet is often misused by students in HLIs to access sites that are not academic related, online chatting, gaming, downloading content of personal interests such as mp3 and movies, academic dishonesty as well as accessing pornographic sites. The goal of this research was to improve Internet usage awareness among undergraduate students by developing an Internet usage awareness framework.

The researcher divided the main goal into three parts: identifying the requirements for an Internet usage awareness framework through literature review and data collection, designing and developing an Internet usage awareness framework, and testing and validating the developed framework to determine its effectiveness and usability, all of which were accomplished using design science methodology. To achieve specific target one, the researcher studied literature on existing Internet usage awareness frameworks and gathered data from participants to create requirements for designing and developing the framework utilizing unified modeling languages. To achieve objective two, the researcher developed a web system that implemented the framework levels and functionalities that were absent according to literature. From literature review and data collected the researcher found out that age and education background of participants were very critical in the design and development of the framework. To achieve objective three, the researcher tested and validated the developed framework.

According to validation results from five technical ICT employees who worked with it, the framework is practical and adaptable for boosting Internet usage awareness among undergraduate students. This research developed a framework to aid in the formation of Internet usage awareness among Ugandan undergraduate students while also correcting shortcomings in previous frameworks. However, the researcher suggested that future studies look into monitoring and detecting problematic Internet use because this study did not.

7.1.3 The Impact of Teacher Acceptance of E-Learning on Student Performance in Higher Institutions of Learning during the Covid-19 Pandemic: a Case Study of East African University Rwanda Nyagatare, Rwanda

Chebet K. Asumani, Businge John

The outbreak of the COVID-19 pandemic has dramatically shaped higher education and seen the distinct rise of e-learning as a compulsory element of the modern educational landscape. Accordingly, this study highlights the factors which affect teacher acceptance of e-learning and how this impacts student performance. Student performance prediction is a great area of concern for educational institutions to prevent their students from failure by providing necessary support and counseling to complete their degrees successfully. There are several challenges that unavoidable implementation of e-learning in the covid-19 pandemic has faced, the most significant being output from the educational systems as a competent graduate. Only a few studies have studied the relationship between teacher acceptances or the e-learning methodology in higher learning institutions and student performance, a gap the researcher intends to cover. The empirical analysis was performed on a sample of 47 higher education teachers. Data from a survey which was employed was analyzed using SPSS to

gain insights from the data to answer the research questions. We designed a structural equation model that revealed the quality of e-learning was mainly derived from service quality, the teacher's active role in online education, and the overall system quality. In contrast, their digital competencies and online interactions with their colleagues and teachers were considered to be slightly less critical factors. We recommended that there is need for institutional support to strongly impact of teacher acceptance of e-learning and on the students' performance into e-learning. The findings provide a basis for policy recommendations to support decision-makers incorporating e-learning issues in the current and any new similar circumstances.

7.1.4 Enhanced Peer Assessment Collaborative Model for Higher Education Institutions Case Study: Bishop Stuart University

Job Kalema, John Businge, Kabarungi Moreen Mukisa

Assessment remains a fundamental part of the learning experience for students and the way to gauge the extent and quality of students in higher institutions of learning. Currently the it's still a norm that academic teachers retain all the ownership and power in the assessment process and make all the choices and in so doing limit the potential learner development through assessment. A model of learners taking a reactive rather than proactive approach to learning and use of feedback, which is critical for students in higher institutions of learning demanding greater input and reflection from each student since it's their last level in their education to improve their critical thinking skills that will be priceless to successful further education and thriving career. This research provides a way to discover the learning and assessment of students in the university. This was done through the design and development of an enhanced peer assessment collaborative model which fulfilled the main objective (to enhance the quality of learning and assessment of students in the university).

The methodology used was a descriptive case study method which was quantitativemethod entailing of participants (Academic teaching staff, and students) who helped determine the current assessment and learning model state in the university. The researcher also carried out a literature review on different components, and analyze them to determine what best fits into the design of the enhanced peer assessment collaborative model. With the help of the DeLone-McLean model designed questionnaire format to which was used in evaluating the enhanced peer assessment collaborative model (assessment of findings and validation of study results).

55 respondents were interviewed, two-thirds (72.7%) were male and 27.3% were female. (50.9%) of the respondents were aged 26 – 35 whereas 41.8% and 7.3% were aged 18 – 25 and 35 and above respectively. 69.1% were students and 30.9% were lecturers/Academic staff.78.2% of the respondents were degree holders, 16.4% had master's degrees, and 3.6% had other educational qualifications whereas 1.8% had PhD.

