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Future Oncology

ISSN: 1479-6694 (Print) 1744-8301 (Online) Journal homepage: www.tandfonline.com/journals/ifon20

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To cite this article: Nicholas Matovu, Noleb Mugume Mugisha, Alfred Jatho & Charlene M McShane (2024) Colorectal cancer research priorities in Uganda: perspectives from local key experts and stakeholders, Future Oncology, 20:39, 3169-3177, DOI: 10.1080/14796694.2024.2416885

To link to this article: https://doi.org/10.1080/14796694.2024.2416885

Published online: 25 Oct 2024.

FUTURE ONCOLOGY
2024, VOL. 20, NO. 39, 3169–3177
https://doi.org/10.1080/14796694.2024.2416885

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WHITE PAPER

Colorectal cancer research priorities in Uganda: perspectives from local key experts and stakeholders

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ABSTRACT

The incidence of colorectal cancer (CRC) is increasing in Uganda but there is limited local research to guide policy and programming for CRC prevention and control. A stakeholder engagement workshop took place in Kampala on 19 March 2024 to identify challenges and opportunities for CRC prevention and control in Uganda. A total of 30 stakeholders with expertise in CRC primary and secondary prevention, diagnosis, treatment, palliative care as well as cancer survivors participated in the workshop. Key challenges for primary prevention included low knowledge/awareness of CRC among the general population and health workers, and rising prevalence of CRC related risk factors. Limited CRC screening, diagnostic facilities and specialists were identified as barriers to diagnosis. Treatment related challenges included limited accessibility to surgical services and drugs, late-stage presentation leading to poor treatment response, treatment abandonment and drug related toxicity. Lack of universal health coverage policies, limited community-based cancer awareness programs, and lack of national cancer registries were cited as policy and economics challenges. Opportunities to address these challenges were discussed. Our findings highlight areas for further research and prioritization to address Uganda's growing CRC burden and may be applicable to other low-resource settings.

ARTICLE HISTORY
Received 26 July 2024
Accepted 11 October 2024

KEYWORDS
cancer control; colorectal cancer; low-and-middle income countries; stakeholders' engagement workshop; Uganda

1. Background

Colorectal cancer (CRC) is the third most common cancer worldwide contributing about 2 million new cancer cases in 2022 [1]. While the overall incidence of CRC in Uganda is still relatively low [2], CRC ranks among the top eight most incident and fatal cancers within the country [1]. Recent studies conducted by members of the study team revealed a gradual increase in CRC incidence, particularly in men (unpublished). Furthermore, the 5-year relative survival rate for CRC in Uganda appears to be the lowest on the continent, at 5.6% [3]. Efforts by the Ugandan government to address the growing burden of cancer have been outlined within the draft Uganda National Cancer Control Plan (UNCCP), a strategic policy document aiming to control cancer in the country [4]. To date, efforts to address the growing cancer burden in Uganda have primarily focused on addressing highest-burden cancers such as cervical, prostate and breast cancers [5–8]. Primary prevention efforts focusing on the aforementioned cancer sites may provide indirect benefit to CRC prevention and control in terms of increasing awareness to signs, symptoms and related risk factors.

Currently, there is limited research in Uganda on CRC across the continuum of CRC control – primary prevention, early detection, diagnosis, treatment, palliative care, survivorship, surveillance, advocacy and policy. Robust studies addressing research gaps are needed to provide evidence for effective CRC control interventions in Uganda. In addition, it is important to develop targeted interventions and awareness campaigns to educate the population about CRC and promote prevention measures that are culturally appropriate, addressing local priorities and feasible to the social context and the low-income setting constraints.

As an initial step toward CRC prevention and control in Uganda, the Ugandan Cancer Institute (UCI) – the national institution responsible for cancer control in Uganda and a designated center of excellence for oncology in East Africa – in a collaborative engagement with Queen's University Belfast (QUB) in the United Kingdom organized a stakeholders' workshop on 19 March 2024 to discuss and document barriers and opportunities for CRC control with emphasis on primary and secondary prevention and treatment. The ideas generated in this meeting

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are anticipated to contribute to the development of a comprehensive research agenda for CRC in Uganda, with a possibility of a ripple effect to the rest of East Africa.

