

## Assessment of knowledge, perception, attitude, risk factors prevention and treatment options of cancer among natives in Elgon sub-region, Uganda.

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### Abstract

**Background:** Globally, cancer is one of the leading causes of morbidity and mortality and most cancers are due to infections and so, are preventable. The Studies have shown that cancer prevention has been possible through intensified healthcare education but such information is poorly documented in Elgon sub-region. Therefore, our study was aimed at assessing cancer indigenous knowledge among natives in Elgon sub-region.

**Methods:** Mixed methods research design was adopted. A total of 73 participants, selected through snowball sampling technique were involved. Data collection was done through pretested questionnaires. MedCalc version, 20.008 was used for data analysis and results were presented in tables and figures.

**Results:** Majority of the study participants were males (58%), aged between 46-55 years (58%), Ugandans (90%) and married (67%). Most of them had inadequate knowledge about cancer ( $p < 0.05$ ) and highlighted sores that slightly heal at any body parts as well as blood in faeces as putative predictors of cancer infection ( $p < 0.005$ ). A total of nine cancer types were documented and cervical was the most prevalent ( $p < 0.0001$ ). Smoking was the most pronounced cancer associated risk factor ( $p < 0.0001$ ) and avoiding smoking was perceived as the major prevention option ( $p < 0.0001$ ). No cancer treatment options in cancer treatment cited in this area ( $p < 0.172$ ).

**Conclusion:** The natives had limited knowledge and poor perception of cancer due low literacy level. Therefore, there is need to intensify on cancer health education programs through the word of mouths and radio talk shows. The plant medicinal plant used in cancer treatment needs to be documented.

**Keywords:** Cancer indigenous knowledge, Medicinal plants, Signs and symptoms, Prevention interventions, Treatment option and Cancer conventional drugs.

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### Introduction

Cancer is one of the leading causes of deaths among the global population with 9.6 million deaths and every 1 in 6 deaths are due to cancer. About 70% of the documented cancer deaths occur in low and middle income countries including Uganda. The reports on cancer incidences and deaths in 2018 revealed an estimate of 752, 000 (4%, global burden) and 506, 000 respectively in Sub-Sahara Africa, peculiarly cervical, breast and prostate cancers. In related development, in 2018 GLOBOCAN reported 32617 cases and of which 21829 scumbled to deaths in

Uganda. Moreover, an earlier study conducted on the cancer incidences in Kampala for the previous two decades revealed a rapid rise in this deadly disease, particularly breast cancer in females and prostate cancer in males. The actual number of cancer cases and deaths in Elgon sub-region is difficult to establish due to lack of regional cancer registry. Therefore, under such circumstances under-estimation of this incidence cannot be ruled out. However, informal interviews with health workers at Mbale Regional Referral Hospital revealed an annual rise case of this deadly disease [1].

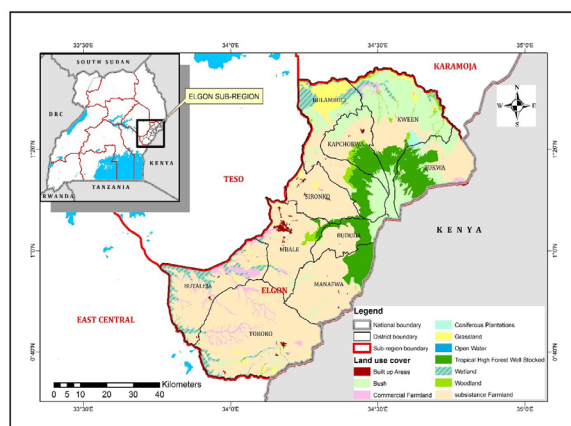
The rise in cancer incidences has been associated with risk associated activities like smoking, excessive body weight, genetic factors, familial polyposis, alcohol, low physical activity, ulcerative colitis and this has been worsened by adoption of western life styles. The studies have shown that adoption of western lifestyles amongst Uganda's population is on the rise and with this globalization phenomenon Sironko and Bulambuli districts may not be exceptional. It was also further highlighted that 50% of cancer disease could be preventable through understanding cancer risk associated factors and prevention interventions. Cancer healthcare education on basic knowledge and perception, comprehending risks associated and early detection have also been cited as some of the key cancer prevention strategies. However, studies on knowledge, perception, attitude, cancer associated risk factors, prevention and treatment options among natives in Sironko and Bulambuli are rare. Therefore, the current study is aimed at investigating knowledge, perception, attitude, cancer risks factors, prevention and treatment option among natives in Sironko and Bulambuli districts.

The previous studies had shown that good knowledge, proper perception and positive attitude of cancer and its associated risk associated behaviours were deterring factors to cancer prevalence among different communities all over the globe. However, such studies specifically on knowledge, perception, attitude, cancer associated risks factor, prevention and treatment options in Sironko and Bulambuli districts are rare and so is paramount to an investigation. Therefore, our study investigated knowledge, perception, attitude, cancer risk associated factors among local communities in Sironko and Bulambuli districts [2].

## Materials and Methods

### Study area

The study was carried out in Sironko and Bulambuli districts. These districts are located within the geographical coordinates of 1°17'N and 1°24'N and 34°15'E and 34°45'E respectively and lies at average elevation of 3996 ft Sironko and Bulambuli are 24.7 km and 55.4 km respectively from Mbale city and 275.9 km and 306.8 km respectively from Kampala, the Capital city of Uganda (Figure 1). The study was conducted from a total of eight peri-urban towns and trading centers in Sironko and Bulambuli districts. These included, Sironko, Budadiri, Buweli and Mutufu Town Councils in Sironko district and Bulambuli, Bulengenyi and Buyaga Town Councils and Zema Trading Centre in Bulambuli district. The area has total population of 1.12 million people representing 4.8% of the total Uganda's population. The total residential occupants in Sironko and Bulambuli are 242,422 and 174,508 respectively as per 2014 National Population and Housing Census. The main tribe is Bagisu who are mainly peasants, and it is the 7th largest ethnic group in Uganda [3].



**Figure 1.** Map of Elgon Region showing Locations of the Study Districts. The Map of Elgon Sub-region with Location of Different Districts

### Study design

The study was a cross-sectional survey with both qualitative and quantitative methods of data collection, presentation and analysis.

### Study population

The study population comprised of all natives in Sironko and Bulambuli with either diagnosed positive for cancer or families with a history of cancer patient. The target population were Lumasaba speaking residents of above 25 years and this age was selected because it was considered a maturity age and responsible so gave and reliable content on the topic under investigation.

