**The cancer spectrum in Uganda: A narrative review**

**ABSTRACT**

**Introduction:** In Uganda and generally in Sub-Saharan Africa, there is an epidemiologic transition to noncommunicable diseases from infectious diseases. Effective strategies to mitigate the cancer burden may be designed by understanding the underlying factors responsible for this increase in noncommunicable diseases. The cancer registration coverage is low and evenly distributed in all regions of Uganda. This narrative review was conducted to determine the cancer burden in Uganda in order to allow for a timely intervention to mitigate cancer risk factors by Public Health authorities. **Discussion:** This review reveals the low levels of cancer awareness which contributes to poor cancer screening and therefore presents a barrier to cancer control and prevention in our population. The sub-regional cancer spectrum in Uganda includes prostate, oesophageal, gastric, liver cancers and Kaposi sarcoma in males. Whilst in females, the sub-regional spectrum includes ovarian, breast, oesophageal and Kaposi sarcoma. There is a significant variation in cancer profile in some sub-regions of Uganda where Non-Hodgkin’s lymphoma was replaced by gastric cancer in males. This finding reinforces the need to support and establish more population-based cancer registries to encourage the establishment of regional cancer centres, determine the cancer burden and guide national control programmes in the country. Part of the national cancer control programme should include cancer surveillance using population-based cancer registries.

*Keywords:* Population-based; sub-regions; Uganda; Sub-Saharan Africa; cancer-; spectrum

**Introduction**

In identifying a country’s health priorities, population-level research is becoming increasingly important as it informs the development of relevant and potential solutions (1). In Sub-Saharan Africa, less attention has been given to noncommunicable diseases, especially cancers, despite their increasing incidence, and instead has focused on infectious diseases, malnutrition, maternal and child health (2).

A doubling of cancer incidence between 2018 and 2040 and a gradual decline om deaths due to infectious diseases has been projected in a recent Lancet Commission Report on Cancer in Sub-Saharan Africa (3). In 2020, there were 1,949 lives lost to cancer and 1,109,209 newly diagnosed cancer cases each day in the region (4). In Uganda there has been a 16% increase in cancer deaths between 2012 and 2018 (5). In the next 20 years, an anticipated 120% increase in new cancer patients underscores the need for proactive measures. Non-communicable diseases in Uganda account for 33% of mortalities every year and one-third (9%) of these are due to cancers (6). At the Uganda Cancer Institute in Kampala, cancer-related mortalities are 80% and survival is 20%, respectively (7).

In Uganda, the most common types of cancers are mainly due to infections, such as those caused by human herpes virus 8, Epstein Barr virus and human papilloma virus. A sedentary lifestyle, excess alcohol intake, an unhealthy diet and smoking have been linked to most of the common cancers in Uganda. A noncommunicable risk factor survey in 2014, showed that 28.5% of Ugandans consumed alcohol, 16.7% were heavy consumers of alcohol and 9.6% of Ugandans smoke tobacco (8). Compared to the Busoga and other sub-regions, the Karamoja sub-regions have been found to have a high consumption of alcohol in a 2019/2020 household survey (9).

In 2020, the Uganda statistics on cancer showed over 22,992 deaths and 34,008 new cancers in the Gulu and Kampala population-based cancer registries (10). The population in Uganda is approximately 42 million and the two population-based registry datasets represent approximately 5 million people (11.9%) (11). Therefore, due to the low coverage and unequal distribution of the population-based cancer registries in Uganda, the magnitude of cancer burden in each sub-region in Uganda is not precisely know.

Disease surveillance priority has been placed on communicable disease surveillance in many low and middle-income countries. Emphasis on the need for noncommunicable disease surveillance, particularly cancer surveillance is necessary (12), In developing low-income countries there are limited resources to establish population-based cancer registries and therefore there is a need to report across the country the spectrum of cancers to provide data that augments the available data and hence prioritises new cancer registries and enables the national cancer screening programme to be guided and established. Knowledge of the cancer spectrum in the country is necessary to guide investment and efforts to maintain and establish population-based cancer registries. This will help the country to select and prioritise cancer control and provide documentation of the impact of national control interventions (13).