The study found that the model of assessment and learning used at the university is not effective in learning and assessment of students given that it does not have the following features evaluation of assessment, learning and evaluation of outcomes, allowing students to review or assess each other's work, promoting communication between students and academic staff, allowing collaborative and active learning as well as ensuring student

attendance. The study also discovered that the model designed and developed enhances learning and assessment of students in the university by employing peer assessment features when assessing students, allowing easy navigation, having well-structured design and security, promoting interactivity and also allowing reliability and flexibility, easing integration among students as well as supporting effective and efficient sharing of information between students and academic staff.

Future research could focus on investigating the factors that influence academic staff's behavioural intentions to use of learning and assessment model and include other moderators such as culture, gender, and socio-economic factors, to form a model that is generally more applicable.

7.1.5 A Mobile Health application with Recommender Algorithm for supporting physical activity and Diet of Diabetic Patients during Self-Management case study: Mbarara Regional Referral Hospital

Kizza Gerald, Angella Musiimenta

Background*:* Type 2 diabetes mellitus (T2DM) leaves patients with a high burden of expensive costs, reduces patient productivity, and causes psychosocial distress. Severe long-term health complications such as hypertension, stroke, and kidney issues are attributed to T2DM. There is increase in advancement in health technology with different models, frameworks and e-health tools to help diabetic patients in self-management however, the dietary changes and exercise are not significantly covered in most innovations. The researcher developed and designed a Type 2 Diabetes (T2D) mobile health (mhealth) technology designed to facilitate self-monitoring,physical activity, diet as well as avail educative information among T2DM patients during self-management. The researcher designed recommender algorithm for T2D mobile health technology, did a preliminary assessment for potential participants to use the technology and evaluated the acceptability and feasibility of the T2D mobile health technology with a recommender-based algorithm using the Unified Theory of Acceptance and Use of Technology (UTAUT) Model.

Objective: This study aimed at improving T2DM self-management by developing a mobile health technology with a recommender algorithm for supporting physical activity, diet as well as avail educative information among T2DM patients during self-management.

Methods*:* The Researcher following Pearson correlation formulae designed a recommender algorithm, to suggest Physical activity and diet changes notification reminderso the T2D mobile health technology for the patients during engagement and interaction with the technology. The Researcher then enrolled adults on treatment for T2DMat Mbarara Regional Referral Hospital (MRRH), Mbarara City southwestern Uganda. All participants were then educated on the use of T2D mobile health technology. The researcher administered a baseline questionnaire for preliminary assessment to get participants for the study. Twenty-five (25) participants were enrolled for the study and followed-up. The researcher conducted an in-depth semi-structured interview 30 days later to explore self-monitoring, Physical activity and dietary changes. The researcher applied UTAUT to evaluate the acceptability and feasibility of the technology.

Results: Literature indicates that mobile health technology with a recommender algorithm could be regarded as an effective compliment to chronic disease management.A T2D mobile health technology with a recommendation algorithm that uses a Pearson's' correlation formula to predict and suggest physical activities and nutritious meals to type 2 diabetic patients was designed.Of the 25 participants who completed the 30-day interviews, mean age was 58 years, 18(72%) were female, median duration of T2DM diagnosis was 5 years (3-5 years). Twenty-four (96 %) participants reported positive acceptability; and participants 73% reported positive feasibility. For each code, more participants expressed positive than negative experiences. Participants reported positive change in their physical exercise routine 19(76%), participants also reported positive dietary changes 23(76.7%) hence improvements in their diabetes self-management 19(76%).

Conclusion*:* Among T2DM patients in Mbarara, Uganda, T2D mobile health technology was largely acceptable and feasible in a research context within a low-resourced setting. Future efforts should focus on a private social network within the application to enable social support among users as well customizing the technology in local languages to overcome possible language barrier issues. Cost-effectiveness evaluation would also be important to investigate, as well as studies with longer follow-up and objective clinical outcomes.