### Selection of the study sites

We conducted a reconnaissance survey in our study area between the months of January to February 2021. The study sites were selected basing on cancer statistics index obtained from Mbale Regional Referral Hospital reports for the previous decade (2010-2020) and as well on the advice of District Health Officer (DHO) of the respective districts of the study.

### Selection of participants and sampling technique

The sample size was calculated from Cochran formula at 95% confidence interval;

$$S = Z^2 * P * Q / E^2 \quad O(S = Z^2(P(1-P)) / E^2) \text{ where } (Q = 1 - P)$$

where S=sample size, Z=standard error for the mean=1.96 at 95% confidence level, P is the estimated prevalence or proportion ratio of natives with cancer knowledge in Eastern Region as previously determined by (13)=95%, E=Tolerable sampling error/ precision, =0.05 at 5% significant level

$$\text{Sample size} = 1.96^2(0.95(1-0.95))/0.05^2 = 73$$

We selected a convenient sample of 73 participants (42 males and 28 females) participants with the help local leaders (LCI chairpersons) who are the gatekeepers to the local communities. We sampled the eligible participants

through snowball sampling technique. Eligible participants included men and women of 25 years above, had lived in the study area for above 18 years and were conversant with local language (Lumasaba). We excluded participants with communication challenges, those below 25 years, those with confirmed diagnosis for mental illness and those who do not have cancer.

### **Data collection**

Pretested self and researcher-administered questionnaire comprising of both close ended and open-ended questions was adopted for data collection. It comprised of four sections, demographic data, knowledge and perception, cancer associated risk factors and prevention and treatment options. The questionnaire was prepared in English language but was translated into Lumasaba to be easily comprehended by the locals and so the validity of the content was ensured. The self-administered questionnaire was collected back from the respondents, two days from the time it was served. This gave the participants ample time to comprehend the items in the questionnaire and so gave valid and appropriate responses. On the other hands, for researcher-administered questionnaire, the responses were instantly recorded as they were being generated and at the end of each session, they were immediately filed by the respective researcher. This saved time and as well ensured the safety, validity and completeness of the data [4].

### **Data management**

The checking and crossing-checking was done on filled questionnaire for completeness and consistence prior to data processing and analysis as per the procedures previously described by. All the collected data were assigned codes only known to the research team to ensure confidentiality and integrity of the participants' responses. The hard copies of the data from the questionnaires were kept in locked file cabinets and all the data were reported as anonymous without referring to the specific identifiers of individual clients.

### **Data analysis and presentation**

The collected data was cleaned and entered Microsoft excels and was export to MedCalc version 20.008 for analysis, where the frequency tables and figures were generated for easy interpretation.

Qualitative data was analysed following procedure previously described by who contends that data analysis and collection must be a simultaneous process in qualitative research. The field notes from the focus group discussions were used and analysis was done along with the data collection after every focus group discussion (FGD). In total four FGDs each taking a maximum of 40 minutes were conducted designated as FG1-4. The data was analyzed for three themes which included knowledge, perception, attitude, risk factors, prevention and treatment options. Themes were intertwined within the theoretical model

of Health Belief Model (HBM) that informed our study. The study further indicated that 90% of the participants were Ugandans and only 10% were non-Ugandans with identified nationality of Kenyan and Tanzanian. It was also ascertained that majority of the participants were married 67% and this a greater extent signified high degree of responsibility and the rest of were single, divorced, and widowed with corresponding percentage of; 17%, 3% and 13% respectively. Low literacy level was noted amongst the respondents in our study, as 42% were secondary school dropout followed by primary 25% and the least those who had not gone to school at all 8%. Only 13% and 12% representing a total of 25% had attained tertiary and university education, respectively. Therefore, to a certain extent there is a likelihood of experiencing knowledge gaps on some the responses generated most especially on those questionnaire items that required technical expertise. Interestingly, we found out that that some of the participants were able to give the meaning of cancer in their responses to structured questions. 25% of the participants gave responses that were considered as correct meaning of cancer while 75% did not understand the meaning of cancer at all [5].

The number of participants who failed to define the term cancer was significantly higher ( $p=0.0006$ ) than those who defined it. Therefore, natives in our study were not conversant with the term cancer. The participants had varied perception on the different means of cancer transmission like, unprotected cough with an infected person, sharing of bathrooms and toilets, sharing of sharp instrument, food and drinks, stepping barefooted in infected urine, bacterial and viral infections. The highest number of participants 39% claimed that unprotected cough from cancer patients, followed by bacterial infections 36% and the least 12% suggested viral infections as mode of transmission of cancer. The response on those who suggested that Cancer can be transmitted through unprotected cough *visa-vi* bacterial infections and sharing of sharp instrument with infected person was significantly higher  $p=0.0057$ . The comparison between cough from unprotected persons with the rest of cancer transmission modes were insignificant. A significantly higher ( $p=0.0001$ ) in the responses was generated between those disagreed and agreed on the view that cancer can be transmitted through sexual intercourse, sharing of sharp instruments with infected persons and viral infections. On the other hand, an insignificant ( $p=0.0691$ ) was yielded for the participants who agreed on unprotected cough from cancer patients, stepping barefooted in infected human wastes and sharing of bathrooms and toilets with infected persons and those who agreed. To the best of our knowledge of cancer some of the modes of cancer transmissions documented are not anywhere documented as mean of cancer spread. Thus, the participant in the present study generally lacked basic knowledge as far as cancer treatment is concerned.

Generally, to a lesser extent, the participants in the present



study had some basic knowledge on signs and symptoms on at least all listed cancer types. Sore throats that slightly at the body parts, unusual breast changes, blood in fecal matter and loss of appetite were the signs and symptoms cited amongst the participant with 75%, 57%, 55% and 55% respectively. On the other hand, very heavy night sweats, change in bowel habit like constipation, and unexplained weight loss or gain were the least documented signs and symptom cited among the participants on cancer patients. Unusual lump/swelling anywhere, mouth or tongue sores and unexplained chronic pain ache were averagely registered as signs and symptoms among cancer patients as far as participants in present study are concerned. There was a significantly higher ( $p=0.0006$ ) difference in responses of the participants on sores that slightly heals anywhere and blood in the fecal materials, ( $p=0.0007$ ) as signs and symptoms of cancer. Therefore, these two were the highly perceived signs and symptoms of cancer by the natives in this area. On the other hand, there was a significant lower difference in the responses of the participants who agreed and disagreed on very night sweats ( $p=0.0006$ ), persistent heartburn or indigestion ( $p=0.0128$ ) and change in the bowel habits ( $p=0.0002$ ) as signs and symptoms of cancer and so were highly disregarded as signs and symptoms of cancer. Hence, these three were not considered as signs and symptoms of cancers as per out present study. The remaining signs and symptoms were insignificant with respective  $p$ - values indicated in the table 3 above so were less perceived as signs and symptoms of cancer [6].

