



MBARARA UNIVERSITY OF SCIENCE AND TECHNOLOGY

DIRECTORATE OF RESEARCH AND GRADUATE TRAINING (DRGT)

BOOK OF ABSTRACTS

16th MUST ANNUAL RESEARCH DISSEMINATION CONFERENCE

THEME:

Transformative Research for development in a changing world

Date:

21st May 2021

Venue: Virtual

21st May 2021

PROGRAMME

08:00-08:15am	Arrival and registration at PHARMBIOTRAC Boardroom. 4th floor, FAST building, MUST Kihumuro Campus.
08:15-08:30am	Singing the Anthems and Prayer: National, East African Community, and MUST
08:30-08:50am	Welcome remarks *Chair Board, MUST DRGT *Director, MUST DRGT
08:50-09:40am	Remarks from Partners <ul style="list-style-type: none">• Center Leader PHARMBIOTRAC• Director, MUST-MGH Global Health Collaborative• Director, Epicentre
09:40-10:00am	Opening Remarks by the Vice Chancellor
10:00-10:30am	Guest Speaker
11:30am - 5:00pm	Presentations
05:00pm	Closing Remarks by the DVC AA

Acknowledgement

Special thanks to the Editorial and organizing team headed by Prof. Amon Agaba who also doubles as Chair of the Directorate of Research and Graduate Training (DRGT) board. The Director, DRGT Assoc. Prof. Vincent Batwala and staff, thank you for setting up a strong secretariat that has supported the organizing committee for this conference.

Mention is made of Assoc. Prof. Grace Kagoro and Dr. Ronald Twongyeirwe for being effective Chairs of the Scientific Committee together with your team of eminent scholars and Mr. Amos Baryashaba and Mr. Samuel Mwesigwa for dutifully managing and leading the ICT process of receiving abstracts and all associated technicalities.

Gratitude is given to the leadership and management of the University for continuously financing this very important activity in the academic life of MUST. A big thanks to you all who have participated in the various activities that have made this conference and the PhD Symposium a success.

To all our development partners, we will always be indebted to you for your generosity.

To the entire MUST community, the service providers, we thank you.

Design and Editorial layout: Samuel Mwesigwa, IT Officer – DRGT and Ms. Gloria Munguci Lecturer - FCI Email: sam.mwes@must.ac.ug and gmunguci@must.ac.ug

@2021 MUST ARDC

UGANDA

1. Oh Uganda! May God uphold thee,
We lay our future in thy hand.
United, free,
For liberty

Together we'll always stand.

2. Oh Uganda! The land of freedom.
Our love and labour we give,
And with neighbors all
At our country's call
In peace and friendship we'll live.

3. Oh Uganda! The land that feeds us
By sun and fertile soil grown.
For our own dear land,
We'll always stand

The Pearl of Africa's Crown.

EAST AFRICAN

1. Ee Mungu twaomba ulinde
Jumuiya Afrika Mashariki
Tuwezeshe kuishi kwa amani
Tutimize na malengo yetu.

Chorus

Jumuiya Yetu sote tuilinde
Tuwajibike tuimarike
Umoja wetu ni nguzo yetu
Idumu Jumuiya yetu.

2. Uzalendo pia mshikamano
Viwe msingi wa Umoja wetu
Natulinde Uhuru na Amani
Mila zetu na desturi zetu.

3. Viwandani na hata mashambani
Tufanye kazi sote kwa makini
Tujitoe kwa hali na mali
Tuijenge Jumuiya bora.

MBARARA UNIVERSITY

Mbarara University succeed we MUST
With God's will, we shall make the best of MUST
Let us unite and cooperate, to build the nation in different sectors
Our Pride and ego MUST will shine forever and we'll be victors
My alma mater long live x2 Mbarara University Ultimum viva

1. MUST we shall hail and salute thee
The frontier of true knowledge
For through advancing novelty
Your excellence will ever grow

2. CRADLE of efficient teachers
Doctors, Scientists and future leaders
Hope of the generation unborn
MUST you are our country's pride

3. WITH God's help Mbarara will shine
As the bright star among the others
To light the way for the future generation
To follow the light yonder

MUST 16TH ARDC ORGANIZING COMMITTEE

- | | |
|---------------------------------|-------------------------|
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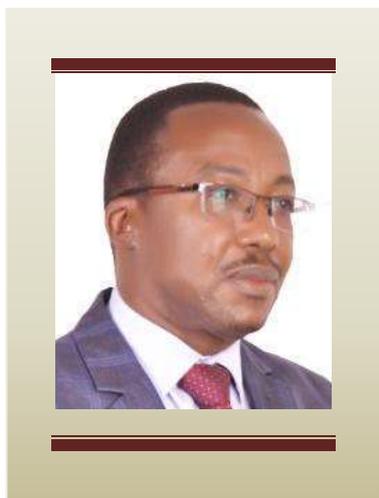


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WELCOME REMARKS FROM THE CHAIR, CONFERENCE ORGANISING COMMITTEE



The Vice Chancellor, Keynote and Guest Speakers, Members of University Council and Senate, Officers of the University and Top Management, Civic and Religious leaders, University Collaborators, Members of Mbarara University of Science and Technology (MUST) community, Distinguished participants, Ladies and Gentlemen.

On behalf of the Organizing committee it is my pleasure to welcome you to this important event, the 16th MUST Annual Research Dissemination Conference (ARDC), whose theme is **“Transformative Research for Development in a Changing world”**. Indeed we are in a changing world, because for the first time, the conference is Virtual, streaming from MUST Kihumuro campus, due to the emerging challenges posed by the Covid-19 pandemic. The new normal dictated by the pandemic has necessitated a paradigm shift in how business is conducted, and in our case increased digitalization. This conference is blended with most of the participants attending and presenting on-line.

We are greatly honored to have in our midst our esteemed Key Note Speaker Dr. Freddie Ssenogooba, a Professor, Consultant and expert in Health Economics and Health Systems Management with vast research experience in health policy and systems. He is well known nationally, regionally and internationally, in his field. Join me in welcoming and thanking Dr. Ssenogooba for accepting to perform this noble task.

I would like to use this opportunity to thank the University Council and Management for funding the conference, and MUST Staff for their continued participation in disseminating their research findings. Likewise, our traditional partners in organizing this conference including MGH Global Health, Epicenter, PHARMBIOTRAC, UCSF, University of Calgary/HCU, among others are hereby recognized. Special gratitude to the Organizing Committee, the Faculty of Applied Sciences and Technology and the Service providers

I express special gratitude to the Director and Members of DRGT Board for hosting this conference, once again for the third time, and in fulfilling the mandate assigned to us by the University Management, to organize and coordinate the MUST ARDC conference. As DRGT it is top on our agenda to ensure that research at MUST is well coordinated, and that research inputs and outputs are efficiently managed and utilized. Tangible research outputs contribute significantly to a University’s growth, visibility and ranking. Therefore, it is

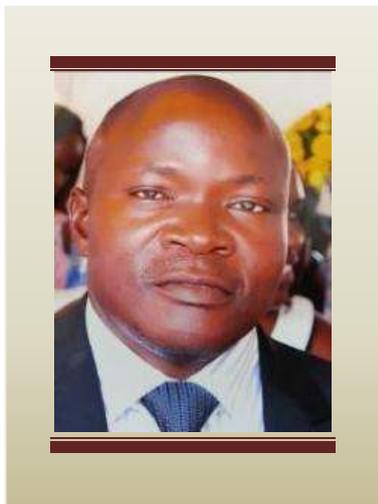
important for MUST to build an enabling environment to achieve its second strategic goal “To enhance the Quality and Quantity of Research, Innovations and Technology Transfer”.

Once again I warmly welcome you all and look forward to an engaging participation at this ARDC, 2021.

SUCCEED WE MUST

Professor Amon G. Agaba MBChB, PhD

Welcome Remarks BY THE DIRECTOR, DIRECTORATE OF RESEARCH AND GRADUATE TRAINING (DRGT)



The Keynote speaker, the Vice Chancellor, Deputy Vice Chancellors, Council Members, our Partners here present and those online, Members of Senate, Members of Top Management, Members of the DRGT Board, Fellow Academicians, Researchers, Distinguished Ladies and Gentlemen. I want to welcome you to this 16th MUST Annual Research Dissemination Conference with the Theme ***“Transformative research for Development in a Changing World.”***

When the corona virus that causes COVID-19 was confirmed in Uganda in March 2020, the academic calendar and the ongoing research activities in the university were interrupted. We eventually missed this important annual event last November 2020 because of the Pandemic. At this point, allow me to thank Top Management for resourcing this conference that we are holding today the 21st May 2021 at Kihumuro Campus. Also, I want to commend the Board of Research and Graduate Training which is the Organizing Committee for the dedication to making this event a reality.

The University was preparing for the 2nd Semester exams when the corona virus reached Uganda, followed by a lockdown on 18th March 2020. At that time, the University only provided for face-to-face dissertation defense. This traditional method of dissertation defense would to some extent compromise social-distancing, which is one of the strategies for preventing the spread of Coronavirus. When the lockdown was lifted, DRGT swiftly developed the ***“Guidelines for online research proposal and thesis defense.”*** These guidelines were approved at the 82nd Council meeting of 11th Dec. 2020. I am grateful to the Board and the various Committees for their contribution to this Great Achievement. The Guidelines are available at the MUST website and can be accessed by the Faculty and students.

The academic staffs as research supervisors have continued to guide the graduate students in conducting outstanding research. Just last month on 24th April 2021, we witnessed a total of 177 postgraduate students being awarded their new qualifications. It was at this ceremony that MUST made history of awarding 24 Doctor of Philosophy degrees at the same function. Again, the Directorate produced the “Graduate Book of Abstracts” that is available at the website (<https://www.must.ac.ug/downloads/Graduation/Graduate%20Book%20of%20Abstracts,%2024%20April%202021.pdf>).

I am delighted to announce that the process of acquiring Turnitin Plagiarism detector License from RENU has started. This particular license shall provide for i) 1 administrator account, ii) Unlimited Researchers and lecturers accounts, iii) 1000 student accounts, and iv) Unlimited number of submissions per student. We shall announce when Turnitin training starts.

I thank you researchers for the trust you have in MUST Grants Office (MGO) to manage your projects. As I promised you in 2019, we cleaned the MGO environment and continuous improvement is our priority. We now have unqualified audit reports that are available to share with new funders who may want to do due diligence. Again I encourage all those who have not yet come to bring your projects to MGO. It is my appeal to you to engage MGO as soon as you start writing your proposals so that you are supported in budgeting as well as generating and sourcing support documents. On this note, I am informing you that the numbers of new grants associated with the usual conditions (HIV, Malaria, etc) have declined while calls related to COVID-19 have increased as you have observed from the emails we circulate. This implies that the funding priorities have changed. Therefore, I urge you to shift with the funders as we finalize the Institutional Research Agenda.

Regarding publications, I am delighted to announce that we have observed an increase in the number of publications associated with MUST from 827 (Jan. – Dec. 2019) to 993 (Jan. – Dec. 2020). This is an increase of 166 publications compared to the previous year.

Distinguished Ladies and Gentlemen, I am hopeful that at the end of this conference, you will have captured our current issues and suggested answers or identified gaps for future research.

Once again, I welcome you all and thank each one of those that have supported us in preparing to host this conference.

Assoc. Prof. Batwala Vincent, MPH, PhD
Succeed we MUST



PHARMBIOTRAC: The Africa Centre of Excellence for Pharm-Biotechnology and Traditional Medicine is based at Mbarara University of Science and Technology (MUST).

PHARMBIOTRAC always invites applications from highly motivated, talented, research-focused and qualified candidates for admission in the study Programmes MSc and PhD (by Coursework and Dissertation) in Pharm-Biotechnology and Traditional Medicine. At PHARMBIOTRAC our goal is not just academic excellence but also development of healthcare professionals, products and services that transform societies.

Goal

To build a critical mass of specialized and skilled human resource that can advance traditional medicine and Pharm-Biotechnology for socio-economic development of Africa.

Vision

To be a leading African centre of excellence for training and research in traditional medicine and pharm-biotechnology.

Mission

To contribute to documentation, validation and value chain development of traditional medicine and biotechnology products for use in pharmaceutical and nutraceuticals industries in the region through training, research and community services for sustainable development

The thematic areas of Research and Development are:

- Understanding Traditional Medicine Philosophy of Health and Disease
- Prevention and Control
- Traditional/Herbal Medicine Quality and Safety Standards Herbal Medicine Production/Manufacturing and Quality Control Standards
- Traditional/Herbal Medicine Knowledge and Material Conservation and Propagation – in-situ, ex situ
- Traditional/Herbal Medicine/ Clinical Validation Protocols and Standards
- Pharmaco-Biotechnology-Application of Biotechnology to Drug Discovery, and Drug Production
- Pharmaceutical Business Management/Regulation

Center Leader: Dr. Casim Tolo (PhD)

<https://pharmbiotrac.must.ac.ug/>

THE MGH GLOBAL HEALTH COLLABORATIVE AT MUST



The Global Health Collaborative (GHC) is a partnership between Mbarara University of Science and Technology (MUST), Mbarara Regional Referral Hospital (MRRH), and the Massachusetts General Hospital (MGH) Center for Global Health, as well as other participating local and international academic institutions. The mission of the Collaborative is to build bilateral institutional capacity through responsive and sustainable program implementation. Our academic medical partnership embraces five strategic objectives that contribute to our mission: Research, Innovation, Clinical/Community Health Partnerships, Advancement of Medical Education, and Core Infrastructure Support.