2. Materials & methods

A 1 day multidisciplinary stakeholder engagement workshop took place on 19 March 2024 at the UCI in Kampala. Stakeholders included cancer experts from civil society organizations under the umbrella of the Uganda Cancer Society, the UCI, tertiary hospitals and cancer survivors. Prior to the workshop, the study team identified leading experts in primary and secondary cancer prevention, diagnosis, treatment and palliative care, survivorship and policy. Experts were solicited from key institutions including academic/universities, public tertiary and regional referral hospitals/cancer centers and civil society organizations across all regions of Uganda. Experts spanned a wide range of specialities including medical oncologists, pharmacy oncologists, radiation oncologists, public health practitioners, gastrointestinal surgeons, medical researchers, oncology nurses and medical officers.

The workshop was divided into three parts including: presentations on the epidemiology and management of CRC, and findings from the recently conducted CRC research in Uganda; group discussions and plenary presentations, and way forward – agreeing on CRC research priorities in Uganda.

2.1. Presentations on the epidemiology of CRC in Uganda

Recognizing the spectrum of professional backgrounds represented in the room, the main aim of this session was to provide all participants with a working knowledge of the global and local burden of CRC, and to stimulate ideas in preparation for the group discussions in the next phase of the workshop.

Five presentations were delivered. Two experts from the UCI (AJ and NMM) made presentations on the current epidemiology and management of CRC in Uganda, respectively. This was followed by a presentation on recent CRC research in Uganda led by the team at QUB (NM and CMcS) in collaboration with UCI (NMM). This included an up-to-date profile of CRC incidence and survival from two population-based cancer registries (Kampala and Gulu) in Uganda; an overview of key findings from a qualitative study with key stakeholders identifying the barriers and opportunities of developing and implementing a CRC screening program in Uganda; and key highlights from a cross-sectional survey of the general public's knowledge and awareness of CRC signs and symptoms. To explore the patient's perspective, a patient undergoing treatment for CRC at the UCI shared a detailed account of their diagnosis and treatment experience.

2.2. Group discussions

In advance of the workshop, the study team based on their expertise and review of literature [9], identified topics (Table 1) relevant to establishing a research agenda for CRC. Group areas included: primary and secondary cancer prevention; diagnosis; treatment, palliative care and survivorship; economics and policy. Workshop participants were asked to self-select the group they wished to contribute to, based on their expertise and/or areas of interest. Group size varied with each group including about 5–8 members.

Each group had a nominated chairperson, who led the discussions in line with the two broad themes: current problems/challenges and possible opportunities. Flipchart paper and markers were provided for participants to write down their ideas. This material was retained and transcribed by the study team, in addition to the rapporteur note.

2.3. Plenary presentations

Each group provided an overview of their discussion points during the plenary where comments, questions and additional issues were raised and discussed by the wider audience. During the entire plenary presentations, the study team (CMcS, NM) acted as rapporteurs, writing down key points within the presentations made.

3. Results

A total of 30 stakeholders participated in the workshop, with an even distribution among sexes (female: n = 15; 50%). Most stakeholders were from the central region of Uganda (n = 24; 80%) and worked within a hospital setting including UCI (n = 21; 70%), Table 2. A summary of the key challenges and opportunities identified by stakeholders during group discussion follows and is presented in Tables 3–6.

3.1. Primary & secondary prevention

Key challenges relating to CRC prevention in Uganda include low population knowledge and awareness of CRC, limited training/specialist knowledge of CRC among health workers, limited screening capacity and rising prevalence of CRC risk factors (e.g., overweight/obesity, alcohol consumption, changing dietary habits and physical inactivity etc.). Conversely, stakeholders identified opportunities such as: utilizing district health educators to deliver CRC related information in the community, encouraging use of behavioral change interventions

Table 1. Discussion topics provided to stakeholders to assist in identification of challenges and opportunities for colorectal cancer control in Uganda during the workshop.