7.1.6 A model for measuring the Readiness of Universities in Supporting Electronic Learning for Students with Visual or Hearing Impairments in Southwestern Uganda

Kyomuhangi Rosette, Nabaasa Evarist

In this study a model was designed that measures the readiness of universities in supporting-learning for students with visual or hearing impairments in south western Uganda. Due to the outbreak of the global pandemic COVID in 2019, teaching and learning in all institutions of learning was affected especially the formal education or classroom teaching and learning. Physical classes had since been discouraged and face to face class interactions reduced in order to implement social distancing thereby reduced on the number of infections. In that regard the students with visual or hearing impairments seemed to have been left behind in the planning of the use and deployment of e-learning.
Universities have therefore engaged in rigorous development, use and deployment of electronic learning for students with no impairments. Little or no information was known about universities regarding their readiness in supporting electronic learning for students with visual or hearing impairments.
This study assessed the readiness of universities in supporting e-learning for students with visual or hearing impairments in southwestern Uganda. Data was collected from Mbarara University of Science and Technology, Bishop Stuart University, Kabale University and Ankole Western University that determined how ready these universities were in delivering electronic learning to visual or hearing-impaired students since the government of Uganda had specifically emphasized the use of e-learning in all universities and higher institutions of learning.

Design science research methodology was used. Strengths and weaknesses of the existing models were reviewed. Questionnaires were used to collect quantitative data for the study. From the results of the model, there was a very small level of readiness in Final Exams with a value of 4.8 (81% of un readiness), While the level of un readiness during mid-semester exams was small with a value of 4.5 (61-80%of un readiness) and lastly the level of readiness

in teaching and learning was also small with a value of 4.0 (61-80% of un readiness). Averagely, the level of un readiness in all the scenarios was small with a value of 4.43 (61-80% of un readiness).

The complexity of the developed algorithm was found to be 3n, in the worst-case scenario where n was the size of the input.This research came up with a model that measured the level of readiness of universities in supporting e-learning for students with visual or hearing impairments. It was found out that universities in southwestern Uganda are majorly not ready for supporting e-learning for students with visual or hearing impairments. The model should be evaluated for its acceptability and feasibility in a larger sample of universities beyond the south western region of Uganda which was considered in this study.

7.1.7 Assessing Security Vulnerabilities of Interfaces in the Eclipse Framework

Bright Niyonzima, Kawuma Simon

Today, developers build their software application on top of framework. This has advantages such as production of good quality software and reduced software development time since the application developer reuses the functionality provided by the framework. One of the widely used and adopted framework is the Eclipse framework. The Eclipse Framework provides functionality to developers inform of Application Programming Interfaces (API). The Eclipse framework has both secure, documented and supported interfaces (APIs) and insecure, unsupported, undocumented and discouraged Interfaces (non-APIs). While code reuse through these frameworks provides several benefits, it also leads to fast spread of security vulnerabilities and actually makes discovery of these security vulnerabilities very difficult. Furthermore, from previous research, Eclipse application developers stated that they manually find security vulnerability free APIs they require for their application from Eclipse. Eclipse being a very large complex framework with many developers and committers, it is very cumbersome and tedious for developers to find security vulnerability free interfaces which in the end has led to many security loophooles in applications on the market and led to several security attacks over the years

To this end, we used SonarQube detection tool to analyze 28 Major Eclipse releases to ascertain security vulnerability free APIs and non-APIs. We aim at recommending security vulnerability free interfaces to developers. The source of our data that we used for this research is the Eclipse project archive website that contains all the source code for the 28 Eclipse SDK major releases.

There is a notion that APIs are secure and security vulnerability free while non-APIs are insecure. However, we discovered that not all non-APIs are insecure and actually over 85.3% of them are security vulnerability free in all Eclipse releases we studied. We discovered that indeed most APIs are security vulnerability free with over 91.4% of them being security vulnerability free in all the 28 Major Eclipse releases that we studied. Still from the same analysis, we discovered that it takes 51 to 1,777 days to fix all the security vulnerabilities found in all the Eclipse releases that we studied. On further investigation, we discovered that on average, 53.6% of the total number of classes have zero security vulnerabilities.

As a contribution in this study, we provided a set of security vulnerability free interfaces (ie those with security vulnerability rating A) which we further recommended to interface providers for consideration in the effort to promote Eclipse security vulnerability free non-

APIs to APIs and also to framework users for usage. We provide a set of 222,320 security vulnerability free APIs and 291,887 security vulnerability free non-APIs.

As future research work, one can study the popularity of the identified security vulnerability free interfaces too see how much the interfaces are actually used. Furthermore, one can also do the same study but using a different tool like Vulas for analysis to see how the results compared with the SonarQube tool that we used for this study.