Collaborations between MUST and Mass General Brigham (MGB) physicians and scientists began over a decade ago. Initially focused on the care and treatment of persons living with HIV, the collaboration has grown to include cutting-edge biomedical research, technology innovation, and community-based projects to understand the local social, behavioral and economic barriers to improved health. Now with over 100 local staff and a growing administrative and clinical team, the MUST-MGH collaboration is a significant investment in the human resource and programmatic capacity of MUST and MRRH. Active clinical partnerships include General and Community Medicine, Pathology, OB/GYN, Pediatric and Adult Oncology, Trauma/Surgery, Radiology, Nursing, and ENT. In the last year alone, MGH supported over 60 scholarships to facilitate the education of students pursuing various advanced degree programs in medicine, nursing and medical lab sciences. This investment in education at the MUST Faculty of Medicine has deepened and strengthened local clinical and research capacity

As with Mass General's commitment to under-served regions of New England, the Faculty of Medicine at MUST prioritizes community partnerships. With the sustained support from the MGH CGH, the MUST Department of Community Medicine regularly sends teams of students and faculty to more than 50 rural or peri-urban sites to understand key challenges and to develop and implement health improvement projects in partnership with the local community.

Finally, we continue to maintain a conducive environment that allows the MUST research community to focus on their work in a supportive, collaborative space through program Infrastructure support. MGH made a significant donation through the First Mile Program to kick start the COVID-19 mitigation response at MUST/MRRH, including the construction of a new space (the COVID Treatment Center) for isolating highly infectious disease like COVID, Ebola etc. With partnership with the MOH, this building complex is in final stages of completion and should be opening in June 2021.

More details at www.ghcuganda.org and <https://globalhealth.massgeneral.org/partnerships/>



Epicentre in Uganda: A Center of Excellence on Clinical Research in Response to Health Challenges in Resource Constrained Communities

Epicentre is a non-governmental research organization created by Médecins sans Frontières in 1986 to help improve the quality of its field interventions and. In 1996 Epicentre became a World Health Organization (WHO) collaborating center for research in epidemiology and response to emerging diseases. Its headquarters are Paris France, Epicentre has 2 major research bases; in Maradi, Niger and Epicentre Mbarara Research Centre in Uganda.

High quality research capacity

The primary role of Epicentre in Mbarara is to conduct high standard clinical research, according to Good Clinical Practice principles, on critical public health questions in Uganda and Africa. To reach this objective, Epicentre collaborates with the MUST and MRRH and other partners. To be able to run its activities smoothly EMRC employs over 100 staff in Mbarara including a full-time experienced research team. The research team is composed of epidemiologists, clinicians, nurses and field workers, all trained on GCP. A full team of monitors ensure the integrity of our data as well as the respect of patient's ethical rights. Our data are managed locally using the most recent data tools and is supported by a secure and strong IT servers. The Information System Department ensures the proper archiving of all data generated within our studies. The Research activities rely on a strong Logistic Department working under IATA regulation with the support of MSF Logistic extensive experience/expertise.

Epicentre has established a state of art laboratory in the heart of Mbarara. The laboratory works under Good Clinical Laboratory Practices (GCLP) and follows ISO 15189 standards. The activities include a biosafety level 3 laboratory dedicated to tuberculosis diagnosis (microscopy, culture, GeneXpert, Line Probe Assay). In addition Epicentre has a long experience on malaria diagnosis using microscopy. This has supported the accomplishment of several clinical trials including the AQUAMAT that led to the change of policy for management of severe malaria in children using artesunate. To better understand the aetiology of infectious diseases, Epicentre has a level 2 microbiology laboratory performing all tests from the microscopic identification of germs to their bacterial identification including their drug susceptibility. The molecular biology laboratory that include manual and automated DNA extraction, PCR and real-time PCR allow the more rapid detection of serious bacterial infections, the detection of viral infection not often detectable in RLS and the assessment of drug efficacy especially in malaria clinical trials. It also plays a critical role on the assessment of the emergence of antimicrobial drug resistance (GeneXpert and LIPA for tuberculosis and real-time PCR for malaria and bacterial infections).

Research areas: Assessment of diseases burden, diagnosis and treatment strategies for RLS

Our research directions are the assessment of new diagnostics, vaccines and therapeutic strategies and the surveillance of burden of major diseases in RLS.

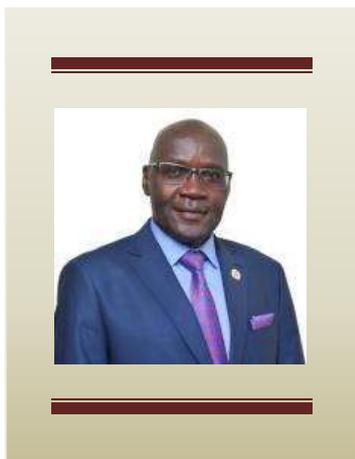
Training and capacity building

To make this high quality research sustainable and relevant to RLS, we are building capacity at MRRH and MUST through teaching and training. Epicentre contributed to the establishment of the Master in Medical Laboratory Sciences at MUST and our staffs are involved teaching in different departments of the faculty of Medicine of MUST. We also receive students and interns from MUST to perform their rotation and research activities; they are guided from their proposal writing to the publication of their research findings in peer review journals. University researchers are involved in all Epicentre research studies as Investigators, allowing them to build their research skills and ensure the relevance of our research to the Ugandan community.

Dr. Juliet Mwangi- Amumpaire Director

<https://epicentre.msf.org/en/epicentre/epicentre-uganda>

DEPUTY VICE CHANCELLOR, ACADEMIC AFFAIRS



Professor Nixon Kamukama Ph.D is the Deputy Vice Chancellor Academic Affairs at Mbarara University of Science and Technology (MUST) since 2016.

He previously worked as the Head of Procurement & Logistics Management Department, Faculty of Computing & Management Science – Makerere University Business School. He also worked as senior Accountant with Uganda Railways Corporation from 1993 to 1999. Other than being a PhD holder in business, Prof. Kamukama is a pioneer of Msc. Accounting & Finance (MUK), holds a Post graduate diploma in Computer Science, post graduate diploma in Microfinance operations and Bachelor of Commerce (Accounting option).

He is a visiting Professor of Ankole Western University- Kabwohe Sheema, chairs the Board of MUST Centre of Innovation and Technology Transfer (CITT), is a board member of the Forensic and Computing Institute, and the Consortium for Affordable Medical Technology (CAMTECH).

Journal & Book Publications

Journals: Nixon has authored a good number of academic articles in different high class international journals. Out of the 15 articles authored, he received the following meritorious academic awards for the two articles:

In 2013, received Best Paper Runner-Up Award from Taylor and Francis Group for the article entitled *“Intellectual Capital: Firms’ hidden source of service quality in the Microfinance industry in Uganda”*, published in the Journal of African Business.

In 2014, received the International Journal of Commerce and Management 2014 Highly Commended Paper Award from Emerald Group Publishing Ltd on the paper entitled *“Social Capital: mediator of social intermediation and financial services in the Microfinance Institutions in Uganda.*

Books:

Cost & Management accounting textbook, widely used by Accountants of Uganda by students offering different Accounting related disciplines.

Paper7 study pack for Cost and Management Accounting for the Institute of Certified Public Accountants of Uganda (ICPAU) (2016).

Research Projects:

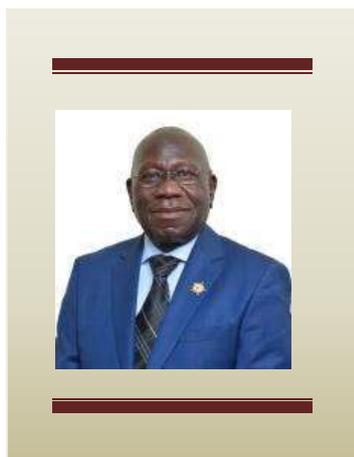
Co- Investigator, Biodiversity Hotspot Conservation – A Batwa Cultural Tourism Development and Management Approach (December 2019).

Leveraging Foreign Investment (FDI) to increase Small and Medium Sized Enterprises (SMEs) access to finance in Africa: A Case of Uganda (2016).

Financial Services for the Poor Initiative: Customer Credit Counseling/Debt Relief Services (2015-2016).

He has successfully supervised over 200 students at post-graduate level, out of which, six are PhD holders; and is also a reviewer of International Journal of Commerce & Management, and International Journal of Competitive Review.

THE VICE CHANCELLOR, MUST



Prof. Celestino Obua is the Vice Chancellor, of Mbarara University of Science and Technology and a Professor of Pharmacology and Therapeutics with a PhD in Pharmacology and a Fellow of the Uganda National Academy of Sciences (FUNAS).

Contribution to Science (Grants, research projects and Mentorship programs):

Director MURTI Program D43TW010128 (2018-2019)– (Mbarara University Research Training Initiative) and **PI MADRI Supplement D43TW010128-04S1** (2014-2016)– (Mbarara

Alzheimer’s and related Dementia Research Initiative) - that has trained to date three cohorts of junior faculty at MUST in conducting research in mental health, CVD, neurology, HIV/AIDs and related morbidities (total of 21 junior faculty), and AD/ADRD research (12 fellows).

PI HEPI-TUITAH R25TW011210 (2018-2023) – (Health-professional Education Partnership Initiative – Transforming Ugandan Institutions Training Against HIV/AIDS) and **HarPResT R25TW011210-04S1(2020-2021)-**

(Sexual Harassment Prevention and Response Training), both of which are currently running focused on training undergraduate students on prevention, care and research towards supplementing the national efforts in the fight against HIV, and promotion of sexual harassment in the research environment respectively.

Investigator MEPI-MESAU (Medical Education Partnership Initiative (2010-2015) – Medical Education for Services to all Ugandans) consortium of 5 medical schools in Uganda– trained 10 PhDs; 35MScs, 29faculty mentored researches; 90 students’ mentored research, leading to 107 publications.

Member INRUD (International Network on rational Use of Drugs) Uganda (2007-2011) - (Developed a survey tool on how to investigate Adherence to Antiretroviral Treatment: An indicator-Based Approach” and several publications)

Mentor and member Technical Advisory Committee PHARMBIOTRAC (World Bank Credit No.5797-UG). (2016-2021) - (Pharm-Bio Technology and Traditional Medicines).

Dual Program Director BlmS-NCD Grant application- “Building capacity for Implementation Science research in Non-Communicable Diseases – for clinicians, health professionals and other practitioners to address three scientific areas of public health significance in rural Uganda: Aging, neurological disorders and stroke, and substance use disorders.

ARCADE- HSSR EU/F7 Grant Agreements No. 281930 & 265970 (African Regional Capacity Development for Health Services and Systems Research) Project (2010 – 2014) – (Needs assessment for high level HSSR training in SSA, training materials, and conference papers)

Co- Investigator AMASA - FP7-EU F7-HEALTH-2009-242262- (Accessing Medicines in Africa and South Asia) (2010-2014)

KEYNOTE SPEAKER



Dr Freddie Ssenooba is an Associate Professor of Health Economics and Health Systems Management with over 20 years of teaching and research in health policy and systems. He is the Chair of Health Policy Planning & Management (HPPM) department and Director SPEED Project and the Center for Health Policy and Systems Development (CHPSD) at Makerere University School of Public Health.

Dr. Ssenooba has background training as a medical doctor and has worked in a clinical setting, as a hospital director and as a District Health Officer in Uganda's health system. He has a doctorate covering the intersection of public health policy and institutional economics from the University of London. In the last 17 years, Dr Ssenooba's teaching and research scholarship have focused health policies, program design and implementation and health system developments.

Dr Ssenooba has led a multi-disciplinary team undertaking Health Systems Assessment for Uganda, National Maternal Health Review and consultative study to operationalize national plans such as safe male circumcision for HIV prevention, reproductive health and health workforce and financing reforms. Dr Ssenooba is well embedded in the national and regional health and development discourses, think-tank taskforces and as advisory boards for health agencies like National Planning Authority, WHO-Afro, Wellcome Trust, KEMRI and Health Systems Global.

He is well versed in quantitative and qualitative research methods drawing on multiple lenses and disciplines such as human medicine, public health, health economics, political economy and systems thinking. As a director of SPEED Project - a program of applied policy analyses to support universal coverage in Uganda, Dr Ssenooba leads a partnership of agencies to respond to policy problems and demand for advice from the government of Uganda. From these enterprises, Dr Ssenooba has published books, journal articles, working papers and Op-Eds.

He has supervised to completion nine doctoral fellows and over 30 masters' student in his field of expertise. He has provided technical and consultancy services to WHO, DFID, USAID, World Bank, Ministries of Health, Uganda AIDS Commission and Multi-lateral and Bilateral Agencies and Foundations.