Primary Prevention	• Understanding etiology of CRC • Risk appraisal and exploring the biological mechanism e.g., exploring the microbiome-mediated mechanisms of oncogenesis and tumor suppression. • Behavioral trials: evidence-based interventions to promote and sustain healthy behavior change. • Novel biobehavioral interventions to assess mechanisms and identify new biomarkers to improve understanding of how lifestyle factors influence carcinogenesis and how this interplay may inform precision cancer prevention
Secondary prevention	• Evaluating the feasibility of the screening options in LMICs • Improving the current screening tests • Developing new early detection tests • Explore the best ways to use artificial intelligence/machine learning and next-generation technologies to aid in early detection
Diagnosis	• Health system strengthening, partnerships, equipment placements, and other collaborative mechanisms to improve access and sustain diagnostic devices across the country. • Application of computational approaches such as mathematical oncology using machine learning to reveal epigenetic patterns in cancers to provide insights into the cancer diagnosis, prognosis, and treatment
Treatment, palliative care and survivorship	• Developing new targets and new chemistry: new cancer drug targets, strategies to inhibit undruggable targets like Ras, including transcription factors. • Discovering opportunities for immunotherapy in LMICs: Exploring tumor heterogeneity, checkpoint inhibitor and addressing issues of immunotherapy treatment costs • Improving the detection and resolution of micro-metastasis • Investigating the psychosocial aspects of metastatic disease and how the interplay between social and biologic factors affects relapse and survival. • Improving the management of patients with metastases at diagnosis with consideration for physical, emotional, and financial factors
Economics & policy	• What are the best ways to implement existing evidence-based strategies to address access barriers? • What multilevel interventions underpin economic issues like healthcare costs and financial toxicity? • Incentivizing and testing interventions addressing the implications of health policy and cost–effectiveness issues?

LMICs: Low- and Middle- Income Countries.

Table 2. Characteristics of stakeholders who attended the workshop.

Parameter	Number (n)	Percentage (%)
Sex		
Male	15	50
Female	15	50
Region of operation		
Central	24	80
Western	3	10
Eastern	1	3.3
Northern	2	6.7
Institution		
Academic	3	10
Hospital	21	70
Civil society	3	10
Both academic and hospital	3	10

to promote healthier lifestyle behaviors and advancing health workers knowledge of CRC through continuous professional development (Table 3).

3.2. Diagnosis

Limited diagnostic capacity, both in terms of healthcare workforce and facilities (equipment, tests, reagents) was identified as a key challenge. To enhance diagnostic capacity, stakeholders proposed expanding the number of trained CRC specialists and improving existing infrastructure at the tertiary levels of the healthcare system. Research investigating the current capacity of the health system, including both human resources and equipment is warranted (Table 4).

3.3. Treatment

3.3.1. Surgical treatment

Late-stage presentation, limited information on tumor location, availability and accessibility to surgical services and equipment were identified as key challenges relating to surgical treatment. On the other hand, surgical camps (whereby surgical services are provided by volunteer surgical teams within the community) were presented as an opportunity to increase access. Training more surgical oncology specialists would allow for nationwide provision of services at different levels of the health system (Table 5a).

3.3.2. Palliative care

Under this theme, the high cost of stoma management supplies and the long-term treatment effects of CRC among both patients and survivors were identified as key challenges. To reduce costs, locally made stoma bags could be used. Counselling and education services for patients and survivors should include management of CRC treatment side effects (Table 5b).

3.3.3. Medical oncology

Poor response to treatment, treatment abandonment, limited scope and availability of drugs and drug related toxicity among patients and survivors were identified as key challenges by stakeholders. Suggested opportunities included: implementing interventions to increase access to CRC drugs, conducting local research to understand

Table 3. Broad field 1: Primary and secondary prevention.

Problems/Challenges identified	Opportunities identified
Low level of population awareness about CRC (risk factors and warning signs and symptoms, detection / testing options)	District health educators and village health teams can deliver key messages on CRC to the public if supported with the CRC factsheets and other information, education and communication (IEC) materials. The public should be sensitized on screening when such services are available in the regional or district health facilities / hospital.
Inadequate training for health workers and village health teams (VHTs) about CRC	Continuous Professional Development (CPD) and Continuous Medical Education (CME) sessions in health facilities as well as health education and promotion campaigns to improve awareness and knowledge on CRC.
High cost of media engagement	Availability of other information sharing platforms and avenues like IEC materials, social media, mass gatherings in church sessions, mosques, markets, schools etc.
Increasing prevalence of CRC risk factors	Existence of mass media like radio stations, television stations, social media platforms and mass gatherings such as churches, mosques, markets, schools etc. provide platforms for education and other interventions to increase awareness of CRC risk factors among the public.
Poor health/lifestyle practices like inadequate intake of fruits and vegetables, low physical activity levels etc.	Possibilities of lifestyle interventions to improve fruit and vegetable intake to reduce CRC risk. Possibilities of creating workplace physical activity schedules to improve physical activity among working "office based" populations.
Lack of enabling infrastructure (or spaces) for physical activity	During construction of new roads and renovation/improvement of old ones, walkways and cycling lanes can be constructed.
Increased availability and access to alcohol through social events	The alcohol control law should be amended to enhance reduction interventions.