On the question regarding the various types of cancers among patients yielded varied and interesting responses were generated. A total of nine cancer types were listed by the participants in this study. The highest form of cancer identified in the present study was cervical cancer among females (98, 162%) followed prostate cancer among males (91, 152%). Bone cancer registered the least (20, 33%). Cervical cancer was significantly higher (0.0001) higher than all other cancers, except prostate cancer. There was an insignificant difference ( $p=0.5725$ ) in the response between cervical and prostate cancers. However, since most participants in our study area were of low literacy class, it is highly doubtful if there were able to clearly distinguish between some of the much related cancers. For instance, to the best of our knowledge, majority could not distinguish between uterine cancer from cervical cancers; intestinal from stomach and colon cancers, and so these related cancer types could have been interchangeable used. Therefore, the corresponding percentages cited for a particular type of cancer in our study are most likely to be either lower or higher than the actual.

Overwhelming number of the participants in the present study claimed to be in the know on the cancer associated risk behaviours as 75% and only 25% suggested they were not in know. A significantly higher ( $p=0.0006$ ) value was yielded for the respondents who claimed to be in the know

of cancer risks associated factor and those who did not have an idea at all. Therefore, to a greater extent signified participants in the present had some ideas on the cancer risk associated behaviours. Various cancer risk associated behaviours were identified. Smoking and alcohol abuse were the highest form of cancer risk behaviours (69, 95% and 68, 93%) respectively. Exposure to factory chemicals and gasses were cited with 2% each in this regard. Other risk behaviours like family history, age factor and viral infections were documented with intermediate responses (49, 67%, 24, 33%, 15, 20%, 15, 20%, 5, 7%, 5, 7% and 12, 17) respectively. Smoking, yielded a significant higher ( $p=0.0001$ ) responses of as compared all other risk factors except alcohol abuse. An insignificant difference ( $p=0.6232$ ) in the response between perceived smoking and alcohol abuse as cancer risk factor was generated. Hence, smoking, excessive and alcohol abuse were the most cancer associated risk behaviours among natives in the present study.

Interestingly, a variety of responses on cancer prevention options were generated and to a larger extent, the participants exhibited rich knowledge base in this regard. The highest percentage (54, 90%) of participants believed that avoid smoking could prevent cancer followed by avoiding excessive alcohol abuse (49, 82%). Regular medical check-up and minimization of exposure to factory gasses (12%, 20% and 9, 15%) respectively were the least documented cancer prevention measures. Further still, healthy diet and vaccination yielded intermediate responses (39, 65% and 43, 72%) respectively. There was a significant higher ( $p=0.0001$ ,  $p=0.0273$  and  $p=0.0003$ ) difference in the responses of the respondents who agreed on avoid smoking and excessive alcohol abuse, vaccination and healthy diet respectively than those who thought otherwise. Therefore, avoid smoking, excessive alcohol abuse, healthy diet and vaccination were highly perceived as cancer prevention interventions by participants in this study. Regular medical check-ups and avoid exposure to factory gasses were significantly lower ( $p=0.0001$ ) for the participants who agreed as cancer prevention measures by residents in this area. Thus, regular medical check-up and avoiding exposure to factory gasses as cancer prevention interventions were not perceived as cancer intervention strategies. However, to the best of our knowledge in disease control and prevention medical check-up serve a critical role.

Interesting responses were generated on the questions. The responses of on the effectiveness on either intervention used alone yielded responses were below the average percentage. However, in either case more natives (43%) claimed that traditional medicine was more effective than modern cancer convention drug alone (40%). Majority of the participants (63%) believed the combination therapy of both modern cancer conventional drugs and traditional medicine yielded promising results. The responses from participants who claimed that combination therapy

was more effective than and use of medicinal plant or chemotherapy was insignificant ( $p < 0.185$  and  $p < 0.121$ ) respectively. Thus, no effective cancer treatment option was documented in the current study.

Most of the participants (47%) asserted that combination therapy of conventional drugs (chemotherapy) and medicinal plants were the most effective in cancer treatment compared to either treatment mode administered alone. The rest of the respondents claimed that cancer treatment option to be use of medicinal plants and spiritual processes, medicinal plants and counselling, medicinal plant only and use of modern cancer conventional drugs with corresponding percentage 34%, 33%, 32% and 31% respectively. There was a significantly lower response among participants who regarded and disregarded the use of medicinal plants and spiritual processes ( $p = 0.0198$ ) medicinal plants and counselling ( $p = 0.0164$ ), medicinal plant only ( $p = 0.0120$ ) and modern drugs only ( $p = 0.0120$ ). An insignificant difference ( $p = 0.158$ ,  $p = 0.172$ ,  $p = 0.187$  and  $p = 0.201$ ) for claimed treatment options combination therapy, medicinal plants and spiritual processes, medicinal plants and counseling, medicinal plants and modern drug each used alone respectively. Therefore, natives in Sironko and Bulambuli district lacked effective cancer drug [7].