MBARARA UNIVERSITY OF SCIENCE AND TECHNOLOGY (MUST)

16th MUST ANNUAL RESEARCH DISSEMINATION CONFERENCE

21 May 2021 at Kihumuro, MUST

Theme: Transformative Research for development in a changing world

Sub-themes:

1. Transforming Health care access and delivery in a changing world
2. Interdisciplinary initiatives for Community health well-being
3. Towards scientific validation and commercialisation of traditional herbal medicine
4. Coping with a changing climate and environmental degradation innovations amidst demographic shifts
5. Promoting nutrition and food safety with value addition for sustainable livelihoods
6. Dynamics in social justice, governance and empowerment of local communities
7. Business management and entrepreneurship in turbulent times
8. Fostering inclusive and quality education access amidst frontier challenges of digital transformation

<u>OPENING PLENARY</u>	
<u>21st MAY 2021</u>	
08:00 -08:15am.	Arrival and registration of participants at PHARMBIOTRAC Boardroom. 4th floor, Faculty of Applied Science building, MUST Kihumuro Campus.
8.15 – 8.30am.	Singing the Anthems and Prayer: National, East African Community, and MUST
08:30 - 08.40am.	Welcome remarks by the Chairman Conference Organizing Committee (Board Chair DRGT) – Prof. Amon G. Agaba
08.40 – 8.50am.	Welcome remarks by Director DGRT – Assoc. Prof. Vincent Batwala
08:50 - 09.00am.	Remarks by Center Leader, PHARMBIOTRAC
09:00 - 09:10am.	Remarks by Director, MUST-MGH Global Health Collaborative
9:10 – 9:20 am.	Remarks by Director, Epicentre
9:20 – 9:45am.	Opening Remarks by the Vice Chancellor – Prof. Celestino Obua
9:45- 10.30pm.	Guest Speaker – <i>Professor Freddie Ssenooba, a seasoned researcher in health systems and policy at the Department of Health Policy, Planning and Management, the School of Public Health, College of Health Sciences,</i>

	<i>Makerere University-Kampala.</i>
10: 30 – 11.00am.	Health Break and group photograph
11:00 – 1.00pm.	Parallel sessions (<i>Plenary attendees, Panelists and rapporteurs at PHARMBIOTRAC boardroom at 4th floor, Lecture theater 01 and lecture theater 02 at ground floor, Faculty of applied Science building; Kihumuro Campus</i>)
02.20 - 05.00pm.	Parallel sessions (<i>Plenary attendees, Panelists and rapporteurs PHARMBIOTRAC boardroom at 4th floor, Lecture theater 01 and lecture theater 02 at ground floor, Faculty of applied Science building; Kihumuro Campus</i>)
5.00 – 5.15pm.	Closing remarks by Deputy Vice Chancellor, Prof. Nixon Kamukama
05:00 -05.15 pm.	Health Break – Tea

PARALLEL SESSION 1 (PHARMBIOTRAC boardroom at 4th floor, FAST building, Kihumuro)

11.00 – 1.00pm

Subtheme: 1) *Transforming Health care access and delivery in a changing world*

Session Chairs: Dr. Scholastic Ashaba & Dr. Joseph Ngonzi

Time allocation	11:00 - 1:00 pm: 15min per presenter (10min for presentation and 5 min for questions after every presentations) and 15 minutes for discussion at the end of the session
	Title/Presenting Author
11.00 - 11.15	Optimization of Temperature in Preparation of Pregelatinized Maize Starch as a Multifunctional Excipient for Direct Tablet Compression, J. R. Angupale
11.15 - 11.30	Ocular Pathology in Patients with Head Injury Attending Mbarara Regional Referral Hospital: A Cross-sectional Study, Amos Twinamatsiko
11.30 - 11.45	Prevalence and Correlates of Carotid Plaque in a Mixed HIV-Serostatus Cohort in Uganda, Prossy Bibagambah
11.45 - 12.00	Money was the problem: caregivers' self-reported reasons for abandoning their children's cancer treatment in south west Uganda, Barnabas Atwiine
12.00 - 12.15	Affective and Psychotic Disorders in War-Torn Eastern Part of the Democratic Republic of the Congo: A Cross-Sectional Study, Bives Mutume Vivalya
12.15 - 12.30	Young people's perspectives on access to sexual and reproductive health services in rural southwestern Uganda, Eleanor Turyakira
12.30 - 12.45	Assessing the effect of covid-19 pandemic on the sexual and reproductive health of young people in south western Uganda, Elizabeth Kemigisha
12.45 - 1.00	Discussion
1.00 - 2.00	LUNCH BREAK

Session two	Subthemes 1&3: Transforming Health care access and delivery in a changing world and Towards scientific validation and commercialisation of traditional herbal medicine
Session Chairs	Dr. Joel Bazira & Dr. Grace Nambozi
Time allocation	2.00 - 5:00 pm, 15min per presenter (10 for presentation and 5 for questions) and 15 mins for discussions at the end of the session
	Title/Presenting Author
2.00 - 2.15	Factors influencing adherence to vaccine management guidelines during immunisation outreach sessions in rural settings in South Western Uganda, Flavia Atwiine
2.15 - 2.30	Perceptions of health and quality of life among older-age Ugandans, Flavia Atwiine
2.30 - 2.45	The Wooden Skull: An innovation through the use of local materials and technology to promote the teaching and learning of human anatomy, Kintu Mugagga
2.45 - 3.00	Effectiveness of the Dolutegravir Transition in Uganda: DISCO Cohort Week 24 Results, Nimusiima Komukama
3.00 - 3.15	Fostering Health System Readiness for Implementation: The Maximizing Engagement for Readiness and Impact (MERI) Approach, Teddy Kyomuhangi
3.15 - 3.30	Understanding motivation and complex community structures prior to implementation of an adolescent sexual and reproductive health initiative in Uganda, Robens Mutatina
3.30 - 3.45	Randomized trial of resistance testing for virologic failure in sub-Saharan Africa, Winnie R. Muyindike
3.45 - 4.00	Antimicrobial Interactions between the Phytoextracts of <i>Callistemon citrinus</i> and <i>Eriobotrya japonica</i> against <i>Streptococcus mutans</i> , Jimmy Ronald Angupale
4.00 - 4.15	Social support, food insecurity, and HIV stigma among men living with HIV in rural southwestern Uganda, Innocent Arinaitwe
4.15 - 5.00	Question, Answer/Discussion and closure
5.00 pm	Closing remarks by Deputy Vice Chancellor (AA)
PARALLEL SESSION 2 (Lecture theatre 01, Ground floor, FAST building, Kihumuro) 11.00 – 1.00pm Subthemes: 2,4,5 &8) Interdisciplinary initiatives for community well-being, Coping with a changing climate and environmental degradation innovations amidst demographic shifts, Promoting nutrition and food safety with value addition for sustainable livelihoods & Fostering inclusive and quality education access amidst frontier challenges of digital transformation Session Chairs: Assoc. Prof. Grace Birungi and Dr. Imelda Tumwesigire	

Session one	Subtheme: Interdisciplinary initiatives for community well-being
	11:00 - 1:00 pm, 15min per presenter (10 for presentation and 5 for questions) and 15 mins for discussions at the end of the session
Time allocation	Title/Presenting Author
11.00 - 11.15	Our destiny is not written for us, it is written by us:” Voices of the community on parent-child sexuality communication in rural South-Western Uganda, Dorcus Achen
11.15 - 11.30	Fluoride Contamination in Ndali-Kasenda Crater Lakes in Albertine Graben, Uganda: Assessment using multivariate statistics and human health risk, Walter Ojok
11.30 - 11.45	Perceived contextual and Psychological factors influencing Open Defecation free status behaviour in Kabale: deductive content analysis, Moses Ntaro
11.45 - 12.00	Knowledge, attitude and behaviour towards the use of insecticide treated mosquito nets among pregnant women and children in rural areas of Isingiro district, Uganda, Isaac Kakuru
12.00 - 12.15	Communication about Sexual and Reproductive Health between parent adolescent dyads in Rural Southwestern Uganda: Does gender matter, Elizabeth Kemigisha
12.15 - 12.30	Supporting artemisia annua farmers to produce quality raw materials for the synthesis of medicines: Kasese, Kabale and Fort Portal, Patricia Wagana
12.30 - 12.45	Sexual and reproductive health during COVID-19 in Uganda, Elizabeth Kemigisha and Viola N Nyakato
12.45 - 1.00	Question and answer/Discussions
1.00 - 2.00	HEALTH BREAK – LUNCH
Session two	Sub themes: Coping with a changing climate and environmental degradation innovations amidst demographic shifts, Promoting nutrition and food safety with value addition for sustainable livelihoods & Fostering inclusive and quality education access amidst frontier challenges of digital transformation
Session Chairs	Dr. Simon Kawuma, Dr. David Okot Kilama & Dr. Sesazi Duncan
Time allocation	2:00 - 5.00 pm, 15min per presenter (10 for presentation and 5 for questions) and 15 mins for discussions at the end of the session
	Title/Presenting Author
2.00 - 2.15	Total polyphenols and antihyperglycemic activity of aqueous fruits extract of <i>Abelmoschus esculentus</i> : Modeling and optimization of extraction conditions, Emanuel L. Peter
2.15 - 2.30	Exploring the Genetic Diversity of Jackfruit (<i>Artocarpus heterophyllus</i> Lam.) grown in Uganda based on SSR markers, Justine Nakintu
2.30 - 2.45	A mathematical model of solid waste accumulation and treatment with a varying human population size, Isaac Rukundo

2.45 - 3.00	COVID-19 Pandemic Management Strategies and Implementation of Educational Programmes in Tororo District, Uganda, Emmanuel James Oketcho
3.00 - 3.15	An Empirical Investigation of Forks as Variants in npm, John Businge
3.15 - 3.30	The Effect of Problem-Based Learning (PBL) Instruction on Secondary School Physics Students' Conceptual Knowledge of Electromagnetic Waves, Stella Teddy Kanyesigye
3.30 - 3.45	Eigenvalue estimates for magnetic Schrödinger operators in a waveguide, Ben Sorowen
3.45 - 4.00	Disturbance, climate change and distribution of tree species along an elevation gradient: implications for resource availability to local communities, Dennis Babaasa
4.00 - 5.00	Question, Answer/Discussion and closure
5.00 pm	Closing remarks by Deputy Vice Chancellor (AA)
Parallel Session three (Lecture theatre 02, Ground floor, FAST building, Kihumuro) 11:00 – 1:00pm Sub theme: Dynamics in social justice, governance and empowerment of local communities Session Chairs: <i>Medard Twinamasiko and Dr. Tom Ogwang</i>	
Time allocation	11:00 – 1:00 pm, 20 min per presenter (15 for presentation and 5 for questions) and 40mins for Questions general discussion
	Title/Presenting Author
11.00 - 11.20	Displacement without placement: voices and experience of Batwa Indigenous People living in south-western Uganda, Viola Nyakato
11.20 - 11.40	Societal stimuli of Social Governance: Understanding pluralistic Agricultural Extension Services in Northern Uganda, Hannington J Odongo
11.40 - 12.00	The Human-Wildlife Conflict Interventions and their Effect on Wildlife Conservation in the Mikeno Sector of Virunga National Park, D.R. Congo, Minani S. Abel
12.00 - 12.20	Biodiversity Conservation and Involvement of Indigenous People: A case of Batwa of Mikeno Sector around Virunga National Park, D.R.C Congo, Eliode Bakole
12.20 - 1.00	Question and Answer/Discussions
1.00 - 2.00	HEALTH BREAK - LUNCH
5.00 pm	Closing remarks by Deputy Vice Chancellor (AA)

THEME: “TRANSFORMATIVE RESEARCH FOR DEVELOPMENT IN A CHANGING WORLD”

SESSION ONE ABSTRACTS

1. Subthemes: Transforming Health care access and delivery in a changing world and Towards scientific validation and commercialisation of traditional herbal medicine

Optimization of Temperature in Preparation of Pregelatinized Maize Starch as a Multifunctional Excipient for Direct Tablet Compression

*J. R. Angupale^{1,3}, S. Kaur¹, A. J. Makuach¹, E. Kaggwa¹, J. Wamukama¹ and J. Oloro²

¹Department of Pharmaceutical Sciences, Faculty of Medicine, Mbarara University of Science and Technology, Mbarara-Uganda

²Department of Pharmacology, Mbarara University of Science and Technology Campus, Mbarara. Uganda.

³Pharm- Biotechnology and Traditional Medicine Center (PHARMBIOTRAC), Mbarara University of Science and Technology, Mbarara, Uganda

*Corresponding author: Email: jangupale@must.ac.ug/jimmyangupale@gmail.com

Abstract

The research was to document the optimum temperature for preparation of pregelatinized starch as a Direct Compression (DC) multifunctional excipient in order to find a better and cheaper alternative to Microcrystalline Cellulose (MCC) in DC. The pre-gelatinized maize starch (PGS) was used in this study to investigate the optimum temperature for its preparation at a specific concentration of starch slurry and determine the physicochemical properties of the pregelatinized maize starch samples produced. Pregelatinisation of 25% w/v BP maize starch slurry was carried out at temperatures 55 °C, 60 °C, 65 °C, 70 °C and 75 °C. Light microscopy was carried out for the PGS samples and MCC. The physicochemical properties of the PGS samples and MCC that were evaluated included; angle of repose, bulk and tapped density, Carr's index, Hausner's ratio, True density, porosity, swelling index, hydration capacity, moisture content and pH. *Results*: Partial rupture of starch granules and less compactness was observed after pregelatinisation. The flow properties, swelling index, and packing properties improved with increase in temperature. The optimum temperature for preparing PGS with favorable DC tableting properties was found to be between 70°C and 75°C. Further formulation studies should be carried out with the multifunctional PGS samples using DC and evaluation of the tablet quality control studies. In addition, further studies with optimization of starch: water ratio should be conducted to determine how it will affect physicochemical properties of the PGS.

Key words: Maize, Physicochemical properties, Pregelatinization, tablet, temperature

Ocular Pathology in Patients with Head Injury Attending Mbarara Regional Referral Hospital: A Cross-sectional Study

¹Kambale Mutanga, ²Derek Harborne, ³Amos Twinamasiko

3Mbarara University of Science and Technology, atwinamasiko@must.ac.ug

Abstract

Ocular injuries are common among head injury patients because of the close proximity of the eyes and the brain. Early detection and management can improve on the outcome of some of these injuries. A cross sectional study to determine prevalence and factors associated with ocular pathology in patients with head injury within one week post trauma was carried out among 169 patients admitted at Mbarara Regional Referral Hospital Emergency Ward from December 2019 to May 2020. Data on demographics, cause of injury and severity of injury were collected, entered into Epi data and analysed with Stata. Of the 169 patients, 104 (61.5%) had ocular pathology, majority of whom were young adult males who were motorcycle riders or drivers. Ecchymosis (35.5%), pupillary abnormalities (21.3%) and lid laceration (15.4%) were the commonest. Those who presented on the third day or later were more likely to have ocular manifestations (adjusted OR = 95%CI, p = 0.0021). This high prevalence of ocular pathology among head injury patients calls for involvement of ophthalmic personnel in the management of head injury patients and further studies to monitor outcome of the injuries.