Table 4. Broad Field 2: Diagnosis.

Problems/Challenges identified	Possible opportunities
Limited human resource capacity at primary healthcare level	Some capacity exists especially at higher level health facilities. Possibilities of nurse endoscopists to improve human resource capacity
Limited availability of CRC screening tests e.g., Feacal Occult Blood Test (FOBT), tumor maker tests (e.g., carcinoembryonic antigen), abdominal, pelvic or ultrasound scans and x-rays at lower-level health centers	Higher level facilities and some private facilities have some capacity to conduct CRC screening tests. Possibilities of higher-level facilities and private facilities improving accessibility and availability to CRC diagnostic tests for those with positive screening results. Possibilities of pilot studies to assess the diagnostic performance of the different CRC test e.g., stool based tests, colonoscopy, computed tomography (CT) scans
Limited diagnostic capacity e.g., pathology services for histological diagnosis	Higher level facilities and some private laboratories and hospitals have some capacity for these services. Health facility assessments can be done to ascertain current capacity for pathology services/immunohistochemistry/molecular tests at all levels of healthcare
Limited capacity to conduct the immunohistochemistry (C-Kit)	
Limited capability of molecular tests (*BRAC1*, *EGFR* etc.)	

Table 5. Broad field 3: Treatment, palliative care and survivorship.

Problems/Challenges identified	Possible opportunities
a Surgical treatment	
Late diagnosis of CRC cases	Possibilities of CRC awareness campaigns to promote early tumor detection.
Limited data on location of tumor in Ugandan CRC patients	Possibilities of training more specialists in surgical oncology, including oncology nurses, to improve capacity in surgical oncology.
Limited availability and accessibility of expertise in surgical oncology	Research is needed to understand tumor location among CRC patients in Uganda.
Limited availability of equipment	Creating partnerships with manufacturers to initiate subsidized equipment deals/placements. Possibilities of surgical camps to increase accessibility to surgical oncology in underserved populations.
b Palliative care	
High cost of stoma management supplies	Possibilities of making stoma bags locally for low-income patients who cannot sustain commercial stoma bags.
Long tern treatment effects of CRC among patients and survivors e.g. Impotence/sexual dysfunction, fistulas, infections at stoma site	Possibilities of having patient counselling services for infection prevention and control of other side effects from treatment
Pain and symptom control difficulties	
c Medical oncology	
Poor response to treatment, treatment abandonment and limited availability of drugs	Possibilities of improving accessibility and availability to CRC drugs and other treatment modalities such as chemo-radiation.
Access/uptake issues for chemo-radiation among rectal cancer patients	Planning and conducting more research on CRC tumor subtypes among Ugandan patients.
Limited data on CRC tumor subtypes	Planning research to further understand the burden of drug related toxicity.
Toxicity of 5-FU drug used in CRC treatment	
d Survivorship	
Long term treatment effects and follow-up	Possibilities of incorporating patient counselling to improve treatment acceptability and quality of life.
Worry for recurrence of CRC.	Patient education can be done regarding expected treatment side effects and their management.
Poor quality of life due to fear of cancer recurrence	

Table 6. Broad field 4: Economics and policy.

Problems/Challenges identified	Possible opportunities
Lack of Universal Health Coverage (UHC)/ Insurance schemes	There are ongoing efforts by the Ministry of Health to introduce universal health coverage. Planning pilot studies on public willingness to pay for CRC screening (stool-based tests and colonoscopy) Initiating subsidized fee colonoscopy services/programs Initiating manufacturer equipment placement programs for colonoscopy services at local tertiary hospitals to improve colonoscopy access.
Lack of local data on cost-effectiveness of various screening modalities for CRC	Pilot program can be designed to assess cost-effectiveness of the different CRC screening modalities such as stool based tests, colonoscopy, CT colonography etc.
Low involvement of leaders (political, cultural and religious) in cancer awareness programs at community level	Creating policies and programs enabling the engagement of community leaders in awareness campaigns.
Lack of national cancer registry or regional based cancer registries	Planning and advocating for national and regional cancer registries. Undertaking research on financial requirements of initialising and maintaining regional and national cancer registries

the burden of drug toxicity and possible reasons for treatment abandonment (Table 5c).