## Results and Discussion

The findings indicated that majority of the participant (67%) in this study were secondary and primary school dropouts and only 25% constituted those who attained tertiary and university education combined (Table 1). This is signified that; the majority of the participant was predominantly of low literacy class. The low literacy class, combined with the remoteness of the participants in our study clearly signified difficulties encountered in accessing information on healthcare programs including cancer most especially through current broadcasting channels and social media. Therefore, information accessibility is only restricted to local FMs radio stations and word of the mouths. Local radio FMs stations are may also not be sustainable on daily basis due to difficulty in

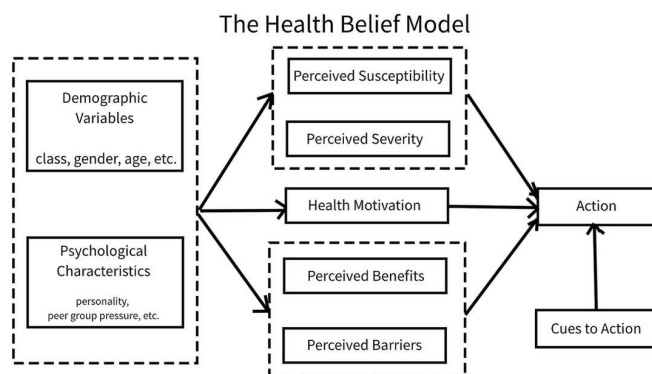
the accessibility and affordability of the dry cells to power their radios. The word of the mouths thus, remains the only feasible form in information accessibility but is also limited in terms of scope and frequency The current study is also consistent with that conducted by [8] who reported that African migrants with high literacy class were 5 times more likely to give reliable information on cervical cancer screening than their counterparts of low literacy standards (Figure 2). This was linked to the ease in accessibility of healthcare information including cancer, increased level of interactions with healthcare expertise, social, press and broadcasting media.

Therefore, education attainment plays a big role in understanding concept of various disease, including cancer and how to mitigate it. On this basis, it can be deduced that since, the participants in the current study were of low literacy there are likely to have little knowledge on the concept of cancer and stands high chance on developing it in their life-time, if other factors are kept constant. We found out that few respondents (25%) could somewhat defined cancer while the rest of the participant failed to define this concept (Table 2). Statistical test was significantly ( $p = 0.0006$ ) for the response of participants failed and those who defined had an idea for the correct definition (Figure 3). Therefore, the participants in the current study had a poor perception of cancer. This could be attributed to low literacy level as the highest number of the participants were primary and secondary school dropouts and so, could not easily comprehend it. This study is in line with [9] who documented that local communities of low educational class experienced limited understanding of cancer in terms of it meaning, risks associated behaviors and importance of early detection and regular medical check-ups Similar observations were also made by where their report opined that natives of low literacy class failed to had poor knowledge and perception of several diseases, their causes, signs and symptoms . Such communities are characterized by poorer health, higher medical expenses and increase number of outpatients visits compared to those of high literacy class.

**Table 1.** In this table, this result has shown that majority of the participants were male (58%) while females constituted only 42% of the total selected sample population. Most participants (58%) were adults who ranged from 46-55 years followed by youths (33%) 35-45 and the least (8%) were elderly of above 56 years.

Characteristic		Frequency	Percentage (%)
Gender	Male	42	58
	Female	28	42
Age (years)	25- 35	10	17
	35- 45	10	33
	46-55	35	58
	56 ≤	05	08
Nationality	Ugandan	54	90
	Non-Ugandan	06	10
Marital status	Married	40	67
	Single	10	17

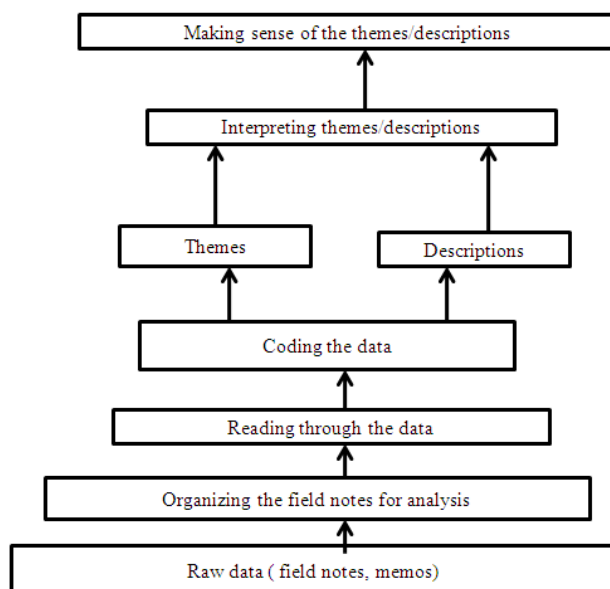
	Divorced	02	03
	Widows	08	13
Education	None	05	08
	Primary	15	25
	Secondary	25	42
	Tertiary	08	13
	University	07	12



**Figure 2.** The Health Belief Model as adopted from Hochbaum (1958) and Rosenstock. The 7 steps of the linear hierarchical approach building from bottom to the top were used in the analysis. For content validity, several methods including observing the participants during data collection were done.

**Table 2.** Understanding the Concept of Cancer. Interestingly, we found out that that some of the participants were able to give the meaning of cancer in their responses to structured questions. 25% of the participants gave responses that was considered as correct meaning of cancer while 75% did not understand the meaning of cancer at all.

Response	Frequency	% age	p value
Yes	18	25	0.0006
No	55	75	
Total	73	100	



**Figure 3.** An Illustration of Qualitative Data Analysis as Adopted from John. The varied and interesting responses were analyzed by use of SPSS and were presented in table and figure forms for easy interpretation. A total of 73 respondents who were all permanent residents of Sironko and Bulambuli district and of which 58 % were males while 42 % were female participated in the present study.

We noted rising cases of cancer as 57% of the respondents agreed there was an increasing trend of cancer incidences in this area while the 43% opposed (Figure 4). A test for comparison of the proportionality for increase and decrease yielded an insignificant difference ( $p=0.2864$ ). Thus, there was minimal change of cases of cancer in Sironko and Bulambuli districts. Our findings are disagreement with earlier report made by where 50 million deaths were reported due to breast cancer with subsequent rise to 1.7 million and 561334 deaths in 2012 and 2015 deaths respectively. It was further projected that breast cancer deaths would rise to 805116 per year by 2030 which represented 43% of absolute number of deaths. Our study further differed from observation made by where they reported rising cases of colorectal cancer in their study in the United States and 1 in every 21 and 23 in males and females were at the risk of suffering this cancer. Unlike the present study. This discrepancy could be explained based on fact that the participant in the current study was of low literacy class the area lacked cancer registry poor equipped with diagnostics facilities unlike the previous studies documented elsewhere in the world.