This narrative review of common cancers by sub-region was conducted in Uganda to assess the cancer spectrum based on this background. The objective of this study was to determine the cancer burden and provide a basis for the setting up of additional population-based cancer registries in the country.

**Discussion**

The data from population-based surveys in Uganda have shown that in 2022, the crude incidence rates of females’ cancers in East Africa range from 100.3 per 100,000 in Kenya, to 83.4 per 100,000 in Uganda to 80.4 per 100,000 in Tanzania and in males (58.5, 64.7 and 57.6 per 100,000) (14). In 2022, the crude cancer incidence rates in Tanzania were 71 per 100,000, 74.3 per 100,000 in Uganda and 79.6 per 100,000 in Kenya. In Uganda, the central region reported an incidence of 63.8 per 100,000 population compared to 12.8 per 100,000 in Karamoja region. Differences in the level of screening and hence diagnosis for CRC and access to treatment may account for the variation in the crude cancer incidence. However, the existence of population-based registries in regions with a higher incidence of CRC may also be responsible.

In Uganda, the most common cancers in females were those of the cervix (43%) and breast (22%) respectively (Table 1) (15,16). One of the most common cancers in females in nearly all subregions of Uganda are ovarian cancers. The exception to this finding has been in the subregions of Karamoja, Rwenzori, Busoga and Ankole (5).

**Table 1:** Common Female cancers in Uganda documented in 2017 – 2020 (Okongo F et al., 2024)

|  |  |
| --- | --- |
| Cancers by site | No. of Cancer Cases (%) |
| Cervix uteri | 6,190(43) |
| Breast | 3,200(22) |
| Oesophagus | 800(5.6) |
| Ovary | 746(5.2) |
| Kaposi Sarcoma | 666(4.7) |
| Others | 2,720(18.5) |
| Total | 14,322(100) |

The presence of population-based cancer registries in the Central and Northern regions also registered ovarian cancers among the top five cancers. Therefore, the increase in ovarian cancers may be due to an increased catchment of cases by the registries. However, in Sub-Saharan Africa there is an increase in the incidence of ovarian cancer which may also explain the increase in burden of ovarian cancer in Uganda. An increase in the immunological and radiological diagnosis of cancers particularly breast cancers in Uganda may be due to BRCA2 and BRCA1 mutations which are implicated in ovarian and breast cancers (15,17). Screening using tumour markers and radiological means will result in early detection of cancers, particularly ovarian cancers in females, which are emerging as one of the commonest cancers in Uganda and Sub-Saharan Africa. Between 2017 and 2020, a population-based survey showed in the mid-Northern region of Uganda, common female cancers included lymphoma (9.8%), breast cancer (10.8%) and cervical cancer (45%) (17-19).

A 2017-2020 survey report involving the Gulu Cancer Registry and the Kampala Cancer Registry has shown that in males, prostate cancer is leading at 25.1%, followed by oesophageal cancer (15.1%) and Kaposi sarcoma (12.4%) (Table 2). However, in 2022, the proportion of Kaposi sarcoma among males in Uganda increased to 17.1% and of prostate cancer was found to be 16.3% (20,21).

**Table 2**: Common male cancers in Uganda documented in 2017-2020 (Okongo F et al., 2024)

|  |  |
| --- | --- |
| Cancers by site | No. of Cancer Cases (%) |
| Prostate | 2,820(25.1) |
| Oesophagus | 1,704(15.1) |
| Kaposi sarcoma | 1,395(12.4) |
| Liver | 989(8.8) |
| Stomach | 539(4.8) |
| Others | 3,807(33.8) |
| Total | 11,254(100) |

Cancers of the liver and oesophagus, have been found in higher proportion in males compared to females in all sub-regions of Uganda. Consumption of alcohol and tobacco smoking is higher in males compared to females in Uganda and have been found to be aetiological agents in liver and oesophageal cancer (9).

The most common cancers in both females and males in the Ankole and Kigezi sub-regions, is gastric cancer. Compared to other districts in the region, cases of gastric cancer in the Mbarara district (Ankole subregion) are more common (22). In the Kigezi and Ankole regions, risk factors such as diet rather than H. Pylori, may be more importantly associated with gastric cancer in this region of Uganda (5).