7.1.8 Performance analysis of Thin Client Technologies over Traditional Ethernet Technologies for Latency Sensitive applications towards optimal Quality of Service at Airtel Service Centre-Kampala

Tukahirwa Deziranta, Wasswa William

Desktop virtualization has emerged as a cost-effective venture as compared to standalone computer laboratory setup, especially in ICT based service delivery centers. This technology is cost-effective in terms of deployment and maintenance; however, the technology is not well sufficient for incident management processes especially for delay-sensitive applications.
The performance of these thin-client technologies leaves much to be desired where a certain number of clients requests for browser services, database requests and dedicated CPU dependent apps have led to denial of service. Any inefficiencies or delays in service delivery by such infrastructure and the service centers may lead to high costs to the company in terms of extra resources required to handle backlog incidents, customer dissatisfaction and loss, staff demotivation, poor incident logging and classification and hence poor handling, unresolved issues which are both costly to the company and the customer.
In this study, we aimed to study the factors that are used to measure the performance of networks including bandwidth, delay and jitter for latency sensitive applications, and we performed controlled experiments to measure and evaluate performance of thin client technologies with latency sensitive applications through simulating the incidence handling processes and designed an optimal strategy for workload capacity of the thin client infrastructure at Airtel Service Center.
Because performance is objective, quantitative state, exact measurements were collected and recorded in continuous numerals and a statistical analysis was done with an understanding of the gap between user expectations, attribute performance through latency metrics to determine efficiency of the systems under study. Our analysis of a load involved of load measurement which refers to the practice of assessing a system's behavior under the load. We achieved an optimal strategy that can be implemented to manage the user load to overcome the problem of exponential growth of the jitter. An implementation of our strategy can allow for optimally use of bandwidth with favorable transfer speeds to accommodate the slight delays and hence better quality of service.
Future works make a deeper analysis on the network infrastructure and employ intelligent routers able to accommodate a load balancer among different connected servers in a mesh topology that makes sure that one disabled or hanging client does not affect the other clients on the network or on the server.

7.1.9 A Model for Measuring Lung Cancer Occurrences from Particulate Matter (PM2:5) Air Pollutant Exposure in Kampala, Uganda

Tumuramye Juliana, Nabaasa Evarist

In this study, a model for measuring Lung cancer occurrences from PM2:5 Air pollutant exposure in Kampala-Uganda was designed. The research critically measured and established the possibility of PM2:5 air pollutant causing lung cancer. This was attained through employing quantitative method, obtaining the annual concentrations of PM2:5 in 2021, 2020, 2019, 2018 and 2017 in Kampala-Uganda and Lung cancer data of the same years. This research came up with a model that measures Lung Cancer occurrences from PM2:5 Air pollutant exposure in Kampala-Uganda. The data used for the research was obtained from Uganda Cancer Institute for Lung Cancer) and from the US Embassy database for PM2:5, this data was analyzed with SP-SS. Use Case diagrams helped with the designing of the model and an algorithm to support the model was also built. The model showed positive variance in Lung Cancer for 2017, 2018, 2019, 2020, 2021 was 25.83% ,5.55%, 2.41%, 60.42%, 16.03% respectively as a result of PM2:5 exposure. The designed algorithm that supports the developed model was tested and found to be having a worst-case complexity of 2n, where n is the size of the input.

7.2 MASTER OF SCIENCE IN HEALTH INFORMATION TECHNOLOGY

7.2.1 An outbreak detection algorithm for rotavirus infection: a case of Kigezi region

Abanza Patience, Ariho Pius, Kamuganga Francis

Study findings reveals that Rotavirus contributes 450,000 deaths annually with 80% occurring in the Sub Saharan Africa and South Asia. In Uganda, Rotavirus is responsible for the 33% to 45% of diarrhoea causes (Bwongi, 2015) whereas diarrhoea is among the top four causes of morbidity in infants thus there is a direct relationship between Rotavirus and diarrhea which is the major cause child morbidity. Despite the existing strategies by governent through launching vaccination campaigns, and creating awareness to reduce death cases resulting fro diarrhoea, death cases resulting from Rotavirus infections remains high especially in Kigezi sub-region. Further study findings reported that the outbreak is seasonal thus, there is need to detect outbreaks of seasonal Rotavirus infection using historical limits methods. The goal of this research was to formulate an algorithm to detect the outbreak of Rotavirus among infants. To achieve the main objective this study, the researcher reviewed existing disease outbreak prediction algorithms, designed the proposed algorithm using CRISP-DM methodology. An artifact of the algorithm running a web browser was developed and deployed to test the designed algorithm. The designed algorithm was tested on a dataset containing 1000 records using Random Forest R and KNeighbor classifiers. Testing results revealed that the Rotavirus prediction using the developed algorithm yielded a mean of 0.5 using the two classifiers.