**Figure 4. Cancer Prevalence in Elgon Sub-region.** There were quite surprising outcomes on the prevalence of cancer in this area as 57% of the respondents claimed an increasing cases of cancer while 43% disagreed in this regard. A test for comparison of between the two proportions was insignificant ( $p=0.2864$ ). Therefore, there is no change in the cancer prevalence in Sironko and Bulambuli districts. **Note:** (■) Increasing, (■) Decreasing

We observed that, the participants in the present study had varying and interesting knowledge, perceptions, and attitude and beliefs on cancer transmission but majority believed that cancer is contagious disease (Figure 5). 39% of the respondent claimed that cancer could be transmitted through unprotected coughing from infected person, and the least (12%) opined that it was through viral infection. A significantly higher( $p=0.0001$ ,) responses between participants who agreed on sexual intercourse viva-vi sharing of sharp instrument and viral infections as cancer transmission modes. An insignificant difference ( $p=0.0691$ ) was yielded for the participants who agreed on unprotected cough from cancer patients, stepping barefooted in infected human wastes and sharing of

bathrooms and toilets with infected persons and those who agreed. To the best of our knowledge, some of the responses on cancer transmission are not applicable and have not been documented in any previous studies. This discrepancy could be attributed to low literacy levels and limited access to healthcare information in regards on cancer transmission by most participants in the present study.



**Figure 5. Means of Cancer Transmission.** The participants had varied perception on the different means of cancer transmission like, unprotected cough with an infected person, sharing of bathrooms and toilets, sharing of sharp instrument, food and drinks, stepping barefooted in infected urine, bacterial and viral infections. The highest number of participants (39%) claimed that unprotected cough from cancer patients; followed by bacterial infections (36%) and the least (12%) suggested viral infections as mode of transmission of cancer. The response on those who suggested that Cancer can be transmitted through unprotected cough visa-vi bacterial infections and sharing of sharp instrument with infected person was significantly higher ( $p=0.0057$ ).

Bacterial and viral infections were the only modes of cancer transmission documented in this study but has been supported by the previous studies. But even then, cancer transmissible cases under normal circumstances are so rare as per the existing literature. The results of our study to small extent are in agreement with earlier studies conducted by where it was opined that some cancers could be transmitted through specific viral and bacterial infection from infected individuals; from mother to fetus and also from twin to co-twin via vascular anastomosed within the placenta. Also study explored by in their study titled “is cancer contagious: reported mixed responses just like the current as majority of the response had a belief that cervical cancer caused by Human papillomavirus (HPV) and was highly contagious and this resulted into high level of stigmatization and fatality associated with this disease This was attribute to limited healthcare education and awareness among girls in those schools where their study was conducted. On the contrary, Sergey reported that human cancer unlike other animals is not transmissible at all. This because their study was based a laboratory based model and on specific types of cancer and drew general conclusions which may sometime be misleading.



Some of the attitudes of participant about cancer in their own words were “Cancer is a disease of the rich who always affords of meat, fatty foods, fried and processed foods and drinks, and avoiding such kind of diet can minimize cancer disease. The findings in the present are in line with three constructs of perceived susceptibility, perceived severity and perceived motivation in the Health Belief Model as designed by Hochbaum and cited in Health Behaviour and Health Education book which states that, In our study, we also found out that the respondents in this study were to some extent were in familiarity with basic knowledge on the signs and symptoms of cancer (Table 3). 75%, 57%, 55% and 55% which corresponded to sore throats that slightly. There was a significant higher ( $p=0.0006$ ) difference in responses of participant on sores that slightly heals at any part of the body and blood in the fecal materials, ( $p=0.0007$ ) as signs and symptoms of cancer. Therefore, these two were the most perceived signs and symptoms of cancer patients by the natives in this area. On the other hand, there was a significant lower difference in the responses of the participants who agreed on very night sweats ( $p=0.0006$ ), persistent heartburn or indigestion ( $p=0.0128$ ) and change in the bowel habits ( $p=0.0002$ ) as signs and symptoms of cancer. Therefore, very night sweats, persistent heartburn or indigestion and change in bowel were disregarded by natives in this area as signs and symptoms of cancer. Similar observations were made by Bianca in Kilimanjaro region of Tanzania who revealed that some of the common signs and symptom of cancer like blood in fecal materials and sore throat [8] but disagreed on very heavy night sweats and appetite as

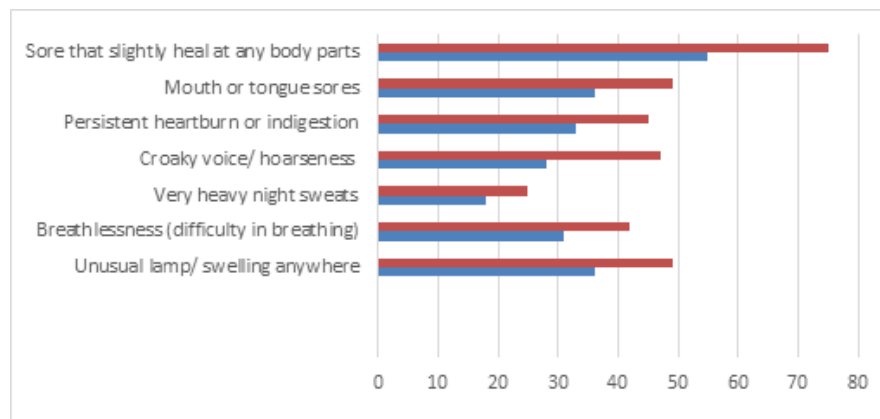
common signs and symptoms of cancer. This could be attributed to differences type of cancers, for example, their study was carried out in areas where GIT cancers were more pronounced unlike the study under question. It is highlighted other symptoms and signs like hoarseness, skin colour changes and unexplained weight loss were cited as some of the signs and symptoms of cancer similar to this study though less frequently cited.

A total of nine different types of cancers were documented in our study. Cervical and prostate cancers were the most pronounced form of cancer cited (98, 162% and 91, 152%) in females and males respectively and the least form of cancer was bone cancer (20, 33%) (Figure 6). Cervical cancer was significantly higher (0.0001) higher than all other cancers, except prostate cancer. There was an insignificant difference ( $p=0.5725$ ) in the response between cervical and prostate cancers. Our study to a greater extent is in agreement with the study revealed by Ferlay et al and GLOBOCAN where prostate and breast cancer were the most documented forms of cancer in females and males respectively. On the contrary, however, unlike our study, other types like skin, gastric and oesophageal cancers were reported as leading cancers in Iran and other middle East countries but either less or not documented at all in present study. Our findings are also consistence with a report made by the World Health Organization (WHO) where prostate cancer incidences was pinpointed at rates of 2,634 individual per-annum and in the same report, Uganda was ranked as the 8th globally in regard to this type of cancer.