In the Ugandan sub-regions, the cancer spectrum includes prostate, oesophagus, liver, Kaposi sarcoma and gastric cancers in males. In females the cancer spectrum includes the cervix, oesophagus, gastric cancer, breast cancer, and Kaposi sarcoma. Surveys conducted to date in Uganda have shown the emergence of ovarian cancer in females. Paediatric cancers commonly found in Uganda include myeloid leukaemia, sarcomas, lymphomas and bone cancer (Table 3). Males have a higher proportion of paediatric cancers than females (M:F-1.3:1).

**Table 3**: Common Paediatric Cancers in Uganda documented in 2017-2020 (Okongo F et al., 2024)

|  |  |
| --- | --- |
| Paediatric Cancer Category | No. of Cancer Cases (%) |
| Lymphomas | 653(33.9) |
| Soft tissue sarcomas | 400(20.8) |
| Malignant Bone Tumours | 305(15.8) |
| Leukaemias other than lymphoid type | 265(13.8) |
| Others | 303(15.7) |
| Total | 1,926(100) |

A survey found that the cancer incidence rates in five high cancer burden districts are Kampala (86.6), Gulu (73.6), Kabale (68.1), Iganga (62.2) and Bushenyi (56.0) per 100,000 population (5). The districts with the lowest cancer burden included Sorenko (13.5), Bundibugyo (13.4), Arua (12.8), Kanungu (10.5) and Kole (10.2) per 100,000 people (5).

In order to assess multiple aspects of cancer control in a population, which includes diagnosis, treatment, prevention, and survival, cancer data using population-level surveillance is necessary (23). Accurate mortality registration systems that provide data on mortality are only available for 0.25% of the Sub-Saharan African population. Therefore, cancer registration is essential to obtain accurate data on cancer burden (24).

In a specific community, data from a population-based cancer registry is used to determine the cancer burden, provide a source of data for cancer aetiologies, establish priorities in cancer control, monitoring and helps to evaluate programmes for national cancer control. Population-based cancer registry data, from within sub-regions and nationally, on treatment, treatment outcomes, survival and incidence, should be used to build national cancer control programmes (25).

Apart from estimating the cancer burden based on mortality, prevalence and incidence, public-based cancer registries have been useful in providing critical frameworks to evaluate cancer research. Public-based cancer registries may through the application of informatics techniques provide rapid ascertainment of a cancer case. They may also serve as virtual population-based tissue repositories and may guide the implementation of evidence-based interventions (26).

These findings emphasize the need for periodic population-based cancer surveys and the need to support and establish more regional population-based cancer registries to determine the burden of cancer and inform regional and national cancer control programmes in the country. This data is vital in guiding interventions due to national cancer control programmes both regionally and nationally, given its fair generalizability of all regions of Uganda. Policy makers may also use this data to prioritise establishing additional regional cancer centres in Uganda and East Africa.

**Conclusions**

In Uganda, surveys on the cancer spectrum have indicated that in all the sub-regions, prostate and liver cancers in males dominate the cancer burden. Whilst in women, the main cancer types are the cervix, ovary, breast, liver and oesophagus. In children, across all regions of Uganda, lymphomas, myeloid leukaemia, soft tissue sarcomas and malignant bone tumours were more common.

The most cancer burden district in Uganda is Kampala and the least was found to be in Kole district. While the cancer profile is similar in most regions of the country, a significant variation has been found for males in different parts of Uganda, compared to those reported in the population-based cancer registries of Gulu and Kampala. There is therefore a need in Uganda to support and establish additional population-based cancer registries to guide and establish national cancer control programmes, inform regional cancer centres and accurately determine the burden of cancer.

**Declarations**

**Consent**

It is not applicable.

**Ethical Approval**

It is not applicable.

**Abbreviations**

CRC – Colorectal cancer

BRCA1/2 – Breast cancer gene ½

NCD – Non-communicable disease

KS – Kaposi sarcoma

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