Key words: *Head injury, ocular injury*

Prevalence and Correlates of Carotid Plaque in a Mixed HIV-Serostatus Cohort in Uganda

Prosy Bibangambah

MUST-Global Health Collaborative,

Corresponding author: bibangambah@gmail.com

Abstract

The extent to which the risk of atherosclerotic cardiovascular disease (ACVD) is increased among people living with HIV (PLWH) in sub-Saharan Africa remains unknown. Cross-sectional analysis nested within the Ugandan Noncommunicable Diseases and Aging Cohort, including PLWH in rural Uganda > 40 years taking antiretroviral therapy (ART) for at least 3 years, and a population-based control group of HIV-uninfected age- and sex-matched persons. We conducted carotid ultrasonography and collected ACVD risk factor data. Our outcome of interest was carotid plaque, defined as >1.5 mm thickness from the intima-lumen interface to the media-adventitia interface. We fit multivariable logistic regression models to estimate correlates of carotid plaque including HIV-specific and traditional cardiovascular risk factors. We enrolled 155 (50%) PLWH and 154 (50%) HIV-uninfected comparators, with a median age of 50 years. Among PLWH, the median CD4 count was 433

cells/mm³ and 67% were virologically suppressed. Carotid plaque prevalence tended to be higher among PLWH (8.4% vs 3.3%). In adjusted models, HIV infection (aOR 3.90, 95% CI 1.12, 13.60) and current smokers (aOR 6.60, 95% CI 1.22, 35.80) had higher odds of carotid plaque whereas moderate (aOR 0.13, 95% CI 0.01, 1.55) and vigorous intensity physical activity (aOR 0.34, 95% CI 0.07, 1.52) were associated with lower odds of carotid plaque. In rural Uganda, PLWH have higher odds of carotid plaque compared to age- and sex-matched HIV-uninfected comparators. Future work should explore how biomedical and lifestyle factors might reduce atherosclerotic burden among PLWH in the region.

Key words: *HIV; atherosclerosis; cardiovascular disease; carotid intima media thickness; carotid plaque;*

Money was the problem: caregivers' self-reported reasons for abandoning their children's cancer treatment in south west Uganda

Barnabas Atwiine^{1,2*}, Imelda Busingye², Rose Kyarisiima², Emmanuel Baluku², Ruth Mbabazi², Brian Bamwine^{†2}, Siyadora Ankunda^{1,2}, Jaime Libes³, Howard Weinstein⁴, Kevin Schwartz⁴, Gertrude Kiwanuka⁵.

¹*Department of Pediatrics and Child Health, Mbarara University of Science and Technology, Mbarara, Uganda.*

²*Department of Pediatrics and Child Health, Mbarara Regional Referral Hospital, Mbarara, Uganda.*

³*Department of Pediatrics, University of Illinois College of Medicine, Peoria, IL, USA*

⁴*Massachusetts General Hospital for Children, Boston, MA*

⁵*Faculty of Medicine, Mbarara University of Science and Technology, Mbarara, Uganda.*

Abstract

Treatment abandonment contributes to poor survival of children with cancer in low-middle-income countries. We investigated why caregivers withdraw their children from treatment in order to formulate interventions. In a qualitative study, in-depth interviews were conducted with caregivers of children who had abandoned cancer treatment at the Paediatric Cancer Unit of Mbarara Regional Referral Hospital in South Western Uganda, between May 2017 and September 2020. Recorded in-depth interviews with were transcribed and analyzed to identify themes of caregiver self-reported reasons for treatment abandonment. Seventy-seven out of 343 (22.4%) children treated for cancer at MRRH abandoned treatment during the study period; 20 contactable caregivers participated in the study. Most (65%) of the caregivers were mothers and eight (40%) children with a median age of 6.5 years were alive. Financial difficulties, other obligations, the child falsely appearing cured, preference for alternative treatments, belief that cancer was incurable, fear that the child's death was imminent and chemotherapy side-effects were the caregivers' reasons for treatment abandonment. Treatment abandonment among children with cancer in Uganda most times results from difficult conditions beyond the caregivers' control and should be approached with empathy and support.

*Corresponding Author: batwiine@must.ac.ug

Key words: cancer, children, low-middle-income countries, treatment abandonment, Uganda

Affective and Psychotic Disorders in War-Torn Eastern Part of the Democratic Republic of the Congo: A Cross-Sectional Study

¹Bives Mutume Vivalya, Germain Manzekele Bin Kitoko, Adelard Kalima Nzanzu, Martial Mumbere Vagheni, Rock Kasereka Masuka, Wilson Mugizi, and Scholastic Ashaba

¹*Department of Psychiatry, Kampala International University Western Campus*

Abstract:

There is lack of information about prevalence of affective and psychotic disorders triggered by traumatic events among people living in war-affected regions. This study is aimed at determining the prevalence rate of affective and psychotic disorders and the associated factors in a war-torn eastern part of Democratic Republic of the Congo. This epidemiological cross-sectional descriptive study was carried out from 1st January 2019 to 31st December 2019 at Cepima and Muyisa health centers. This study enrolled 344 patients that had experienced traumatic events in Eastern Democratic Republic of the Congo from the 1119 participants, of whom 229 had positive bipolar affective disorder and 115 patients had psychotic disorders. The results revealed that bipolar affective disorders were two times more than psychotic disorders. Sexual abuse, sudden death of a relative, kidnapping, the physical torture, and childhood trauma were the psychological factors correlated to the occurrence of bipolar affective and psychotic disorders. It was concluded that the traumatic experiences were precursors for the occurrence of bipolar affective and psychotic spectrum disorders.

Key words: Democratic Republic of the Congo Psychotic disorders, War

Young people's perspectives on access to sexual and reproductive health services in rural southwestern Uganda

Eleanor Turyakira¹, Teddy Kyomuhangi², Clare Kyokushaba², Neema C Murembe³, Elizabeth Kemigisha³, Barbara Naggayi³, and Jerome Kabakyenga², Jennifer Lynn Brenner⁴

¹*Mbarara University of Science and Technology, Faculty of Medicine*

²*Mbarara University of Science and Technology, Maternal, Newborn and Child Health Institute*

³*Mbarara University of Science and Technology, Faculty of Interdisciplinary Studies*

⁴*University of Calgary, Calgary, Alberta, Canada*

¹Correspondence author: eturyakira@must.ac.ug

Abstract

Consistent access to comprehensive and quality sexual reproductive health and rights (SRHR) services is key to advancing SRHR of young people. This study aimed at understanding the barriers and enablers for access to SRHR by young people in rural Uganda to inform project planning and implementation. We conducted a qualitative study in September 2020, in Bushenyi and Rubirizi districts. Participants (94) included community health workers, young people, parents, health workers. Ethical approval was obtained and

Covid-19 prevention guidelines followed. Data was thematically analyzed. Young people expressed a general lack of trust in health workers and other facility staff to keep their use of SRHR services confidential especially from their parents. They perceived health workers as judgmental and unfriendly when delivering services to them especially family planning and post-abortion care. Public health facilities were viewed as a last-resort for SRHR services. Young people asked for sufficient facility visiting hours to allow for confidentiality and privacy, and consistent SRHR services. Health workers' judgmental attitude and behavior towards young people is a deterrent to access to SRHR services. Providing services consistently in a dignified manner, ensuring privacy and confidentiality would ease access to SRHR services for young people.

Key Words: *Health workers, reproductive health, Rights, Young people*

Assessing the effect of covid-19 pandemic on the sexual and reproductive health of young people in south western Uganda.

Elizabeth Kemigisha¹, Teddy Kyomuhangi², Barbara Naggayi¹, Jennifer Lynn Brenner⁴, Neema C Murembe¹ Clare Kyokushaba², and Jerome Kabakyenga² Eleanor Turyakira³

¹ Mbarara University of Science and Technology, faculty of interdisciplinary studies

² Mbarara University of Science and Technology, maternal, newborn and child health institute

³ Mbarara University of Science and Technology, Faculty of Medicine

⁴University of Calgary, Calgary, Alberta, Canada

Abstract

This study aimed at understanding the effect of covid-19 pandemic on young peoples' sexual reproductive health and rights (SRHR) services access in rural Uganda. In September 2020, a qualitative study among 94 participants in Bushenyi and Rubirizi districts including 14 focus group discussions and 3 key informant interviews was conducted. Participants included community health workers, young people, mothers, community leaders and health workers and district health officers were key informants. Young people reported poor SRHR outcomes including perceived increase in sexual and gender-based violence, early onset of sexual activity, teenage pregnancy and early marriage. Dramatic migration to rural communities, resulted in significant increases in rural population increasing demand for SRHR services leading to commodity stock outs. Access to SRHR services was limited by stigma and difficulties of reaching facilities due to limited transport, curfews and lack of Covid-19 protection masks. However, parents coming home early and having more time for their children was identified to be a positive outcome of the pandemic. The results showed that COVID-19 and related necessary public health measures resulted in significant change in SRHR behaviors, care-seeking and health amongst young people. Community based intervention to support access to information and services for young people are essential to curb escalating teenage pregnancies.

Key words: *Adolescents, COVID 19, Sexual and reproductive health*

Factors influencing adherence to vaccine management guidelines during immunisation outreach sessions in rural settings in South Western Uganda.

Flavia Atwiine

Mbarara University of Science and Technology, fatwiine@yahoo.com

Abstract

In Uganda, outreaches were established to increase access to and use of immunization services for populations with limited access to facility-based services. However, several outbreaks of immunisable diseases like measles have been reported over time leaving a lot of unanswered questions with policy makers and other stakeholders. The aim of this study was to find out factors influencing adherence to vaccine management guidelines during immunization outreach sessions in rural settings in South Western Uganda. An observational descriptive study using qualitative methods was conducted in 16 public health facilities in 4 purposively selected districts of Kasese, Mitooma, Rubirizi and Rwampara in South Western Uganda. Data was collected using in-depth semi-structured interviews, review of health facility records and observation methods. The demographic characteristics and observation checklists data were entered into Excel software and analyzed in relation to the World Health Organisation immunisation practice recommendations. All interviews were transcribed, data coded, categories formed and triangulated with data from observation checklist and record reviews. Generation of themes was guided by the socio-ecologic framework to enable a better understanding of the practices of health care providers during immunization outreach sessions in relation to vaccine management guidelines, identify the gaps and factors influencing adherence. Overall, 51 individuals were interviewed including 4 ADHOs in charge of maternal and child health, 4 cold chain technicians, 15 Expanded Program on Immunisation focal persons and 28 health care providers. The main themes identified in the data regarding gaps identified included insufficient monitoring and handling, poor documentation, poor refrigerator management, and poor transportation of vaccines while factors influencing adherence to vaccine management guidelines during outreach immunisation sessions were knowledge, skills and motivation of health care providers; teamwork, funds, support supervision, staffing levels, and transport. Most gaps in vaccine management practices were identified at health care provider level but they were facilitated by the policy/ environment-level factors. Therefore, specific strategies to address the identified factors influencing adherence to vaccine management would tremendously improve adherence to vaccine management guidelines

Key words: *adherence, immunization, vaccine management guidelines*

Perceptions of health and quality of life among older-age Ugandans

Flavia Atwiine¹, Rebecca Gilbert², Zahra Reynolds², Ruth Sentongo¹, Ana-Claire Meyer³, Deanna Saylor^{4,5}, Samson Okello^{1,6}, Noeline Nakasujja⁷, Meredith Greene⁸, Janet Seeley⁹, Alexander Tsai^{1,2,10}, Stephen Asimwe^{1,11}, Mark J Siedner^{1,2,10}

¹*Mbarara University of Science and Technology, Mbarara, Uganda*

²Massachusetts General Hospital, Boston, MA, USA

³Yale School of Medicine, New Haven, CT, USA

⁴Johns Hopkins University School of Medicine, Baltimore, MD, USA

⁵University of Zambia School of Medicine, Lusaka, Zambia

⁶Gillings School of Global Public Health, University of North Carolina, Chapel Hill, NC, USA

⁷Makerere University, Kampala, Uganda

⁸University of California, San Francisco, CA, USA

⁹London School of Hygiene and Tropical Medicine, London, UK

¹⁰Harvard Medical School, Boston, MA, USA

¹¹Kabwohe Clinical Research Centre, Kabwohe, Uganda

Corresponding Author: fatwiine@yahoo.com

Abstract

Little is known about priorities for older people in sub-Saharan Africa. We interviewed older-aged Ugandans to learn about their perceptions of health and their concerns and priorities about their future health as they age. We conducted semi-structured interviews among Ugandans aged >48 years in Mbarara. We explored domains of quality of life, including activities of daily life, mental health, health perceptions, and impacts of HIV on health. Interviews were translated, transcribed, and coded using thematic analysis. We conducted 36 interviews of respondents aged 49 to 73, with a median age of 56, evenly distributed by sex and HIV serostatus. Many PLWH considered themselves healthy. By contrast, HIV-negative respondents generally considered themselves unhealthy. When asked about changes as they have aged, participants reported reduced energy and strength, increased pain, changes in sleep patterns, and memory loss. Their future health concerns included non-communicable diseases and physical abilities. PLWH and their HIV-negative peers consider NCDs the greatest risk to their health and prioritize functioning to enable independence. These results highlight the importance of NCD prevention and greater attention to geriatric syndromes in public health programming for older-aged individuals in the region.