The overall contribution of the study is the formulated algorithm which is able to predict seasonal outbreak of Rotavirus and triggers sensitization alerts as an intervention. It should be noted that the testing dataset was obtained from the Kigezi sub-region where climatic and

weather conditions differ from those of other regions like central Uganda. Similarly, algorithm testing was performed parallel to the actual hospital information management system since it was never integrated into the hospital information management system hence compatibility issues were never assessed thus, future scholars need to venture into these areas.

7.2.2 A Data Analytical Framework for Enhancing Decision Making in Diabetic Care: Mitooma and Ruhoko H/CIV

Kyokusiima Miria, Fred Kaggwa

Diabetes mellitus (DM) also known as Diabetes is widely recognized as an emerging epidemic that has a cumulative impact on almost every country, age group, and economy across the world. According to the International Diabetes Federation, in 2015, approximately 415 million people were suffering from diabetes region 1DF,(2015). With the increasing Amount of diabetes in the Uganda population, the health care system has been collecting volumes of information about treatment and management of diabetes and its long-term effects DiFranza,(2019).

Wei Sim et al (2017) commends that there is a need to enhance clinical management of diabetes and decision making with universal access to medical data that is graphically summarized, connects disparate datasets, transformed and cleaned into a data framework which is currently not the case. The goal of this research was to improve decision making in diabetic care and management in health facilities by designing and developing a digital data analytical framework. To achieve the main objective, the researcher broke it into three specific objectives that is; to identify requirements for the development of the framework through the reviewed literature of existing methods and frameworks, to design and develop a data analytical framework for decision making in diabetic care for health workers and to assess the preliminary impact of the data analytical framework on enhancing decision making in diabetic care. These were achieved by using design science methodology.

To achieve specific objective one, the researcher reviewed literature about existing data analytical frameworks and derived requirements that were used to design and develop the framework using unified modelling languages. To achieve specific objective two, the researcher designed and developed a data analytical framework that was used to enhance decision making. To achieve objective three, the results showed that the framework generally improved decision making in the treatment and management of diabetic patients by health workers. The health workers agreed that the framework was user-friendly, easy to use and provided quality information that enhanced decision making in diabetic care.

However, the researcher recommends the designed framework to be adopted in health facilities system especially in urban community-based health clinics whose majority health workers lack systems that can enable them to analyze clinic data.

7.2.3 Effectiveness of Electronic Medical Records System (EMRs) in enhancing Diabetes Care at Mbarara Regional Referral Hospital Diabetes Clinic

Mubiru Lasto, Annabella Habinka Ejiri, Fred Kaggwa

Background**:** Even with the tremendous work done on implementation of EMRs in many hospitals given their many benefits, research has reported that EMRs implementation could create unintended changes in the hospital workflow if not studied well and designed properly. These changes may impact the time patientsspend on the various steps of their clinic visits, such as the time spent at the reception. The amount of timepatients spend at the reception before consultation is often a strong predictor of patients' satisfaction, and willingness to come backfor a follow-up visit. The majority of researches done that examined the impact of EMR systems on time focusedon single aspects of patient visits or user (physicians or nurses) activities. The effectiveness of EMRs use on patients' time spent duringthe different aspects of the visit is rarely investigated.
Objective: This research aimed to assess the effectiveness of electronic medical records systems in enhancing diabetes care

Methods: A time and motion observational study was conducted at Mbarara Regional Referral Hospital Diabetes Clinic. The patients were chosen usingstratified randomized sampling. 70 patients were picked for this specific research, Of the 70, 40 were picked for the third objective due to their regular high blood sugar levels. The research was first conducted using the usual clinic paper based system. In addition, a longitudinal observation was conducted after 3 months but this time while using an EMR-based system after its implementation and training of staff.