**Table 3.** Sign and Symptoms of Cancer; Generally, to a lesser extent, the participants in the present study had some basic knowledge on signs and symptoms on at least all listed cancer types. Sore throats that slightly at the body parts, unusual breast changes, blood in fecal matter and loss of appetite were the signs and symptoms cited amongst the participant with 75%, 57%, 55% and 55% respectively.

Signs and Symptoms	Response				Significance level P values
	Yes		No		
	Freq.	% age	Freq.	% age	
Unusual lamp/ swelling anywhere	36	49	37	51	0.8653
Breathlessness (difficulty in breathing)	31	42	42	58	0.2254
Very heavy night sweats	18	25	55	75	0.0006
Croaky voice/ hoarseness	28	47	32	62	0.2479
Persistent heartburn or indigestion	33	45	40	55	0.0128
Mouth or tongue sores	36	49	37	51	0.8653
Sore that slightly heal at any body parts	55	75	18	25	0.0006
Change in bowel habits eg. constipation	26	36	47	64	0.0002
Loss of appetite	40	55	33	45	0.4447
Unusual breast changes	42	56	31	42	0.2864
Blood in fecal matter	45	62	28	38	0.0007
Unexplained weight loss or gain	27	38	45	62	0.0726
Skin pigmentation/ coloured spot on the skin	31	42	42	58	0.2864
Unexplained chronic pain/ ache	36	49	37	51	0.8653





**Figure 6.** Types of Cancer in Elgon Sub-region, Cervical and  $p$ ,  $p = 0.5725$ ,  $p = 0.0001$ . On the question regarding the various types of cancers among patients yielded varied and interesting responses were generated. A total of nine cancer types were listed by the participants in this study. Note: (■) %age, (■) Frequency

Further still, the results in the present study also concurred with those revealed where a rise in different types cancers was documented in Kampala, particularly in Kyadondo county, amounting to 33,357 cases for the duration of 25 years. Prostate cancer alone was documented at rate of 55.1 per 100,000 individuals. Similarly, cervical cancer as the most prevalent cancer across various continents and sub-continent in the world. For instance, their study found out that Eastern African sub-continent where Uganda lie was ranked 1st with 218.4 cases per 100,000 cases representing 26.5% of the total cancer followed by Middle Africa 84.6 per 100,000 which represented 23.6% of the total cancer burden. On the contrary, Phiona pointed out Kaposi sarcoma, oesophageal and breast cancer as the most predominant cancer which was either less frequently or not documented at all in current study. This discrepancy could be attributed in the low literacy level and limited exposure and access to information by the participants in the present study. For example, whereas their study was carried in the capital city of Uganda, where most participants are believed to be of the highest literacy class in the country and could easily access information and so, were knowledgeable enough to clearly distinguish between the various types may not be the case in present remote based study.

Responding to the question of on the awareness of cancer risk behaviours, 75% agreed of being in the know in this regard while 25% did not know (Table 4). However, given the low literacy class and exposure of participants in our study combined with limited access to information, even some of them who claimed to know of cancer associated risks factors still are still doubtful of the level of their comprehension. There was a very significant difference ( $p=0.0006$ ) in the response between those who claimed to be known cancer risks associated risk and those who did not have an idea at all. Therefore, it can be summed up that participant in the present were in the knowledgeable of cancer risk associated behaviours. Observations made by Oresto opined that participants in Tanzania were also showed the residents in Kilimanjaro region were aware of

various cancer risk factors, for example, 90%, 67%, 54% and 16% suggested tobacco, strong sprits, alcohol type and home-brewed alcohol were type as the major cause for lung, oesophageal, liver, and gastric cancers which much are much similar to those in the present study. Similarly, documented that 95% of the respondent in Bugiri and Mayuge in Eastern Uganda were aware of cancer risk behaviours specifically cervical cancer. Our study further agrees with finding unveiled by Mwaka et al on the status of awareness of cancer risk factors in Northern Uganda particularly in Gulu district were 99.1% of the participants agreed to have heard about cervical cancer, its screening and their participants largely shared similar demographic characteristics with the study under question.

**Table 4.** Awareness of Cancer Risk Associated Behaviours. Overwhelming number of the participants in the present study claimed to be in the know on the cancer associated risk behaviours as 75% and only 25% suggested they were not in know. A significantly higher ( $p=0.0006$ ) value was yielded for the respondents who claimed to be in the know of cancer risks associated factor and those who did not have an idea at all.

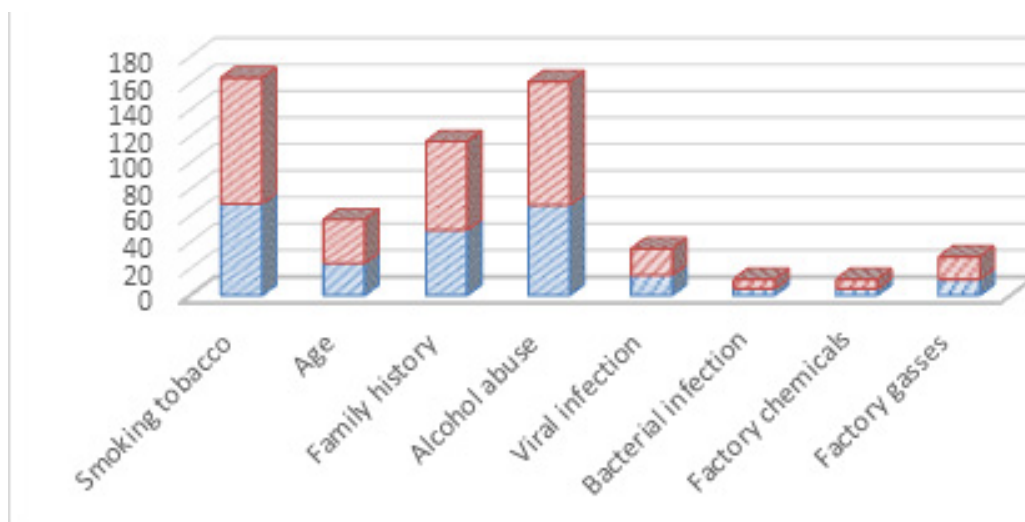
Response	Frequency	% age	p-value
Yes	55	75	0.0006
No	18	25	
Total	73	100	