Keywords: *Aging, HIV, Quality of life, Uganda*

The Wooden Skull: An innovation through the use of local materials and technology to promote the teaching and learning of human anatomy

Kintu Mugagga,¹ Masilili G. Mwarisi,² and Samuel S. Dare³

1. Department of Anatomy, Faculty of Medicine, Mbarara University of Science and Technology, Uganda

2. Department of Human Anatomy, School of Health Sciences, Makerere University, Uganda

3. Kabale University School of Medicine, Kabale University, Uganda

Abstract

Skeleton models are important in facilitating a student's easy learning, retention and recollection of information in future. These assist students to carry out hands-on practice in order to acquire and practice new skills that are relevant to health professional practice. The increasing number of medical institutions and medical students attracts the challenge of

inadequate facilitation of the teaching and learning processes. This warrants a study and/or an exploration of an alternative solution such as wooden models in order to solve the problem of scarce and ethically restricted human teaching aids. Wooden pieces (50 cm length × 20 cm diameter) from a Jacaranda *mimosifolia* tree were prepared for the carving process, and wooden replicas of human skulls were made. Two experimental groups of randomly selected medical students (60: active and 60: control) were separately taught using wooden and natural skull models, respectively. The two groups were assessed and evaluated using the natural skull models to compare their understanding of the anatomy of the skull. Additionally, opinion statements were collected from participants in the active group during the oral examination. Six (6) wooden skull models were produced and used for experimental study. Comparisons of academic scores (mean and median) between active (students using the wooden skull) and control (students using natural skull) groups showed no statistically significant difference ($P \geq 0.05$). Concerning the enhancement of learning skills, the wooden model was constructed in a way that would be able to enhance learning like the natural skull. The wooden skull model, with more improvement in structural formation, can adequately facilitate the teaching and learning of anatomy of the human skull. This project and the experimental study about utilization of the wooden skull model provide a good potential of using the wooden models to supplement the use of the natural human skeletal models.

Key words: *local materials, teaching and learning, skull models, human anatomy*

Effectiveness of the Dolutegravir Transition in Uganda: DISCO Cohort Week 24 Results

Nimusiima Komukama¹, Mwebesa B. Bwana¹, Winnie Muyindike¹, Daniel Omoding¹, Godfrey Masette¹, Ashley Stuckwisch², Bethany Hedt-Gauthier^{3,4}, Vincent C. Marconi⁵, Mahomed-Yunus S. Moosa⁶, Deenan Pillay⁷, Ravindra K. Gupta^{8,9}, Mark J. Siedner^{2,3,9,10}, Suzanne M. McCluskey^{2,3,10}

¹ Mbarara University of Science and Technology, Mbarara, Uganda

² Medical Practice Evaluation Center, Massachusetts General Hospital, Boston, MA, USA

³ Harvard Medical School, Boston, MA, USA

⁴ Harvard T. H. Chan School of Public Health, Boston, MA, USA

⁵ Emory University School of Medicine and Rollins School of Public Health, Emory University, Atlanta, GA, USA

⁶ Department of Infectious Diseases, University of KwaZulu-Natal, Durban, South Africa

⁷ University College London, London, United Kingdom

⁸ University of Cambridge, Cambridge, United Kingdom

⁹ Africa Health Research Institute, Durban, South Africa

¹⁰ Division of Infectious Diseases, Massachusetts General Hospital, Boston, MA, USA

Presenting author: Nimusiima Komukama, **Corresponding author:** smccluskey@mgh.harvard.edu

Abstract

Tenofovir, lamivudine, and dolutegravir (TLD) is now preferred first-line antiretroviral therapy for most adults with HIV. Limited programmatic data are available to describe success of the TLD transition in the region. We established the DISCO cohort to quantify viral

suppression and regimen tolerability during the TLD transition. We prospectively enrolled adults with HIV who were programmatically switched to TLD from previous first-line regimens. We conducted questionnaires, chart reviews, and retrospective HIV-1 viral load (VL) testing from plasma specimens collected at enrollment and week 24. We enrolled 500 participants (41% female). Median age was 47 years. 95% had VL <50 copies/mL at enrollment. By week 24, 1% had discontinued TLD. At week 24, 96% (432/448) had VL <50 copies/mL. Of those with VL >50 copies/mL at enrollment, 25% had persistent viremia at week 24, as compared to 3% among those with viral suppression at enrollment (X^2 p-value<0.001). **Conclusions:** Most participants transitioned to TLD with an undetectable VL. We documented 96% suppression in those completing a week 24 visit. These data support early tolerability and efficacy of TLD transition in the public sector. However, vigilance and programmatic monitoring are needed to ensure long-term durability of TLD.

Keywords: *antiretroviral therapy, dolutegravir, HIV, Uganda, viral suppression*

Use of Smart Pill Boxes to Support ART Adherence in Routine Care: Early Implementation Science Lessons from Southwestern Uganda

Stephen Asiimwe^{1,2,3}, John Bosco Tumuhairwe¹, Edna Tindimwebwa¹, James Tinkamanyire¹, Elly Tuhnamagyezi¹, Robert Baijuka¹, Lindsey Garrison³, Marisa DeSignore³, Jessica E. Haberer^{3,1}

¹Kabwohe Clinical Research Center (KCRC), Kabwohe, UG

²Mbarara University of Science and Technology (MUST), Mbarara, UG

³Center for Global Health, Massachusetts General Hospital (MGH), Boston MA

Abstract

High, sustained adherence is critical for achieving individual and public health benefits of HIV antiretroviral therapy (ART). “Smart” pill boxes provide detailed adherence information and can enable real-time interventions; however, their use has largely been confined to research. A novel, low-cost device (Medication Event Reminder Monitor, MERM) may be appropriate for routine care. Implementation was guided by previously published qualitative interviews informed by the Consolidated Framework for Implementation Research. We provided a prototypical ART clinic in Uganda with MERM enabled to offer multiple types of SMS reminders to clients or social supporters and/or an alarm. Clinic and client experiences were observed for 3 months/client, including time and motion studies. Training required 4 hours and was most efficient when limited to the triage nurses identified as best suited to oversee MERM use. Twenty-five ART clients were enrolled: 40% were female and the median age was 36 years. The median number of visits was 2/client; counselors reviewed MERM data with 88% of clients at least once; 60% reviewed data at all visits. Limitations included poor internet connectivity and time. Among available interventions, 20% of clients chose daily SMS reminders, 68% chose SMS reminders triggered by a missed dose, and 12% chose both. Additionally, 84% chose to send SMS notifications to a social supporter; 88% opted for a daily alarm. Average adherence was

91%; 4 clients had adherence gaps >1 week. Acceptability was high; all clients found the monitor "very useful", and 80% found the SMS "very useful". The average time spent on the technology and associated counseling was 7 minutes/client. In a prototypical ART clinic, we successfully implemented a low-cost electronic adherence monitor and associated interventions among most clients. Adherence was generally high, although individuals were identified who could benefit from intervention. Overall clinic flow was minimally affected.

Key words: *Adherence, HIV antiretroviral therapy (ART), Medication Event Reminder Monitor (MERM), Smart Pill Boxes*

Fostering Health System Readiness for Implementation: The Maximizing Engagement for Readiness and Impact (MERI) Approach

Teddy Kyomuhangi, Kimberly Manalili, Eleanor Turyakira, Clare Kyokushaba, Sobia Khan, Jerome Kabakyenga, Dismas Matovelo, Jennifer Brenner

Mbarara University of Science and Technology – Healthy Child Uganda

Correspondence author: hcupmcdn@gmail.com

Abstract

While policymakers, researchers, and practitioners in global health have long advocated for system strengthening approaches to enhance effectiveness, little attention has been made to ensuring that local governments and organizations are actually *ready* to deliver and support implementation. The MERI Approach is comprised of a package of strategies and processes that enhance readiness of district health departments to adopt, implement and sustain public health interventions. It was first developed in 2015 based on >10 years of implementation experience in Southwestern Uganda to improve maternal, newborn, and child health, the intervention has since been adapted and tested for different contexts and populations (Tanzania). As a readiness intervention, this approach is guided by the heuristic $R=MC^2$, focused on enhancing motivation ("M"), general and intervention-specific capacity ("C²"). We are currently applying the approach to a health initiative for adolescents and young people in Uganda. This approach has contributed to improvements in morbidity and mortality, high levels of local engagement, and sustainability. We developed a *foundational framework* of factors necessary to increase *motivation* for adopting, implementing and sustaining the intervention, which include: promoting self-reliance, fostering collective action, embeddedness, a comprehensive approach, and transparency. Enhancing *capacity* involves four key strategies: leadership engagement (mentorship, and meetings), provide resources (equipping), and training. The MERI Approach helps foster readiness to implement any intervention, paving the way for future implementation efforts to improve and sustain population health. Readiness is an important aspect of implementation and one in which there has been little attention to date, particularly in low-income contexts. This approach has been tested and is being continually refined based on lessons learned from implementation and has shown to be effective in improving both clinical outcomes, but also in optimizing implementation and sustainability of public health interventions.

Key words: *The MERI Approach, readiness, implementation public health*

Understanding motivation and complex community structures prior to implementation of an adolescent sexual and reproductive health initiative in Uganda

Teddy Kyomuhangi¹, Barbara Naggayi², Eleanor Turyakira³, Sundus Khan⁴, Neema C Murembe², Elizabeth Kemigisha², **Robens Mutatina**¹, Joy Muhumuza¹, Clare Kyokushaba¹, Jerome Kabakyenga¹, Jennifer Lynn Brenner⁴

¹ Mbarara University of Science and Technology, Maternal, Newborn and Child Health Institute

² Mbarara University of Science and Technology, Faculty of Interdisciplinary Studies

³ Mbarara University of Science and Technology, Faculty of Medicine

⁴ University of Calgary, Indigenous Local & Global Health Office

Corresponding author: robens.hcu@gmail.com

Abstract

An estimated 35% of Uganda's population is 10-24 years old. Recent national indicators show concerning sexual and reproductive health (SRH) trends including high teen pregnancy, unsafe abortions, and limited contraceptive use. Barriers to adolescents seeking and receiving care are complicated due to pre-existing social structures in smaller, closely linked communities, especially in rural areas. To understand community motivation and unique social structures relevant to initiation of an adolescent SRH initiative in rural southwestern Uganda. Healthy Child Uganda, a Ugandan-Canadian partnership, conducted a qualitative study in September 2020, prior to finalizing implementation plans for an intervention in 2 districts. Semi-structured focus group discussions (14) and key informant interviews (3) comprised purposefully-selected participants (adolescents, parents, community health workers (CHWs), community leaders, clinicians, decision-makers), seeking their input regarding motivation and barriers for adolescent programming. The study complied with ethics and COVID-19 requirements. Interviews were audio-recorded, transcribed, and thematically analyzed. Participants (n=94) recognized unique adolescents SRH challenges in their communities, expressing a tension for change and high motivation for adolescent-SRH focused interventions. Participants who were mothers conveyed a motivation for SRH programming prompted by the potential for their own daughters' improved marriage prospects which they saw linked to social standing. When unwanted pregnancies occurred, participants shared fear of shame and desire to keep adolescents in school. To reduce this risk, mothers commonly encouraged unsafe abortion. There was a reported negative shift in relationships between adolescents and their 'aunties and uncles' who were traditionally regarded as 'champions' providing protection and guidance to adolescents; recent cases of such relatives exposing female adolescents to risks such as through introductions to men seeking sex in exchange for gifts/money had eroded trust in 'auntie and uncle' mentors for youth on SRH topics. In contrast, volunteer CHWs, who provide health promotion and referral services at the household level, emerged as a potentially 'trusted' group for SRH information and support, especially by adolescent participants themselves. In interviews with CHWs themselves, frequent experiences of

adolescents confiding in them when uncomfortable seeking parental support, were described. Study participants were highly motivated towards supporting adolescents. To plan an effective, targeted adolescent SRH initiative in our setting, complex community structures and emerging issues and ideas must be incorporated.

Key words: *adolescents, implementation, motivation, sexual and reproductive health*

Randomized trial of resistance testing for virologic failure in sub-Saharan Africa

Winnie R. Muyindike^{1,2}, Mahomed-Yunus S. Moosa,³ Suzanne McCluskey,^{4,5} Rebecca F. Gilbert,⁴ Selvan Pillay,⁶ Isaac Aturinda,¹ Kevin Ard,^{4,5} Nicholas Musinguzi,¹ Godfrey Masette,¹ Melendhran Pillay,⁶ Pravikrishnen Moodley,⁶ Jaysingh Brijkumar,⁶ Tamlyn Rautenberg,⁷ Gavin George,⁶ Rajesh T. Gandhi,^{4,5} Brent A. Johnson,⁸ Henry Sunpath,^{6*} Mwebesa B. Bwana^{1*^}, Vincent C. Marconi^{9,10*}, Mark J. Siedner^{1,3,4,5,6}

¹Mbarara University of Science and Technology

²Mbarara Regional Referral Hospital

³University of KwaZulu-Natal, Durban, South Africa

⁴Massachusetts General Hospital, Boston, Massachusetts, United States

⁵Harvard Medical School, Boston, Massachusetts, United States

³Mbarara University of Science and Technology, Mbarara, Uganda

⁴Africa Health Research Institute, KwaZulu-Natal, South Africa

⁶University of KwaZulu-Natal, Durban, South Africa

⁷Griffith University, Brisbane, Queensland, Australia

⁸Department of Biostatistics & Computation Biology, University of Rochester, Rochester, New York, United States

⁹Department of Medicine, Emory University School of Medicine, Atlanta, Georgia, United States

¹⁰Department of Global Health, Emory University Rollins School of Public Health, Atlanta, Georgia, United States

*These authors contributed equally to this work; ^Posthumous contribution

Corresponding Author: wmuyindike@gmail.com

Abstract

HIV virologic failure predicts future drug resistance and mortality. Genotypic resistance testing (GRT), the standard of care after virologic failure in high-income settings, is rarely implemented in sub-Saharan Africa. We conducted an open-label, randomized-controlled trial in Uganda and South Africa to estimate the efficacy of GRT to improve rates of re-suppression after virologic failure. We enrolled adults on first-line antiretroviral therapy in public clinics with an HIV-1 RNA >1,000 copies/milliliter. We randomly assigned participants to receive standard of care (SOC arm), including adherence counseling sessions and repeat viral load testing, or immediate GRT (GRT arm). Our primary outcome of interest was achievement of an HIV-1 RNA <200 copies/milliliter nine months after enrollment. We enrolled 840 individuals, most of whom (73%) were taking tenofovir/emtricitabine/efavirenz. We found no difference in virologic suppression at nine months between the GRT (63%, 263/417) and SOC arms (61%, 256/423, OR 1.11, 95%CI

0.83-1.49). Among participants with persistent failure at endline, drug resistance was less common in the GRT arm (58% [48/82] vs 76% [78/103], $P=0.01$). Nine-month survival and retention in care were similar between arms. The addition of GRT to routine care after first-line virologic failure did not improve rates of re-suppression.