3.4. Economics & policy

With regards to the economy and policy, stakeholders identified the lack of universal health coverage policies to cover/reduce costs associated with CRC screening, diagnosis and management, limited community-based cancer awareness efforts, and lack of cancer registration at a national level as key challenges to addressing CRC burden in Uganda. Conversely stakeholders identified opportunities such as ongoing plans to introduce universal health coverage, the possibility of piloting subsidized fee colonoscopy programs, and initiating partnerships with equipment manufacturers to increase access to screening and diagnostic tests for CRC. Increasing engagement of local community leaders in CRC awareness efforts to increase participation rates, acceptability, awareness and attitudes toward screening in pilot programs was also suggested (Table 6).

4. Discussion

To our knowledge, this is the first multidisciplinary engagement workshop to have been conducted in Uganda focusing on CRC prevention and control. Stakeholders identified several challenges as well as opportunities relating to primary and secondary cancer prevention; diagnosis; treatment, palliative care and survivorship; and economics and policy. The findings of this report highlight areas for further research and prioritisation to address Uganda's growing CRC burden.

4.1. Primary & secondary prevention

Promoting knowledge of CRC at both the population and health system level is key to addressing early detection challenges. At a population level, awareness of signs and symptoms may lead to earlier presentation, while a higher level of suspicion among healthcare providers may lead to timelier referrals and diagnosis and ultimately improved patient outcomes. Cancer awareness campaigns, including CRC have been tested in some European [10], North American [11] and Asian countries [12] and proven effective in improving population-level awareness to CRC and cancer in general. Piloting a culturally tailored CRC awareness campaign to determine its effectiveness in Uganda will not only boost early detection efforts but also provide insights into implementation components necessary for success of such programs in the future. Furthermore, different media platforms have differing effectiveness regarding message uptake and reach among the public. During implementation of a CRC awareness campaign in Malaysia, Schliemann and colleagues found that television provided the widest reach for CRC messages (42.9%) compared with other media (40% for print media, 18.4% for radio announcement) [12]. Studies to understand the media platforms with greatest information reach during awareness campaigns are needed in Uganda. Stakeholders also identified limited knowledge/awareness of CRC among healthcare workers as a key challenge to addressing CRC burden in Uganda. This observation is consistent with a recent systematic review which reported knowledge deficits regarding CRC and screening among healthcare providers across several countries globally [13]; and further investigation among Ugandan healthcare providers is warranted, along with a review of the medical curriculum and/or continuing professional development courses provided locally.

Excessive alcohol consumption (≥30 g of ethanol per day i.e. approximately two drinks per day) is reported by the World Cancer Research Fund (WCRF) as having convincing evidence for increased CRC risk [14]. Moreover, engaging in moderate or vigorous physical activity has also been documented by the WCRF as having convincing evidence for reduced CRC risk [14]. Interventions increasing physical activity and those reducing alcohol consumption for CRC risk reduction were identified by stakeholders for further investigation. In Uganda, 44.6%

of adults (18–69 years) reported consuming alcohol in 2023, of which 15.2% reported being high end alcohol consumers (40–60 g per occasion) [15]. Physical inactivity, on the other hand, is still low in Uganda at 6.9% among the adult population according to the most recent STEPS survey [15]. However, this is likely to vary depending on occupation and geographic location e.g., rural vs urban setting. In the workshop, stakeholders highlighted the need for interventions to improve physical activities such as testing effectiveness of workplace physical activity interventions to reduce CRC risk. Interventions to improve workplace physical activity may be effective according to previous research, although evidence has been inconclusive to date [16]. Interventions addressing lifestyle factors should include nutritional advice, with local research finding 88.9% of adult Ugandans (18–69 years) consuming less than 5 servings of fruits and vegetables per day [15]. Probable evidence for a reduced risk of CRC has been reported for dietary fiber, which is found in fruits and vegetables [14]. Moreover, 24.4% of adult Ugandans are reported to be overweight or obese [15]. Adult body fatness has been associated with a convincing risk of CRC by the WCRF [14]. However, studies in some African settings demonstrate that being overweight/obese is perceived as a sign of affluence and happiness [17,18]. Therefore, interventions for weight loss to reduce CRC risk should be culturally sensitive and appropriate.