The analysis included descriptive statistics and groupcomparisons.
Results: The results showed a significant difference in the amount of time spent by patients in the reception area (P=.000), between the EMRs and paper-based groups. There was also a significant difference (P<.000) in the number of dishonored appointments while using the EMR based appointments reminder sms's. The longitudinal observation also showed tremendous reduction in the patients' blood sugar levels (from 10.91 [SD 3.7722]mmol/l to 6.88 [SD 1.786] mmol/l) given that the normal range is 4-7mmol/l, this could be attributed to the introduction of an EMR based SMS reminder system for patients with out of range sugar levels.
Conclusions: The reduction of time patients spend at the reception is most likely to be attributed to elimination of some work processes and therefore the effectiveness of the EMR in improving work processes may not be justified by the EMR itself but the elimination of some processes, also to note the missed appointments by patients could be due to the location of where they come from and not the EMRs influence. If web-based appointments booking and confirmation tools were put in place it would help the clinic workers plan well way in advance before that visit day that way, it quickens the processes.

7.2.4 Applying Health Systems Framework to Investigate the Challenges of Scaling Up M-Health Interventions: A Case of Western Uganda

Owen Muhangi, Ssembatya Richard, Fred Kaggwa

Background: Over the years governments and donor agencies funded M-health interventions across the world and a pilot study of over 300 M-health donor agency funded interventions showed that after piloting these interventions, little was known about their best strategies for engagement, the likely uptake and their effectiveness. In Uganda alone over 30 M-health projects were funded but most of them never moved past pilot stage. This research applied the health systems framework to investigate the challenges of scaling up M-health interventions.
Methods: This research drew its foundations from literature and theoretical review using qualitative approaches. The research also reviewed the recommendations got from different stakeholders. Selected case study approach with purely qualitative research methods were used to obtain the results of this research whose main aim was to apply the health systems framework to investigate the challenges of scaling up M-health interventions.
Results: It was found out that lack of proper communication and guidance from the government, Misunderstandings between the government and project coordinators, budget constraints and lack of motivation among project staff were the main challenges that hampered the scaling up of these M-health interventions in Western Uganda. In addition to the above, failure to monitor project activities, incompatibility of the system with the user mobile phones and lack of enough technical experts at the community level to manage the system were also challenges identified while scaling up M-health interventions in Western Uganda. This research also developed a customized M-health framework tailored for M-health implementation at scale which could be used to implement M-health interventions to achieve bigger coverage.
Conclusion: The findings of this research shall help the implementers of M-health interventions to implement at scale. However more testing and research needs to done in the urban and semi urban settings.

7.2.5 A model to predict the number of medical consultations. A case study: OB-GYN OPD at Mbarara Regional referral hospital

Ndibarekera Maureen, Ariho Pius, Ngonzi Joseph, Mugonza Robert

Background: Since 1918, Uganda has used role shifting to deal with low staff numbers, according to documented facts. Not only is there a shortage of health staff in Uganda, but there is also a strong demand for health care services. This is due to a lack of skill mix, unequal regional distribution, insufficient remuneration, and low morale among health workers. Patients have turned to more accessible methods of receiving care, such as self-medication with over-the-counter medications or reliance on herbal medicine, as a result of the shortage of health personnel. Outpatient clinics have become overcrowded, with high wait times for patients and increased staff working hours as a result of the growing demand for outpatient services. Task shifting has been used to address the core causes of these issues, which are flaws in the appointment system, resource allocation, and patient flow

management. This study aims to investigate patient medical consultation rates develop an algorithm to predict medical consultation counts based on existing patient records.
Methods: This was a quantitative research study. Data was gathered through a study of the literature and existing medical records at Obstetrics and Gynecology Outpatient Department. A modification of the Raising Activity Multi-Level Indicator Emphasis (RAMMIE) model for case count predictions. SPSS was used for data analysis
Results: 18649, 19294, and 22738 (2017, 2018, 2019) medical visits for six instances were reported over a three-year period, with 31%, 32%, and 37%, respectively. There are three age groups: 10-19 (1190, 1752, and 1672), 20-24(6449, 6158, and 7186), and 25> (11010, 11384, and 13925). Support vector machine algorithm was used for model evaluation and it presented 0.73 performance rate.
Conclusion: Increased medical consultations are common among women over the age of 25 who visit the MRRH OB-GYN OPD clinic, with the majority seeking postnatal care. The reason for the increase should be communicated regularly to create room for early detection and resource allocation

7.3 MASTER OF BUSINESS INFORMATICS

7.3.1 A Framework for Linking Banana Farmers to Market. Case Study: Banana farmers in Isingiro District.

Ayebaza Sandrah, Kawuma Simon

Farmers involved in household and Small Enterprises (SEs) based in banana farming have not benefited from their hard work and this is attributed to insufficient, untimely and inadequate market for their produce. This is caused by lack of timely information about who needs the product at a given time in a given location. The situation is monopolized by the middlemen who usually make abnormal profits yet the farmers who suffer a lot end up getting scanty from their sweat. The aim of this research is to increase market access for banana farmers' in Isingiro district through development of a framework to link banana farmers direct to market.