Key words: *Antiretroviral drug resistance; clinical trials; HIV; treatment failure; Uganda*

Antimicrobial Interactions between the Phytoextracts of *Callistemon citrinus* and *Eriobotrya japonica* against *Streptococcus mutans*

Onen, H.¹, Kavuo, J.S.¹ Namboko, J.K.¹, Bukusuba, S.¹, Hope, D.² and *Angupale, J. R.^{1,3}

¹Department of Pharmaceutical Sciences, Faculty of Medicine, Mbarara University of Science and Technology

²Microbiology Laboratory, Epicentre Uganda, Mbarara University of Science and Technology

³Pharm- Biotechnology and Traditional Medicine Center (PHARMBIOTRAC), Mbarara University of Science and Technology

*Corresponding author: jangupale@must.ac.ug / jimmyangupale@gmail.com

Abstract

Streptococcus mutans is a gram-positive bacterium in the oral cavity that is most implicated in the dental caries progression. The condition is very expensive to manage and the most commonly used products such as fluoride tooth pastes and alcohol-based mouth washes are associated with many side effects. The current study focused on providing a scientific evidence to guide the use of a combination of *Eriobotrya japonica* (EJ) and *Callistemon citrinus* (CC) as actives in development of an effective and cheaper herbal formulation for management of dental caries. The leaves of both plants (EJ and CC) were shade-dried and pulverized into a coarse powder which were then cold macerated using ethanol (60 %) for 24 h. Phytochemical screening was conducted for the two dry extracts obtained after fan drying before they were mixed in to five different proportions (1:0, 3:1, 1:1, 1:3 and 0:1). Minimum inhibitory concentrations (MIC) and minimum bactericidal concentration (MBC) were determined for all the proportions against *Streptococcus mutans* with ciprofloxacin and 2.5 % Dimethyl sulfoxide (DMSO) used as the positive and negative controls respectively. Antimicrobial interactions between the two extracts were evaluated using Fractional Inhibitory and Bacterial Concentration Indices (FICI/FBCI). Results unveiled that EJ and CC had percentage yields of 20.05 % and 15.45 % respectively. All the extracts demonstrated almost similar phytochemical profiles with presence of flavonoids, saponins and tannins, and absence of alkaloids and volatile oils. But the flavonoids were more prominent in the CC extract. They also demonstrated an inhibitory effect on *Streptococcus mutans* with MIC and MBC values ranging from 0.417 to 3.333 mg/ml and 0.833 to 3.667 mg/ml respectively. However, CC: EJ (1:0) had the lowest MIC and MBC comparable to that of the standard drug at $P < 0.05$. The FICI/FBCI were between 1.5 and 3.917. Therefore, CC: EJ (1:0) proportion markedly demonstrated better antimicrobial activity against the test organism and there were no beneficial antimicrobial

interactions between the two plant extracts to inform their combination as actives for dental caries product formulation. Future initiatives to develop a standard herbal formulation for dental caries from EJ and CC should only consider the use of CC as active ingredient and further studies may focus on use of other extraction solvents apart from 60 % ethanol.

Key words: *Antimicrobial interactions, Streptococcus mutans, Callistemon citrinus, Eriobotrya japonica, Hydro-ethanolic extract.*

Social support, food insecurity, and HIV stigma among men living with HIV in rural southwestern Uganda

Innocent Arinaitwe¹, Hildah Amutuhaire¹, Davis Atwongyeire¹, Esther Tusingweire¹, Peter Chris kawungezi², Godfrey Zari Rukundo³, Scholastic Ashaba^{3*}

¹*Faculty of Medicine, Mbarara University of Science and Technology (MUST), Mbarara, Uganda.*

²*Department of community Health, MUST, Mbarara, Uganda*

³*Department of Psychiatry, MUST, Mbarara, Uganda*

*Corresponding author: sashaba@must.ac.ug; Presenting author: (arinainnocent@gmail.com)

Abstract

HIV stigma remains a major barrier to HIV care. Internalized HIV stigma more impacts adherence to antiretroviral therapy due to its direct effect on behavior and is more common in men. Information about HIV stigma and its associated factors among men living with HIV (MLWH) in rural settings is limited. Determining the prevalence of HIV stigma and its relationship with social support and food insecurity among MLWH in rural southwestern Uganda was the objective of this study. We conducted a clinic-based cross-sectional study and consecutively enrolled 252 adult MLWH accessing HIV care at a rural health Centre in southwestern Uganda. We collected data on sociodemographic information, HIV stigma, social support, and food insecurity. We fitted modified Poisson regression models to determine the associations. Almost half (48%) of the participants had high-level HIV stigma, 75% had food insecurity 5% of whom had severe food insecurity. We found statistically significant associations between HIV stigma and age (45+years) (ARR=0.84; 95% CI 0.71-0.98; P=0.03), food insecurity (ARR=1.51; 95% CI=1.13-2.01; P=0.005) and social support (ARR=0.62; 95% CI 0.47-0.82; P=0.001). Social support moderated the effect of food insecurity on HIV stigma (P=0.42). Stigma is common among MLWH in rural Uganda and it is significantly associated with food insecurity. The mainstream HIV care should have interventions to build social support systems and economically empower MLWH.

Keywords: *HIV positive men; HIV stigma, social support, food insecurity, rural Uganda.*

SESSION TWO ABSTRACTS

2. Subthemes: Interdisciplinary initiatives for Community health well-being Promoting nutrition and food safety with value addition for sustainable livelihoods, fostering inclusive and quality education access amidst frontier challenges of digital transformation and Coping with a changing climate and environmental degradation innovations amidst demographic shifts

“Our destiny is not written for us; it is written by us”: Voices of the community on parent-child sexuality communication in rural South-Western Uganda

Dorcus Achen¹, Cecilia Akatukwasa² Elizabeth Kemigisha³, Wendo Mlahagwa Olema³, Gad Ndaruhutse Ruzaaza³, Godfrey Z Rukundo³, Kristien Michielsens², Stella Neema⁴, Viola N Nyakato³, Gily Coene¹

¹Centre of Expertise on Gender, Diversity and Intersectionality, Vrije Universiteit Brussels, Brussels, Belgium. Faculty of Interdisciplinary Studies, Mbarara University of Science & Technology, Mbarara Uganda

²International Center for Reproductive Health, Department of Public Health and Primary Care, Faculty of Medicine and Health Sciences, Ghent University, Ghent, Belgium

³Mbarara University of Science & Technology; Mbarara, Uganda

⁴College of Humanities; Makerere University, Kampala, Uganda

Corresponding Author: dachen@must.ac.ug or Dorus.Achen@vub.be

Abstract

Adolescents who discuss with their parents on sexual and reproductive health issues are more likely to make healthy decisions on the use of reproductive health services such as condoms when they want to have sex than adolescents who do not talk to their parents often. However, in Africa and in Uganda in particular parent child communication between parents and their children is limited and in instances where parents have attempted to talk to their children about sexual and reproductive health issues, it has been authoritative, parents have used fear tactics and adolescents have said they give wrong information. The paper uses participatory methods to contextualize the experiences of parent-child sexuality communication in rural-SW Uganda.

The objective of the study was to explore the experiences of the community with parent-child communication in rural south-western Uganda. Data was collected in Mbarara district in the six villages of Rwebishekye parish. It was a community based participatory designed study with stakeholder engagement meetings, interviews with parents, timeline activities with emerging adults and Venn diagram activities with very young adolescents. 43 interviews were carried out; 115 interviews with parents, 12 retrospective interviews with emerging adults (18-25), and 2 Venn diagram activities with very young adolescents (10-14). Results indicated that there was a general lack of sexuality communication between parents and their children. The nature of communication for those who communicate was very authoritative and event triggered. Fathers preferred to talk to boys and mothers to girls.

There is therefore need for parent-child sexuality communication in the community and researchers need to be creative and interactive while designing interventions because talking about sexuality between parents and their children.

Key words: *communication, parent-child sexuality sexual reproductive health*

Fluoride Contamination in Ndali-Kasenda Crater Lakes in Albertine Graben, Uganda: Assessment using multivariate statistics and human health risk

Walter Ojok *^{1,2}, William Wanasolo⁴, John Wasswa³, James Bolender⁵, Emmanuel Ntambi¹

1. Department of Chemistry, Faculty of Science, Mbarara University of Science and Technology, Uganda

2. Department of Chemistry, Faculty of Science, Muni University, Arua, Uganda

3. Department of Chemistry, College of Natural Sciences, Makerere University, Kampala, Uganda

4. Department of Chemistry, Faculty of Science, Kyambogo University, Kampala-Uganda

5. Department of Chemistry and Biochemistry, University of San Diego, San Diego, CA 92110

*Corresponding author: w.ojok@muni.ac.ug

Abstract

Ndali- Kasenda crater lakes serve as important water sources in Ndali-Kasenda but pose potential health risks due to occurrence of high fluoride levels in them. Hydrogeochemistry of the lakes was studied using USEPA protocols with concentration of fluoride (2.69 mg/L), pH, Ca²⁺, Fe²⁺, Mn²⁺ exceeding the WHO regulatory limits in drinking water with strong positive correlation between F⁻ and TDS; F⁻ and pH; F⁻ and EC; F⁻ and HCO₃⁻. Hydrogeochemical signature of the lakes are Ca-HCO₃ type and Na-K-HCO₃ type due to rock water interaction. Principal component analysis (PCA) produced six principal components explaining 88.6 % of the total variance representing primary processes controlling lake hydrogeochemistry like weathering of rocks, ion exchange and evaporation processes. Hazard quotient (HQ) for non-carcinogenic health risks from exposure to Ndali- Kasenda fluoride levels via ingestion revealed that HQ for infants surpassed the acceptable HQ limit for all the lakes studied, while 86.67% of the sampled lakes exceeded the HQ value of children via ingestion. Based on the hydrogeochemical parameters analysed, L. Murigamire and L.Wankenzi, water from the other studied lakes are chemically not acceptable for drinking purposes. An urgent need to take ameliorative action of defluoridation of the crater lake water was recommended.

Key words: *Albertine Graben, fluoride contamination, health risks, hydrogeochemistry, Ndali-Kasenda,*

Perceived contextual and Psychological factors influencing Open Defecation free status behaviour in Kabale: deductive content analysis

Moses Ntaro

Department of Community health, Mbarara university of Science and Technology

Corresponding author: mntaro@must.ac.ug

Abstract

Worldwide, 946 million people practice open defecation. In sub-Saharan Africa, it is estimated that 35% of the rural households practice open defecation. Ensuring an Open Defecation Free (ODF) environment results into improved child health. Open Defecation Free status refers to a state in which there is elimination of faecal oral transmission by having no faeces scattered in the open, faeces in latrines is confined with fly proof device and no faeces in the hands (that is to say hands are washed with water and soap or ash after defecation). Unfortunately, all the aspects of an ODF status at household or community levels are sometimes lacking. For example, increase in latrine access is not always proportionate to consistent use since there is evidence that individuals who have access to latrines do not use them all the time. Therefore, understanding factors influencing ODF status in different settings is crucial in designing context public health interventions to end open defecation. This study was a qualitative and a deductive content analysis approach was used. It employed Focus Group Discussions (FGDs) and Key Informant Interviews (KIIs) as data collection methods; of which 7 were FGDs and 3 KIIs. Using a categorization matrix derived from the RANAS-model which is comprised of contextual and psychological factors, the contextual factors influencing the Open Defecation Free status behavior included land fragmentation, income levels, ash use, theft of ODF components, gender roles, weak enforcement of byelaws, hilly terrain, water logged soils, water access, children sanitation options, individual awareness about ODF components and alcohol use. The psychological factors included perceived health risk for typhoid disease, low perceived severity for lack of ODF components, positive attitude related to health and economic benefits, negative attitude of less value attached to ODF components and time wastage practicing ODF status behaviour, and ODF components perceived as for more educated persons. Additionally, perception that ODF components were doable and knowledge to put in place ODF components was high were some additional factors although capability to maintain ODF was low when it came to replacement of ODF component if stolen or destroyed. Open Defecation Free status was influenced by contextual and psychological factors as theorized by Mosler in the RANAS-model factors. However, these identified factors in this study are settings-specific and cannot be generalized to all settings.

Key words: *behaviour, contextual & psychological factors, open defecation, Kabale*

Knowledge, attitude and behaviour towards the use of insecticide treated mosquito nets among pregnant women and children in rural areas of Isingiro district, Uganda

Kakuru Isaac.