4.2. Diagnosis

A systematic review published in 2023 identified that limited endoscopic and human resource capacity are major barriers to CRC screening in Africa [19]. To improve CRC care, an audit of workforce/resource capacity is required at all levels of healthcare in Uganda to inform planning of future screening programs and current delivery of CRC services in general. Further, the quality of CRC care is also not known in Uganda. According to a retrospective review conducted at the Mulago National Referral hospital [20], staging data was missing for the majority (68.1%) of CRC patients. Given the scarcity of screening and diagnostic tools for CRC, additional research is needed to comprehend the gaps in screening, diagnosis and subsequent investigations are needed for determining the stage and grade of the tumors. Stakeholders also highlighted challenges regarding limited data available on CRC tumors in Uganda such as molecular profiles, tumor subsites and associated genetic mutations which are vital to informing the best treatment options. For example, CRC high on microsatellite instability appears to be more common in African populations [21] and has been shown to have distinct responsiveness toward chemotherapy compared with microsatellite stable CRC [22,23]. Particularly for Uganda, studies to assess molecular and genetic profiles of CRC are not yet available.

4.3. Treatment

4.3.1. Surgical treatment

Possibilities of utilizing surgical camps to improve accessibility of CRC treatment was identified by stakeholders. Surgical camps, a model of delivery where volunteer surgical teams offer surgical services to underserved or impoverished communities to improve access, are proving to be vital in advancing surgical treatment to underserved populations and have been successfully implemented in treatment of other surgical conditions in Africa [24]. However, the limited number of trained surgical specialists in CRC across Africa remains a key challenge to its success. Further research on the number of specialized lower gastrointestinal surgical oncologists across different levels of care in Uganda may prove vital, given the limited number of specialists in this field within low-income countries [25,26].

4.3.2. Treatment during palliative care

Stomas are lifesaving surgical procedures used in the treatment of several gastrointestinal conditions including CRC. Research conducted in Uganda reported poor quality of life and reduced social interactions among patients with stomas [27], however no research has focused on individuals who have specifically undergone colostomy. Interventions such as pre- and post-stoma counselling were suggested by stakeholders as potential ways to improve quality of life among stoma CRC survivors in Uganda.

4.3.3. Medical oncology

Understanding patient experiences on accessibility and availability of CRC treatment is vital in improving patient care. In a previous cross-sectional study, Nakaganda and colleagues reported on the various challenges experienced by cancer patients in Uganda, of which drug access issues were reported to result in delayed initiation of treatment [28]. Defaulting or late enrolment to treatment could result in tumor progression and reduced chances of survival [29]. Stakeholders highlighted challenges of defaulting and abandonment of CRC treatment (chemotherapy and radiation) and emphasized the need for local research to understand factors associated with such practices. Different treatment modalities are associated with different prognosis and survival outcomes among CRC patients [30]. Research is needed to guide choice of treatment in Uganda, given the poor 5-year

relative survival rates of those with the tumor at 5.6% [3]. Drug related toxicity and unfavorable patient experiences were also highlighted as key challenges and would benefit from further investigation.

