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Stage at Diagnosis of Stomach Cancer Amongst Selected East African Countries: A Mini Systematic Review

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ABSTRACT

Background: Stomach cancer is one of the leading cause of death globally due to its ability to hide clinical manifestations at early stage. This review was mainly aimed to assess the stage at diagnosis of the stomach malignancy among the selected East African countries.

Methods: In this review, we retrieved 61 resources composed of 57 papers and 4 reports that were published between the year of 2005 and 2023, however only 22 papers that satisfy the inclusion criteria were considered.

Result: The results revealed of this review disclosed that the stomach cancers are diagnosed at advanced stages, specifically stage III and stage IV and this was found to negatively affects the patients' clinical outcomes and overall survival rate.

Conclusion: The present review concludes that the stomach cancer cases that are diagnosed in the selected East African countries are diagnosed late and recommend early diagnosis, improvement of health facilities and diagnostic modalities and capacity development of the oncologists, cancer focal persons and other health professionals.

Keywords: stomach; cancer; Uganda; Rwanda; stage at diagnosis

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Background

Gastric cancer is a pressing health burden in Africa that needs to be addressed appropriately for better patients' clinical outcomes[1]. It is ranked the fifth most common cancer worldwide and the fourth leading cause of cancer death [2].

It was disclosed that the risk factors that are highly associated with the development of stomach cancer including but not limited to a diet high in salt and smoked foods, a diet low in fruits and vegetables, family history of stomach cancer, genetic predisposition, having another type of cancer and it attacks the stomach through metastasis , stomach polyps and its associated surgery, long-term stomach inflammation, pernicious anemia, smoking, and infection with *Helicobacter pylori* (*H. pylori*)[3]. Africa was reported to have the highest prevalence of *H. pylori* infection and males exhibiting the stomach cancer than females.

Africa occupied 5.7 % of all 19.3 million of cancer incidences that were reported for both male and female patients globally. This continent also recorded 7.2 % of all 9.7 million global cancer deaths in both sexes. By considering the number of cancer cases that were reported among men, Africa recoded 4.7 % of new cases and 5.9 % of cancer deaths. By emphasizing on the percentage of malignancies that affected females, Africa reported 6.9 % of the new cases and 8.7% of cancer deaths[4]. As far as the epidemiology of the stomach cancer is concerned, WHO has reported 1,089,103 new cases that occupies 5.6% of all global malignancies and 768,793 new deaths that represent 7.7 % of all cancer deaths worldwide. In males, the new cases of stomach cancer occupy 7.1% of all incidences and 9.1% of the global mortality. In females, the new cases of gastric malignancies occupy 4.0% of all global incidences and represent 6.% of all death caused by stomach cancers [4]. The recent data from Globocan, an international agency for cancer research resources revealed that Uganda recorded 576 new cases, 500 deaths and 817 of the 5-year prevalence of all ages in 2020 [5] .In the same year, Rwanda recorded 587 incidences, 517 deaths and the 5-year prevalence of all ages of 817 attributed to gastric malignancies[6].

Despite the outstanding interventions and improvements in diagnosis and treatment modalities that were made, international benchmarking studies have shown that gastric cancer survival remains low, even in high income countries, this demonstrates that more focus and attention should be continuously invested on primary and secondary prevention[7]. The statistics that were published by Globocan stated that poor clinical outcomes and reduced survival rates of cancer cases are attributed to the late diagnosis[3]and the highest number of poorly diagnosed cancer cases are mostly prevalent in low and middle income countries due to lack of health facilities and awareness, timely diagnosis and effective treatment modalities, early screening and preventive strategies, shortage of research resources, under-reporting and absence of epidemiological expertise [2,4]. This report also disclosed that the stage at diagnosis and subsequent treatment outcomes are important determinants of cancer survival[8].

The incidences of GC are still high as it is often asymptomatic before it progresses to the advanced stage, it has a low early diagnosis rate and this leads to the most cases of gastric cancer being among the top causes of death [9]. The low survival rate indicates that the prognosis of patients with GC is still poor[2] and this call on different intensive research to be carried out for better understanding the prognosis of the stomach cancer.