Mbarara University of Science and Technology

Corresponding author: kakurunashwel32@gmail.com

Abstract

The burden of malaria in Uganda remains unacceptably high, especially among children and pregnant women. To prevent malaria related complications, household possession and use of Insecticide Treated mosquito Nets (ITNs) has become a common practice in the country. Despite the availability of ITNs, malaria remains a foremost public health concern in Uganda. We sought to explore knowledge, attitude, and behaviour towards the use of ITNs as a nightly malaria prevention strategy among pregnant women and children under five years of age in Isingiro district, Southwestern Uganda. This was a community based, descriptive cross-sectional study, in which households with children under 5 years, and/or pregnant women were enrolled. We used a structured questionnaire to collect data on participants' understanding of the causes, signs and symptoms of malaria; use of ITNs to prevent malaria; attitudes and behaviours towards the use of ITNs. We also conducted key informant interviews (KIIs) to get in-depth understanding of responses from the participants. We analysed quantitative data using STATA version 12. Qualitative findings from the KIIs were transcribed and translated, and manually analysed using thematic content analysis. Of the 369 households enrolled, 98.4% (N=363) households had children under five. Most participants (41.2%, N=152) were in the 21–30 age category (mean age; 32.2 years). 98.1% (N=362) of the respondents considered ITNs a key malaria prevention strategy. The ITN possession rate was 84.0% (N=310), of these, 66.1% (N=205) consistently used them. 39% of the respondents did not have a positive attitude towards ITNs. Although 84.0% of the respondents possessed ITNs, many were not consistently using them. To this, there is a need to engage all stakeholders (including cultural leaders, community health workers, religious leaders and the government) in the malaria prevention campaigns using ITNs through: a) government's concerted effort to ensure universal access of right fit ITNs, b) end-user directed health education to emphasize positive attributes of ITN use, c) telling the ITN success stories to improve on the usage.

Key words: *insecticide treated mosquito nets, usage, pregnant women, children, Isingiro*

Communication about Sexual and Reproductive Health between parent adolescent dyads in Rural Southwestern Uganda: Does gender matter?

Elizabeth Kemigisha¹, Cecilia Akankwasa¹, Dorcus Achen¹, Wendo Mlahagwa¹, Gad N Ruzaaza², Godfrey Rukundo², Viola N Nyakato¹ and Kristien Michiels³

¹Faculty of Interdisciplinary studies, Mbarara University of Science and Technology

²Faculty of Medicine, Mbarara University of Science and Technology

³Ghent University

Corresponding author: ekemigisha@must.ac.ug

Abstract

The overall objective of the study was to analyze gender dimension in parent adolescent sexual and reproductive health communication. This was part of baseline evaluation for a study aimed to evaluate the effectiveness of a community-based intervention in improving

parent adolescent sexual and reproductive health (SRH) communication. We interviewed parent/caregiver and very young adolescents (VYAs) aged 10 to 14 years from randomly selected households in Rwebishekye parish. A total of 218 caregiver adolescent dyads were enrolled in study between January and Feb 2020. The mean age was 44.8 years vs 11.9 years for caregivers and VYAs respectively. Female participants were majority (75% among caregivers and 57% among VYAs). Overall, 90.8% of caregivers' vs 61.9% VYAs reported to have discussed at least one SRH topic. Gender specific talks on either menstruation (females) or wet dreams (boys) occurred less frequently among boys (3.2%) compared to girls (34.4%). More female caregivers and female VYAs reported having discussed any of the SRH topics. Pregnancy prevention was discussed by more female caretakers (19.6% vs 3.8%) and mainly to female adolescents compared to males (15.2% vs 4.3%) and this gender difference among caretakers and VYAs was statistically significant. Topics such as condoms, wet dreams were least discussed. HIV/STI discussions were most frequently discussed topics followed by handling sexual pressure and sexual violence. Gender is an important fact in parent-child communication, female specific topics are more talked about with their female parents than their counterpart dyads.

Key words: *Gender, Young adolescents, Caregivers, Sexual and Reproductive health, Communication*

Supporting *artemisia annua* farmers to produce quality raw materials for the synthesis of medicines: Kasese, Kabale and Fort Portal

Patricia Wagana

Mbarara University of Science and Technology

Corresponding author: pwagana@must.ac.ug

Abstract

The plant *Artemisia annua* produces the raw material needed by the pharmaceutical industry for the synthesis and production of artemisinin-based drugs. In Uganda, the farmers that cultivate this crop need support at different levels, to be able to meet the demand from local consumers and industry. This work was to assess the farmer practices used in developing an able environment of growth for the seedlings, and quality crop harvest. This work was based on the theory of totipotency in plant tissues in optimizing quality seed and seedlings, as well as farmer practices in their geographical location. The methodological approach included surveys and focused group discussions with stakeholders. The results indicated that a lot of improvement in practice of handling and harvest of the crop over the past three years, but a need for understanding the scientific process especially in the verification of the product (*Artemisia annua* harvest), the quality content in the final product, and how to help with other emerging health concerns like Covid-19 was still required.

Key words: *Artemisia annua*, handling practices, totipotency,

Sexual and reproductive health during COVID-19 in Uganda

Elizabeth Kemigisha and Viola N Nyakato

Faculty of Interdisciplinary studies Mbarara University of Science and Technology

Abstract

The overall goal of this global study is to better understand sexual and reproductive health among adults during COVID-19 using an online convenience sample from 23 countries. We conducted a cross sectional online survey among eligible participants in Uganda who were 18 years and above and consented to participate. Email invitations were circulated using list servers from institutions, organizations and WhatsApp groups. A total of 206 participants were enrolled between September and December 2020. Of these 51% were female, 49% were male. The mean age was 33.8 years (SD 10.2) majority were from the urban area (85%). During the Covid 19 epidemic 62% reported worsening economic status of which 9.2% lost jobs. Access to SRH was affected whereby 11.7% could not access condoms and 16% had limited access to HIV/STI tests. At least 14% participants reported more tension in family relations during Covid 19 lockdown. There was slight increase in two of three aspects of SGBV: Physical violence (2.4% vs 3.4%) Sexual violence (4.3 vs 5.3%) but moderate decrease in emotional violence (17% vs 13.6%). Covid 19 restriction measures had a negative impact on sexual health and wellbeing of participants with worsening socioeconomic conditions, reduced access to SRH services, increased family tension and sexual and gender-based violence. Future public health measures should be more inclusive to cater to economic and sexual and reproductive health of the population.

Key words: *Adults, COVID 19, Sexual and reproductive health, Online survey*

Total polyphenols and antihyperglycemic activity of aqueous fruits extract of *Abelmoschus esculentus*: Modeling and optimization of extraction conditions

Emanuel L. Peter^{1*}, Prakash B. Nagendrappa², Clement Olusoji Ajayi³, Crispin D. Sesazi⁴

¹*Department of Pharmacy, Faculty of Medicine, Mbarara University of Science and Technology, Uganda*

²*Centre for Local Health Traditions & Policy, The University of Trans-Disciplinary Health Sciences and Technology (TDU), Bengaluru, India*

³*Department of Pharmacy, Faculty of Medicine, Mbarara University of Science and Technology, Uganda*

⁴*Department of Pharmaceutical Sciences, Faculty of Medicine, Mbarara University of Science and Technology, Mbarara, Uganda*

*Corresponding and presenting author: epeter@std.must.ac.ug/ epeterlyimo@gmail.com

Abstract

Aqueous fruits extract of *Abelmoschus esculentus* (L.) Moench (Malvaceae) has been used traditionally in several communities to alleviate elevated blood glucose levels. However, optimized extraction conditions have not been reported. Thus, this study determined the optimal extraction conditions for extracting polyphenols from *A. esculentus* fruits and

evaluated antihyperglycemic activity *in vivo*. Extraction time, temperature, and solid-to-solvent ratio were optimized using Response Surface Methodology (RSM). Folin-Ciocalteu method quantified total polyphenols. The antihyperglycemic activity was determined in a high-fat diet-Streptozotocin rat model. The rats were assigned to five groups (n = 6): Group 1 and 2 were normal and diabetic control received distilled water 1 mL/100g; Treatment group 3 and 4 received standardized *A. esculentus* fruit extract (AEFE) at a dose of 100 and 200 mg/kg, respectively; Group 5 received 5 mg/kg glibenclamide for 14 days. Measurements of fasting plasma glucose (FPG) and body weight were done weekly. The results indicated that the RSM quadratic model predicted total polyphenols of 22.16 mg GAE/g DW. At optimal conditions of a solid-to-solvent ratio of 5%, extraction time 1 h, and extraction temperature of 70°C, confirmation experiments yield 20.2 [95% CI; 16.7 to 27.6] mg GAE/g DW, implying the model successfully predicted total polyphenols. Compared with diabetic control, the standardized AEFE reduced FPG level dose-dependently ($P < 0.001$) with an EC50 of 141.4 mg/kg. Together, at optimal extraction conditions, extract with a high content of total polyphenols and good antihyperglycemic activity can be obtained.

Key words: *Abelmoschus esculentus*, diabetes mellitus, optimization, phenol, preclinical

Exploring the Genetic Diversity of Jackfruit (*Artocarpus heterophyllus* Lam.) grown in Uganda based on SSR markers

¹Justine Nakintu, ^{1,2}Christian Albrecht, ³Christina M. Müller, ¹Grace Kagoro-Rugunda, ⁴Morgan Andama, ¹Eunice A. Olet, ¹Julius B. Lejju. and ³Birgit Gemeinholzer

¹Department of Biology, Mbarara University of Science and Technology, Mbarara, Uganda

²Animal Ecology and Systematics, Justus Liebig University, Heinrich-Buff-Ring 26-32(IFZ), 35392 Giessen, Germany

³Systematic Botany, Justus Liebig University Giessen, Heinrich-Buff-Ring 38, 35392 Giessen, Germany

⁴ Department of Biology, Muni University, Arua, Uganda

Corresponding author: jnakintu@must.ac.ug

Abstract

Artocarpus heterophyllus is an economically important tree crop that is widely cultivated in Uganda for its fruit. Despite its economic importance, little is known about the genetic diversity of jackfruit in the country. This puts the crop's genetic resource at risk as farmers selectively grow varieties based on market demand. The study analyzed the genetic diversity of *A. heterophyllus* trees from 12 districts belonging to three agro-ecological zones and three political regions of Uganda. Ten SSR loci were used to assess the genetic relationship among 200 trees, 197 from Uganda and 3 out-group individuals. All SSR loci were polymorphic with an average of 10.9 alleles per locus. STRUCTURE analysis proposed two genetic clusters: Cluster 1 was composed of samples from Eastern and neighboring Central districts, and Cluster 2 which constituted out-groups and samples from Western and neighboring Central districts. Results of STRUCTURE analysis were confirmed by PCoA. Mbarara District exhibited the highest genetic diversity ($He = 0.79$, $I = 1.71$), while Kamuli ($He = 0.61$, $I = 1.08$ and Pallisa ($He = 0.59$, $I = 1.12$) displayed the lowest genetic diversity

despite high abundances of jackfruit trees. Molecular variation was higher within populations than among populations. Moderate and significant genetic differentiation was registered among geographical zones, while varietal differences displayed little insignificant genetic differentiation. Soft and white pulped varieties, considered inferior on the market, harbored private alleles which may be genetically valuable resources. Therefore, sustainable utilization and conservation efforts of the jackfruit genetic resource should consider preserving inferior varieties for future crop improvement.

Key words *Crop improvement. Conservation. Genetic resource. Microsatellites.*

A mathematical model of solid waste accumulation and treatment with a varying human population size.

Isaac Rukundo and Pius Ariho

Department of Mathematics, Mbarara University of Science and Technology.

Corresponding author: rukundo17@gmail.com

Abstract

Solid waste management has continued to be an increasing challenge worldwide and the situation has become worse in urban areas of developing countries. The rapid urban population growth mainly due to high immigration and birth rates has led to large amounts of solid waste, making it difficult for authorities to effectively manage the accumulated waste. In this study, a mathematical model of solid waste accumulation with a varying human population size is developed and analysed. We consider solid waste of two categories: biodegradable and non-biodegradable, and incorporate parameters for human immigration and solid waste recycling. The existence of equilibrium points is established and their stability analysed. Numerical simulations are done using MATLAB ode45 and Maple to illustrate the analytical results. The results show that solid waste increases with increasing human population and thus it becomes difficult to attain a solid waste free environment. However, sensitivity analysis suggests that controlling population growth patterns, increasing biodegradability of solid waste coupled with aiding solid waste decay and solid waste recycling would lead to an almost solid waste free environment.

Key words: *Biodegradability; Population growth; Recycling; Solid waste.*

COVID-19 Pandemic Management Strategies and Implementation of Educational Programmes in Tororo District, Uganda

Emmanuel James Oketcho¹, Dennis Zami Atibuni^{1*}

¹*Department of Education, Faculty of Science and Education, Busitema University, Tororo*

**Corresponding Author: zamidennis79gmail.com*

Abstract

The various responses by different governments to control the spread of COVID-19 were enforced with little regard, if any, to the future impacts on the implementation of

educational programmes. In this study, we investigated the extent to which the management strategies intended to curb the spread of the deadly virus impacted on the implementation of educational programmes in Tororo District, Uganda. The objectives of the study included (a) to determine the levels of implementation of education programmes in Uganda during the Covid-19 lockdown, (b) to determine the extent to which COVID-19 pandemic management strategies were effective in preventing COVID-19 spread in Uganda, and (c) to explore other factors other than COVID-19 pandemic management strategies that affected the implementation of education programmes in Tororo District, Uganda. These were measured using the Ministry of Health guidelines among a simple random sample of 202 teacher participants in a National Curriculum Development Centre “Competence Based Curriculum” workshop. The results indicated low to high levels of effectiveness of the pandemic management strategies, generally low mean level of implementation of the educational programmes, and hence a constraining effect of the COVID-19 management strategies on the level of implementation of the educational programmes. Other factors that affect education programmes and strategies to mitigate them were also identified. Implications for policy and practice were discussed.