4.4. Economics & policy

Given that Uganda has no national insurance program, most health services are paid out of pocket. Previous research across Africa identified limited financing by the governments as a strong barrier to introducing screening programs [19]. Should a CRC screening program be implemented in Uganda, it is likely that a user-fee will be required. Stakeholders highlighted the need for local research investigating population willingness to pay for CRC screening and diagnostic tests (i.e., stool based tests, colonoscopy and CT colonography) in the event of a positive stool test. In China, a partially participant paid colonoscopy program was effective and led to increased participation rates in CRC screening [31]. In addition, there were suggestions from stakeholders that having agreements with manufacturers to place screening equipment such as colonoscopes at major regional hospitals and cancer centers could increase access to such services at reduced costs. Gaps in evidence regarding the feasibilities and cost-effectiveness of such models to guide future CRC screening programs should be addressed. Studies exploring the cost–effectiveness of CRC screening methods i.e. stool-based tests, colonoscopy, and CT colonography, are also warranted in Uganda. In a Dutch screening program, screening using fecal immunochemical tests was the most cost-effective approach, saving the healthcare system 27 euros compared with guaiac fecal occult blood test and 72 euros compared with no screening [32]. Mortality after cancer surgery is highly dependent on availability of resources and key facilities at hospital level [33], however, there is yet to be evidence on the type and availability of facilities for CRC surgery at several cancer treatment centers in Uganda. Previous studies have shown that involvement of community leaders in community-based programs is vital to increasing uptake, awareness and attitudes toward participation in health related programs. For instance, in rural China and Malawi, engagement of local community leaders resulted in improved willingness to participate in breast and cervical cancer screening [34,35]. Similar opportunities exist within Uganda to engage local community leaders to promote CRC prevention.

5. Conclusion

This report summarizes key challenges and opportunities for CRC prevention and control in Uganda according to local key experts and stakeholders. Opportunities exist for research across the continuum of CRC prevention and control to help inform policy in Uganda to address the growing CRC burden.

Article highlights

- This report summarizes key challenges and opportunities for colorectal cancer (CRC) prevention and control in Uganda as identified by local experts and stakeholders during a stakeholder engagement workshop in Kampala, Uganda.
- At the primary prevention level, low knowledge and awareness of CRC among both the population and health workers, and rising prevalence of CRC related risk factors were identified as key challenges. Opportunities included: utilizing district health educators to deliver CRC related information in the community, encouraging use of behavioral change interventions to promote healthier lifestyle behaviors and advancing health workers knowledge of CRC through continuous professional development.
- For secondary prevention and diagnosis, limited diagnostic capacity, both in terms of healthcare workforce and facilities (equipment, tests, reagents) were identified as key challenges. Opportunities included: expanding the number of trained CRC specialists and improving existing infrastructure at the tertiary levels of the healthcare system.
- For treatment, limited accessibility to CRC surgical services and drugs, late-stage CRC presentation leading to poor treatment response, treatment abandonment and drug related toxicity were identified as key challenges. Opportunities included: designing and implementing interventions to increase access to CRC drugs, conducting local research to understand the burden of drug toxicity and possible reasons for treatment abandonment as well as studying the feasibility of surgical camps as avenues to improve CRC surgical treatment.
- For economics and policy, lack of universal health coverage policies to cover/reduce costs associated with CRC screening, diagnosis and management, limited community-based cancer awareness efforts and lack of cancer registration at a national level were identified as key challenges. Opportunities included: ongoing plans to introduce universal health coverage, the possibility of piloting subsidized fee colonoscopy programs, and initiating partnerships with equipment manufacturers to increase access to screening and diagnostic tests for CRC.
- Addressing the identified challenges may help inform policy and contribute to CRC prevention and control in Uganda.

Acknowledgments

The authors acknowledge the support from the Queen's University Belfast, the Uganda Cancer Institute, and the and all the participants who took their time to participate in the stakeholder's engagement workshop.

Author contributions

N Matovu: Conceptualization, coordination, writing and editing original draft of the manuscript. N Mugisha: Coordination, stakeholders' engagement and editing original draft of the manuscript. A Jatho: Coordination, stakeholders' engagement design, engagement content curation, stakeholders' engagement, review and editing original draft of the manuscript. C McShane: Conceptualization, coordination, supervision, editing and approval of the original draft of the manuscript.

Financial disclosure

This work was funded by the Department for Economy Northern Ireland, International Science Partnership Fund Official Development Assistance Institutional Support Grant administered through Queen's University Belfast. The authors have no other relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript apart from those disclosed.

Competing interests disclosure

The authors have no competing interests or relevant affiliations with any organization or entity with the subject matter or materials discussed in the manuscript. This includes employment, consultancies, honoraria, stock ownership or options, expert testimony, grants or patents received or pending, or royalties.

Writing disclosure

No writing assistance was utilized in the production of this manuscript.

Data availability statement

Authors declare that the required data is available within the manuscript.

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Papers of special note have been highlighted as: • of interest; •• of considerable interest

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