From that standpoint and the fact that there is no paucity of published data on stage at diagnosis of gastric malignancies in East Africa, we therefore carry out this review aiming to synthetize data on stage at diagnosis of gastric cancer in selected East African countries (Rwanda and Uganda) to provide relevant and accurate data that can help to build efficient and sustainable strategies by policymakers to mitigate the health concerns of this disease.

Methods

Bibliographic database searches

Articles published on gastric cancer were identified using online search boards including but not limited to EMBASE, WHO, GLOBOCAN, NCBI, Science Direct, PubMed, Africa Index Medicus, Africa Journals Online, and Web of Science. The papers that were published between January,2005 and February ,2023 were considered. Gastric cancer stage at diagnosis, stomach neoplasm, gastric neoplasm, and stomach cancer were used as keywords to find the relevant publications. The name of the selected countries that are located in East African community were also used alongside keywords to find any information relevant to gastric cancers. The information that were not found in the database were obtained from other sources by scanning the references and retrieve the full texts. In this review, we also considered the reports from cancer registries, official governments documents related to health, government reports, and conference papers.

Inclusion and exclusion of studies in the review

In this study, we considered studies and reports that were published between the year of 2005 and 2023. The research findings that were published by Rwandan, Ugandan and other researchers of other nationalities that carried out researches on gastric cancer and reported on its status in the countries of interest. The studies obtained from searches were evaluated by to assess their reliabilities. This was done by screening the titles and abstracts of papers obtained, after which the full texts of potentially eligible papers were considered. Cohort studies, case-control studies, cross-sectional studies, and case series with more than 30 study subjects were included, however, the studies with less than 30 participants, studies with inaccessible full text online or from the principal investigators, short communications, letters to the editor, case reports, narrative reviews, commentaries, perspectives, and editorials were excluded.

Results

We have retrieved 57 articles and 4 reports that contained information on gastric cancer in the countries of interest, however the articles that were talking about the stage at initial diagnosis were 22. The papers showed that both Rwanda and Uganda have established the full functional cancer registries to carry out cancer data abstraction as an initiative to monitor cancer cases and compile accurate and quality data that should be used to inform the policy makers and health organizations/institutions for improving the prevention strategies and effective treatment modalities that should be embraced to curb the global health burdens associated with cancer. The papers that specifically report about the gastric cancer stages at initial diagnosis are few in the two countries of interest and this lack of enough published reports on stomach cancer cases should be attributed to the fact that the most focus was given to communicable diseases and less attention to non-communicable disease (NCDs), lack of research resources, late patients' presentation to the health facilities and sometimes limited resources to afford the medical bills.

Discussion

In Uganda, the incidence rate of gastric cancer rose from 0.8 (per 100,000) in 1960 to 5.6 in 2008, indicating a sharp increase[10]. The stomach cancer was common in South Western Uganda where it accounted for 12% of all cancers in males and six percent in females, but rare in Northern Uganda and Kyadondo County in Central Uganda. In 2014, Rwanda and Uganda were among the African countries that demonstrated high incidence and mortality rate whereby Uganda (9/100000,8.7/100000),Rwanda(8.3/100000, 8/100000). In Uganda, East Africa, most recent data shows a seven-folds increase incidence of gastric cancer from 0.8/100000 in the 1960s to 5.6/100000 [11]. The rate of stomach cancer in Uganda (18.4%) showed an increasing trend in 2017 with the average of 17 cases per year and this increment was found to be attributed to diet,

precancerous lesions, infection of *Helicobacter pylori* , Epstein-Barr virus and chronic gastritis [12].

As far as the cancer stages at diagnosis are concerned, the assessed papers revealed that these cancer type is diagnosed at late stage and this is in agreement with the findings of the study that was done by Jedy-Agaba and his colleagues which disclosed that most cancer patients in SSA have been diagnosed at late stages due to poor awareness, absence of early detection programs and poor facilities for accurate and timely diagnosis and treatment[9].

A study that was conducted on 14 population-based cancer registries in 12 Sub-Saharan countries demonstrated that the patients diagnosed at early stages had a 3-year relative survival of 78% in contrast to 40.3% for the patients diagnosed at advanced stages (III and IV). This demonstrated that early diagnosis increases the survival rate [13]. This is supported by another study that was carried out in different 17 Sub-Saharan African countries which revealed that 74.7% of all cancers were diagnosed at late stages[9].