Key words: COVID-19, Pandemic, Management, Strategy, Educational Programme

An Empirical Investigation of Forks as Variants in npm

John Businge

Mbarara University of Science and Technology

Abstract

Software developers often need to create variants to accommodate different customer segments. These variants have a common code base but also comprise variant-specific code. A common strategy to create a variant is to clone & own (or fork) an existing repository and then adapt it to the new requirements. This form of reuse has been enhanced with the advent of social-coding platforms such as GitHub, and package distribution platforms like npm. GitHub offers facilities for forking, pull requests, and cross-project traceability. npm offers facilities for managing package release dependencies and dependents on the distribution platform. Little is known about the maintenance practices of the variants. We therefore performed an exploratory investigation on the evolution of variants, focusing on their technical aspects. We collected variants from the JavaScript ecosystem, whose sources are hosted on GitHub, and whose packages are released on npm. We have identified a total 12,813 variant forks from the JavaScript ecosystem. In general, we observed that mainlines have more number of package releases, package dependencies, dependent packages and dependent projects compared to their variant counterparts. However, it is still interesting that some variants have quite a considerable number of package releases and dependent packages/projects; in some cases, even more than their mainline counterparts.

Key words: Forks, JavaScript ecosystem, npm, Variants

The Effect of Problem-Based Learning (PBL) Instruction on Secondary School Physics Students' Conceptual Knowledge of Electromagnetic Waves

Stella Teddy Kanyesigye¹, Jean Uwamahoro², Imelda Kemeza³

^{1,2}African Centre of Excellence for Innovative Teaching and Learning Mathematics and Science (ACEITLMS), University of Rwanda, College of Education

³Department of Educational psychology, Mbarara University of Science and Technology, Mbarara, Uganda,

Corresponding author: kanyesigyestella@gmail.com

Abstract

Secondary School Science curricula includes the understanding of scientific knowledge and how it is developed and used. However, Uganda National Examination Board reportd (2016; 2017) reports have indicated lack of this understanding majorly among physics students pointing out poor performance and tendency of students to dodge mostly questions on waves. They associate this problem with teachers' failure to employ methodologies that actively involve students resulting into low enrolment among future related careers. This study aimed at analyzing the effect of Problem-Based Learning (PBL) instruction on physics students' conceptual understanding of electromagnetic waves among secondary schools in Mitooma district-South Western Uganda. A quasi-experimental, nonequivalent pretest-posttest control group design was employed in this study involving 419 participants. Descriptive statistics, paired and independent samples tests were used in data analysis. Findings from the study indicated that PBL did improve significantly students' conceptual understanding more than traditional methods with those exposed to both pre-test and post-test scoring significantly more than those exposed only to the posttest. However, students still exhibited difficulties with some concepts of electromagnetic waves. We recommend that schools supplement book libraries with internet connected computers to help students visualize the nature of electromagnetic waves to enhance their conceptual understanding.

Key words: *conceptual knowledge, electromagnetic waves, physics' students, Problem-Based Learning.*

Eigenvalue estimates for magnetic Schrödinger operators in a waveguide

Ben Sorowen^{1,2} and Martin Karuhanga¹

¹Department of mathematics, Mbarara University of Science and Technology, p. o box 1410, Mbarara, Uganda

²Department of mathematics, kyambogo university, Kampala, Uganda

Corresponding author: sorowenben@kyu.ac.ug

Abstract

The study of quantum waveguides has attracted much interest in the recent years largely because of their physical importance. They represent many important applications in nano physical devices as well as flat electromagnetic waveguides. Several interesting results on the spectral properties of these quantities have been obtained, including results on the existence of eigenvalues below the essential spectrum. Some of these results largely depend on the geometry of the waveguide and the conditions imposed at the boundary. In the

present work, we present an upper estimate for the number of negative eigenvalues below the essential spectrum for the magnetic Schrödinger operator with Aharonov-Bohm magnetic field in a strip. The estimate is obtained by reducing the operator to a family of self-adjoint Sturm Liouville operators whose estimates for the number of negative eigenvalues below the essential spectrum are given by the well-known Bergman type estimates.

Key words: *Negative eigenvalues, magnetic Schrödinger operator, strip*

Disturbance, climate change and distribution of tree species along an elevation gradient: implications for resource availability to local communities

Dennis Babaasa, PhD

Institute of Tropical Forest Conservation, Mbarara University of Science and Technology, Uganda

Corresponding author: dbabaasa@itfc.org

Abstract

Tropical montane forests face threats from deforestation, fragmentation and degradation and are likely to encounter further challenges from impending climate changes including biodiversity loss, shifts in species elevation ranges, community reshuffling or forest death. These changes are likely to affect the livelihoods of human communities that are dependent on forest resources. As a baseline for monitoring the impacts of climate change, we mapped the vegetation communities of Bwindi Impenetrable National Park, SW Uganda, based on tree species data from randomly placed transects and mapped biophysical parameters. The results show the trees species can be clustered in six groups. Though, statistically different in tree species composition, the groups have many tree species in common, meaning that the changes in trees species composition across the forest are gradual and transitional. Elevation was the main factor determining tree species composition and distribution. However, the effects of human disturbance in the past are superimposed on the differences caused by topography to form a mosaic of vegetation types at different stages of succession, patchily distributed trees species and size classes as a result of reduced competition. The implications of this in view of impending climate change and resource availability to the local communities are discussed.

Key words: *Bwindi Impenetrable National Park, climate change, Disturbance, tree species, elevation, local communities*

Displacement without placement: voices and experience of Batwa Indigenous People living in south-western Uganda

¹Viola N. Nyakato, ¹Rogers Bariyo, ¹Elizabeth Kemigisha, ³Robert Bitariho, ¹Hannington J Odongo and ²Gad N Ruzaaza

¹Faculty of Interdisciplinary studies, Mbarara University of Science and Technology

²Department of community health, Mbarara University of Science and Technology, Mbarara

³Institute of Tropical Forest conservation (ITFC), Mbarara University of Science and Technology, Uganda

Corresponding author: vnyakato@must.ac.ug

Abstract

The Batwa are an indigenous group of people who originally lived in the forests in the south and western parts of Uganda. In the early 1990's a group of Batwa were evicted from the forest lands to pave way for conservation. Between July and December 2020, a Community Based Participatory Research (CBPR) design was used to conduct a study on the Livelihoods of the Batwa, an indigenous group of people who live in Kanungu, Kisoro and Rubanda districts. Majority of the Batwa 322 (67.6%) had lived and originated from the forests. Some participants, 30.5%, still went to the forests for Spiritual (30.5%) and medication (45.8%) purpose. Majority of the Batwa have experienced ethnic-related discrimination and exclusion. At least 40% do not own any land. Marginalization of the Batwa manifests and is experienced at all levels from the topmost government level up to the lower levels in the community. There is a wide disparity in the standard of living between the Batwa and the other members of the community. Development programs designed to alleviate poverty hardly reach the Batwa. The government support is viewed as selective. The displacement of the Batwa from the forests affected their cultural identity and survival mechanisms. Coupled with discrimination, marginalization, lack of land ownership and inadequate access to social, economic, and political opportunity and services, most Batwa live a destitute life. The Batwa desire hunting, medicinal plants, religious rituals from the forests that cannot be simply erased even after three decades.

Key words: *Batwa, Forest, displacement, south-western Uganda*

Societal stimuli of Social Governance: Understanding pluralistic Agricultural Extension Services in Northern Uganda

Hannington J Odongo, Adrian Mwesigye, Alfonse Opiyo and Rogers Bariyo

Mbarara University of Science and Technology

Corresponding author: odonqojawoko@gmail.com

Abstract

Pluralistic agricultural extension service models are designed to increase smallholder farmer's voice in agricultural planning in order to realize agricultural development goals at the local level. This paper presents an analysis of smallholder farmer's perceptions of pluralistic agricultural extension service and its effects on social governance practices in local planning in northern Uganda. Utilizing a multinomial logistic regression model, this paper aims at testing the hypothesis; the quality of pluralistic agriculture extension service affects social governance of local government planning and budgeting process. The results showed that adequate, good quality and reliable input supply, effective communication and coordination and monitoring and evaluation of extension services improves social governance practices. In contrast results also showed that inadequate input supply, ineffective training and demonstration and incompetent extension agents reduces social governance practices in local planning and budgeting process. Improvement of the design of pluralistic agricultural extension service models by integrating aspects of quality, quantity and timing of input supply; having training and demonstration that meet technology needs and requirements, enable effective farmer learning, are affordable, acceptable and sustainable and having extension agents with the right knowledge, skills and attitudes may increase power relations in and legitimacy of local planning and budgeting process.

Key words: *Agricultural Extension Services, Governance, Northern Uganda, smallholder farmers*

The Human-Wildlife Conflict Interventions and their Effect on Wildlife Conservation in the Mikeno Sector of Virunga National Park, D.R. Congo

Minani S. Abel^{1,2}, Medard Twinamatsiko², Ronald Twongyirwe²

¹*Goma Volcano Observatory (D.R. Congo)*

²*Faculty of Interdisciplinary Studies, Mbarara University of Science and Technology*

Corresponding author : abelminani13@gmail.com

Abstract

Despite the interventions applied to secure the wildlife and the local residents in the Mikeno Sector of Virunga National Park, poaching, crop raiding and other Human-Wildlife Conflicts (HWC) are still widespread. This study was conceived to assess the current spatial distribution of the Human Wildlife Conflicts interventions, the ways of their implementation and their effect as perceived by local people. Documentary review, key informant interviews observations and field surveys helped to collect qualitative and quantitative data. Atlas ti7 software and SPSS version 22 helped for qualitative and quantitative data analysis respectively. Results revealed a significant difference of perceptions among respondents over the effect of the HWC interventions across their groups of origin. The Stone walls failed to stop the forest dwelling animals and was then reinforced by the electric fence. The Gorilla Monitoring Response Team failed due to lack of maintenance and the electric fence was unevenly distributed across the Park boundaries. Thus, poor maintenance and negative

perceptions could explain the persistence of the Human-Wildlife Conflict in the Mikeno Sector. The study recommended a combination of interventions, a strong platform of stakeholders, planting of non-palatable plants around the Park, early warning systems, crop raiding compensation and revenue sharing.

Key words: *Conservation, Human-Wildlife-Conflict, Interventions, Wildlife*

Biodiversity Conservation and Involvement of Indigenous People: A case of Batwa of Mikeno Sector around Virunga National Park, D.R. Congo

^{1,2}Eliode Bakole, ¹Medard Twinamatsiko and ¹Clementia Neema

¹Mbarara University of Science and Technology, Uganda

²Goma Volcano Observatory (OVG), D.R. Congo

Corresponding author: eliode2014@gmail.com

Abstract

This study examined Biodiversity Conservation and Involvement of Indigenous Batwa of the Mikeno sector of the Virunga National Park, in D.R. Congo. Despite efforts to conserve biodiversity, there has been a decrease of species in the ViNP and little attention is paid to involve local communities including indigenous people. These communities express concerns over their lack of participation in the nomination, declaration, and management of world heritage sites. The study used a mixed-method approach in which descriptive and exploratory research designs were utilized. Results revealed that the ViNP benefit-sharing with Batwa is in terms of community projects. However, the Batwa are still living in poverty, their involvement in the benefit-sharing and access to jobs in the park are limited due to their low level of education. Participation in decision making process and implementation is ineffective. Their current socio-economic conditions do not motivate them to get fully involved in the biodiversity conservation efforts. They are still begging and picking leftovers in other people's gardens, they lack good livelihoods and income. The study recommends first to improve their level of education, implement the Batwa employment strategic plan, urgently approve and implement the ViNP management plan, implement a proposed park benefit-sharing scheme and a compensation plan.

Key words: *Biodiversity Conservation, Indigenous People, Involvement,*

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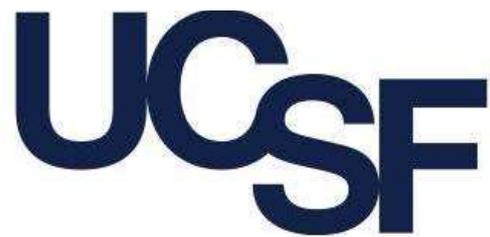
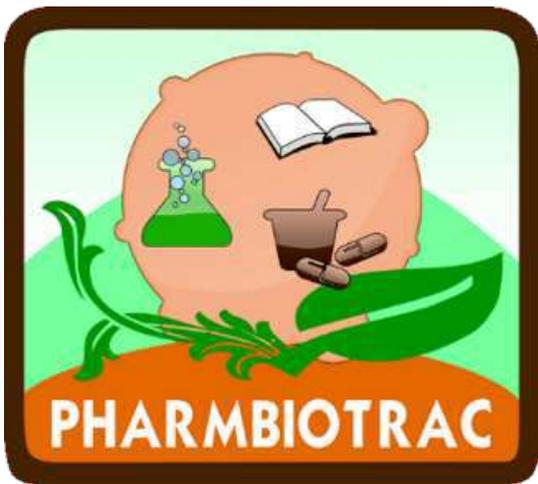
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MBARARA UNIVERSITY OF SCIENCE AND TECHNOLOGY
DIRECTORATE OF RESEARCH AND GRADUATE TRAINING
P.O.BOX 1410, MBARARA
WWW.MUST.AC.UG
DRGT@MUST.AC.UG