A design science methodology was used where to achieve objective 1. Both qualitative and quantitative data collection methods were used to investigate the marketing channels used by banana farmers in Isingiro district and their limitations in linking them to market. This research has identified direct marketing and indirect marketing as the main channels used by banana farmers in Isingiro district where direct marketing involves selling directly to consumers through road side stands, institutions, local market and restaurants and indirect marketing involves selling indirectly to consumers through middlemen, wholesalers and retailers. The research also identified lack of market and price information, price fluctuations, too low prices given by middle men and difficulties in setting prices as the major challenges faced by these farmers.

During the development of the framework, the Unified Modeling language (UML) was used. This culminated into development of a 4-tier framework comprising of farmer identification, access to information, connecting with customers and records management all aimed at increasing market access for banana farmers in Isingiro district. The framework digitizes the

market chain and eliminates the middlemen who have been reported to stagnant the market chain.

The acceptability and usability of the developed framework was tested using a mobile application developed based on the developed framework. The UTAUT model was used to test acceptability of the developed app. The researcher purposively identified and recruited 10 farmers with smart phones in this study for a period of one month and were given questionnaires based on a 5 likert scale. Acceptability and usability levels of 96% and 95% were obtained. This implies that the app was acceptable and usable among the test population; and similar results are expected in a similar setting and transferable in a wider population.

This research identified middlemen, agents, wholesalers, distributors and retailers as the key actors in the marketing channels. This research also identified that the farmers' marketing channel objectives are mainly influenced by; nature of the product, company characteristics, characteristics of intermediaries, competitors' channel and environmental factors. The research has shown that the banana farmers face several challenges including lack of real time information about market prices of similar produce. Failure to have access to market information makes these farmers vulnerable to exploitation by the middlemen. It is hence necessary to have mechanisms that provide real time information about market prices hence the developed framework. However, the developed framework was developed based on a sample size of 95 respondents and tested for acceptability and usability among 10 participants. We are optimistic that although the sample size was limited, the same results can be realized on a wider scale and hence the framework is suitable for use in similar settings.

This research focused on developing a framework for linking banana farmers to market. However, in the future, other farmers like those in cassava farming, cereal farming and those in animal husbandry can also be included on the framework to produce a comprehensive framework for farmers.

7.3.2 Techno-economic Analysis and Optimization of an off-grid hybrid renewable energy system Case Study: Institute of Tropical Forest Conservation, Bwindi

John Ziine, Simon Kawuma

Hybrid renewable energy systems (HRES) have gained popularity as a suitable meansfor energy generation in areas located far from the electricity grid. The objective of thestudy was to perform a techno-economic analysis andoptimisation of an HRES for the institute of tropical forest conservation (ITFC), Bwindi. Analytic hierarchy process (AHP) amulti-criteria decision analysis method was used. The HRES under study comprised ofa solar photovoltaic (PV) system, wind turbine, fixed capacity diesel generator, batterystorage system and inverter. Climatic data for the solar irradiance and wind speed data for the study locationwere obtained. The study location is characterised by an average daily solar radiation of 4.87kWh/m^2/day, an annual average direct normal irradiation of 1,058kWh/m^2,average wind speed of 2.89m/s and an annual electricity load demand of 56,626.10kWh/year. The Hybrid Optimization Model for Electric Renewable (HOMER) software was used tomodel and simulate the system. Simulation results used six techno-economic parametersto analyse system configurations to determine their performance against each of theparameters. The net

present cost, cost of energy, initial capital, operation cost, operationand maintenance cost, and fuel cost were used as the performance parameters to assessthe HRES systems. Using the analytic hierarchy process (AHP), a multicriteria decision analysis method, the optimal energy system was derived. The optimal system has a net present cost of$40,675 and a cost of energy of $0.766, an initial capital of $29,385, operations cost of$873.32 per year and an operation and maintenance cost of $361.6 per year and a zerofuel cost.