Our study also cited various cancer associated cancer associated risk behaviours. The most frequently cited factor was smoking (57, 30%) followed by alcohol abuse (56, 29%) and exposure to factory gasses and chemicals were the least (2% each). Other intermediately documented cancer risk associated factors were family history (21%), age (10%) and viral infections (Figure 7). Smoking and excessive alcohol abuse were significant higher ( $p=0.0001$ ) than other risk factor age and family history ( $p=0.0132$ ). Hence, these were the most perceived cancer associated risk factors among natives in the current study. Further still Lawson et al revealed that secondhand smoke (SHS) contains over 3,000 chemicals and of which

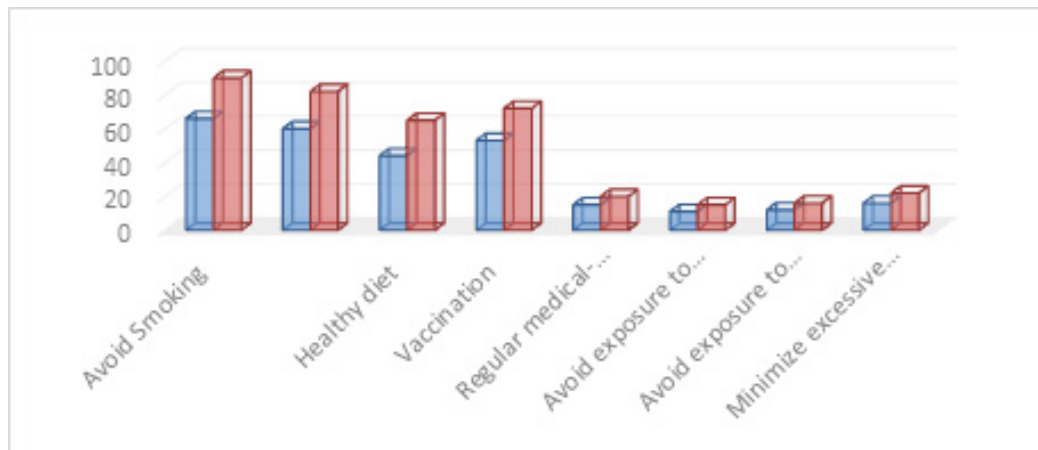
over 50 were well known to have carcinogenic effect on human health while 200 were clearly documented as poisonous. Therefore they concluded that, continuous inhaling these chemicals either actively or passively from an individual could subsequently cause devastating impact on such individual. This clearly explains why lung cancer is the leading form of cancer cited as the most common among patients globally. On the other hand, a significant lower ( $p=0.0001$ ) was yielded between participants who regarded factory chemical and gasses, viral and bacterial infections as cancer risk factors and those who agreed. Thus, factory gasses and chemicals, bacterial and viral infection were not cancer risks in this area. Unlike the current study by Mwaka where they pointed out on cancer risk factors in Gulu district such as multiple sexual partners, human papillomavirus and early sexual activity which were recognized by 88%, 82% and 78%. This is because their study was specifically carried out on cervical cancer where sexual transmission may under some circumstances be a mode of transmission unlike this study which was more general.

Interesting and varied responses were generated in response to the question of cancer intervention or prevention options. The result indicated that majority of the respondents (90%) and supported the idea of avoid smoking as the best cancer prevention measure while the least (15%) suggest minimization of exposure to factory chemicals and gasses (Figure 8). Avoiding smoking, excessive alcohol abuse ( $p=0.0001$ ), vaccination ( $p=p=0.0273$ ) and healthy diet ( $p=0.0003$ ) were significantly agreed Viv-v those who disagreed. Therefore, avoiding smoking, excessive alcohol abuse, healthy diet and vaccination were most perceived as cancer prevention interventions by participant in this study. The findings of

this study are also in line with where several prevention measures where outlined; such as avoid smoking, early detection and dietary supplementation, avoid alcohols and vaccinations. Their study however, revealed other prevention options like chemoprevention which did not surface anywhere in our study. Also a study revealed by regular screening for cervical cancer and reduction of screening cost could serve as a perfect cancer prevention intervention. However, other prevention measures like educate and increase awareness social media for promotion of prevention strategies, improve access to cancer health facilities were part of their findings unlike the present study. This discrepancy could be attributed to difference in the study population and the developmental level of the study area. For example, whereas their study was carried out in the United States which is a highly developed country and so all the forth-mentioned services are easily available and affordable was not the case of our study. On the other hand, regular medical check-up and avoid exposure to factory gasses yielded significantly lower ( $p=0.0001$ ) perception as cancer prevention measures. Thus, the natives in this are did not take regular medical check-up and avoid exposure to factory gasses as cancer serious cancer prevention interventions. This is line with earlier report made by Rachael who opined that 97.8% of the participant suggested that adoption of health diet (nutrition), regular screening and physical activity were some of the major cornerstones cited in cancer prevention interventions but still the quoted percentage was higher than the current study. The lower perception of avoiding factory gasses prevention option in this area is due to the fact that the area is very remote and so no factory was ever viewed this study and worse of it all even electricity is less common in most parts of these district.



**Figure 7.** Cancer Risk Factors Identified. Various cancer risk associated behaviours were identified. Smoking and alcohol abuse were the highest form of cancer risk behaviours (69, 95% and 68, 93%) respectively. Exposure to factory chemicals and gasses were cited with 2% each in this regard. Other risk behaviours like family history, age factor and viral infections were documented with intermediate responses (49, 67%, 24, 33%, 15, 20%, 15, 20%, 5, 7%, 5, 7% and 12, 17) respectively. **Note:** (■) Frequency, (■) Percentage (%)



**Figure 8.** Cancer Prevention Interventions, Interestingly, a variety of responses on cancer prevention options were generated and to a larger extent, the participants exhibited rich knowledge base in this regard. The highest percentage (54, 90%) of participants believed that avoid smoking could prevent cancer followed by avoiding excessive alcohol abuse (49, 82%). Note: (■) Frequency, (■) Percentage