The gastric cancer in African patients are younger, in their 3rd-4th decade, and present at a late stage of the disease. The gastric cancers in the LMICs were reported to be diagnosed at later stage due to inadequate endoscopic, radiological facilities and lack of timely and accurate screening programs. These limitations also apply to the countries of interest in this review as the effective options that are used to identify the stage at diagnosis such as endoscopic (endoscopic ultrasound, EUS) and radiographic [computed tomography (CT), magnetic resonance imaging, positron emission tomography and abdominal ultrasound[11].

After initial diagnosis of the cancer cases, staging is an important step that contributes a lot in the management and treatment of the disease[14], however the financial instability, inability of different oncologists at health facilities to assign stages, absence of stage related information in patients' files contribute to many data that are recorded in cancer registries with no stages at diagnosis. [11]. Staging

extends from 0 to 4, with 0 being localized (also known as carcinoma *in situ*) and stage IV representing metastatic disease to distant organs in the body. The most cases presented in Rwanda and Uganda are diagnosed at advanced stages (stage III and IV) and the possible treatment modality is palliative care and the prognosis is poor[15]. The presence of stomach cancer patients at the health facilities with advanced stages was also revealed by the study that was conducted by Luwaga and his colleagues which stated that stomach cancers carry poor prognosis and manifest at an advanced stage of the disease[10]. The stage I disease has about a 60 to 80% five-year survival; this can be as low as a less than 5% five-year survival rate in stage IV. This low survival rate is attributed to the fact that the patients delay to present to the health facilities, delayed medical appointments due to reduced number of oncologists and poor prognosis and awareness of the disease [11].

Rwanda is a low-income country that was previously labelled a failed nation due to a tragedy of genocide against the Tutsi in 1994. To date, Rwanda has demonstrated a remarkable growth in all sectors and it is now among the top performing and award-winning countries. As a part of their missions to improve health sector and cancer disease outcomes, Rwanda Ministry of Health in partnership with Rwanda Biomedical Center has established cancer registry unit under non-communicable diseases division. This unit does tremendous work to record all the cancer related data.

Studies that were conducted by Niyongombwa *et al* and Shikama *et al* at the university teaching hospital of Kigali and the university teaching hospital of Butare in Rwanda disclosed that most of the patients presented with advanced disease (stage III and IV) at the time of diagnosis[16] representing 74% of enrolled patients and 62.3% of them manifested metastatic disease [17]. The fact that patients presented with advanced disease has negatively affected their management, limiting the treatment options to palliative surgery in 25.3% or to non-surgical palliative treatment, like intravenous fluid therapy, analgesics, nutrition

and oxygen supplementation for 55% of patients [17]. This is supported by the results published by Ntakiyiruta who carried out an assessment of gastric cancer at Kibogora hospital and found that the majority of the cancers cases were diagnosed at an advanced stage due to the fact that the early stomach cancers do not show any specific symptoms and endoscopic screening were not easily accessible [18]. The study that was conducted by Niyibizi and colleagues in 2023 revealed that the patients in lower and middle income countries including Rwanda often present to the health facilities and cancer centers with more advanced cancer that require multi-modality treatment for better clinical outcomes [19]. The diagnosis of cancer cases that is done at advanced stage was also highlighted by Rubagumya and his colleagues noting that the increment of cancer awareness in the general population is a great necessity to encourage them to shift to early diagnosis, hence effective treatment and better clinical outcomes [20]. A retrospective time-series study that was conducted by Habinshuti and colleagues to assess the impact of the COVID-19 pandemic on cancer care services among patients seeking cancer care in Rwanda emphasized that the scarcity of adequate medical equipment and laboratories to effectively diagnose cancer cases leads to the diagnosis at advanced stages, hence reduced survival [21].

Conclusion

Based on the findings of this mini systematic review, it is factual to conclude that the gastric cancer cases reported in these selected East African countries are diagnosed at advanced stages, hence low survival rate. From that standpoint, it is clear to recommend the empowerment of the diagnostic modalities, capacity development for the oncologists and other health professionals to assign stage at initial diagnosis and report them in cancer patients' files, cancer awareness, reporting of cancer- related data and publishing cancer research findings.

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