Our study also indicated that 63% of participants agreed that combination therapy for both modern conventional drugs (chemotherapy) and traditional medicine were more effective in the cancer treatment while 55% believed traditional medicine alone could treat cancer and only 40% trusted use of only modern cancer conventional drug (Table 5). There was insignificant difference on the perception of effectiveness of the use of modern, traditional and combination therapy ( $p=0.1320$ ), use of modern drugs alone ( $p=0.4447$ ) and medicinal plant ( $p=0.0537$ ). Therefore, was no effectiveness treatment option of cancer treatment is so far available by natives in Sironko and Bulambuli districts. Unlike observations made by Cristina et al demonstrated that addition of Aidi plus chemotherapy (combination therapy) significantly exhibited anticancer activity, tumour inhibition and immunological functions. Other previous studies further disagree with the present study where medicinal plants have been documented to be more effective in cancer treatment option. For example, curcumin was found to exhibit antitumor activities and

were mediated through inhibition of multiple pathways signaling pathways involved in regulation of proliferation, apoptosis, survival, angiogenesis, and metastasis. Our study also differed from Wing-Hin where it was revealed that when curcumin or paclitaxel was used alone, caused increased apoptosis and reduction in mitochondrial membrane potential (MMP) a so increased the release of cytochrome C. Curcumin was more effective in this regard as compared to paclitaxel. Thus, their study somewhat supported the claims that medicinal plants were more effective than chemotherapeutic drugs. Therefore, combination therapies under all standards proved to be more effective in cancer management as compared to use of either medicinal plants or chemotherapy alone. This difference with current study could be explained based on the type of study. For example, whereas, the previous studies were purely experimental design based on laboratory and clinical trials and so less biased unlike the current whose findings was based on people knowledge, perceptions and attitude [8].

**Table 5.** Perception on Effectiveness of the Use of Modern Conventional and Traditional Medicine on Cancer Treatment. Interesting responses were generated on the questions. The responses of on the effectiveness on either intervention used alone yielded responses were below the average percentage. However, in either case more natives (43%) claimed that traditional medicine was more effective than modern cancer convention drug alone (40%).

Item	Response				p values
	Yes		No		
	Frequency	%	Frequency	%	
Modern drug	29	40	44	60	0.1320
Traditional medicine	40	55	33	45	0.4447
Traditional medicine + modern drugs (combination therapy)	46	63	27	37	0.0537

This question generated interesting views; majority of the participants (47%) claimed that cancer could be treated by combination therapy of conventional drugs and medicinal plants. This was followed by 34% who asserted that medicinal plant and spiritual processes, use of cancer conventional drug yielded the least (31%) and the rest; medicinal plants and counselling medicinal plant alone had intermediate response (Figure 9). There was a significant lower ( $p=0.0198$ ), in the responses between those who regarded the use of medicinal plants and spiritual processes medicinal plants and counselling ( $p=0.0164$ ), medicinal plant and modern drugs only ( $p=0.0120$ ). Therefore, there are no effective cancer treatment options by natives in Sironko and Bulambuli district as effective cancer treatment options [9]. An insignificant difference ( $p=0.656$ ) for the participants who disagreed on the use of combination therapy and those who thought otherwise. Unlike the current study, the study by Katherine indicated the chemotherapy and surgery were the most effective cancer treatment modes and no medicinal plant with healing benefit was reported in their study. Suhail revealed that Nuclear Factor kappa B (NF-kB), a specific

chemotherapeutic drug could be used to treat various cancers including but not limited to breast, lung, liver, pancreatic, prostate and multiple types of lymphoma. Unlike, the current findings documented by revealed various cancer treatment options such as nanoparticle and thermal therapy, Photothermal Therapy (PTT), Magnetic Hyperthermia Treatment (MHT), Ultrasounds (US) and Radiofrequency (RF) induced thermal therapy, Photodynamic Therapy (PDT), Sonodynamic Therapy (SDT), chemotherapies in combination with thermal therapy Combination of PTT and SDT. Larisa also highlighted that chemotherapy were effective remedies on breast remedies for cancer. However, other remedies such endocrine therapy and targeted therapy were also documented in their study did not surface anywhere in our current study. This could be attributed to difference in the nature of research conducted. For example, where their study was experimental based on several clinical trials, our study was mainly qualitative study which greatly assessed people knowledge, beliefs and opinions on cancer [10].



**Figure 9.** Cancer Treatment Options most of the participants (47%) asserted that combination therapy of conventional drugs (chemotherapy) and medicinal plants were the most effective in cancer treatment compared to either treatment mode administered alone. The rest of the respondents claimed that cancer treatment option to be use of medicinal plants and spiritual processes, medicinal plants and counselling, medicinal plant only and use of modern cancer conventional drugs with corresponding percentage 34%, 33, 32% and 31% respectively.

### Conclusion

Majority of the study participants were males (58%), aged between 46–55 years (58%), Ugandans (90%) and married (67%). Most of them had inadequate knowledge about cancer ( $p<0.05$ ) and highlighted sores that slightly heal at any body parts as well as blood in faeces as putative predictors of cancer infection ( $p<0.005$ ). A total of nine cancer types were documented and cervical was the most prevalent ( $p<0.0001$ ). Smoking was the most pronounced cancer associated risk factor ( $p<0.0001$ ) and

avoiding smoking was perceived as the major prevention option ( $p<0.0001$ ). No effective cancer treatment options were cited in this area ( $p<0.172$ ). Since majority of the participant in our study were of low literacy class and had limited exposure to information sources like broadcasting, social and press media, there need to enhance on cancer healthcare programs through the word of the mouths and radio talk shows. It is paramount to carry out an ethnobotanical investigation to document plant with claimed anticancer activity.



### Ethical Approval and Consent

Approval for this study was provided by the Islamic University in Uganda, Research Review Committee. Permission to access the communities was obtained from Sironko and Bulambuli districts Local leaders including LC1 Chairpersons of the respective villages. We explained the purpose of the study to the respondents, provided oral informed consent and signed applied thumb print to register the participants in our study. In addition, verbal permissions were obtained from participants to allow the auto-recording of discussions and finally uniform transport refund was provided for all the participants.

### Availability of Data and materials

Data sets generated and analysed during this study are available from the corresponding author reasonable request.

### Conflicting Interests

We the authors of this article declare that there is no conflict of interest regarding publication of this article

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### Authors Contribution

Ali Kudamba (AK) and Abdul Walusansa, conceived the research idea, participated in the data collection and analysis and in writing the primary draft of the manuscript” “Nsubuga Hakim (NH) and Hussein Mukasa Kafero (HMK) participated in data collection, advised on data entry plan and were major contributors in writing this manuscript. Jamilu E (JES) Ssenku and Shaban A Okurut (ASO) and were the senior advisors and supervisors in the study, They were also major contributors in writing of the manuscript and performed final editing of the manuscript”. All authors read and approved the final manuscript".

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