CHAPTER II. LITERATURE REVIEW

2.1.Cancer Disease

Cancer is a global health burden that is considered as the main culprit of cancer death (Hamdi *et al.*, 2021). Referring to the estimate numbers from the World Health Organization (WHO),malignancy is the first or second cause of mortality among the patients of less than 70 years of age (Sung *et al.*, 2021). The overall health concerns of cancer incidences and mortality is quickly expanding globally and this reflects the contribution of aging, demographic expansion, cancer associated risk factors that are linked to socioeconomic development (Sung *et al.*, 2021). The study findings reported that diets high in salt, consumption of less fruits and vegetables, alcohol consumption, history of stomach cancer in family and gastric polyps, gastric inflammation for a long-run, low red blood cells, smoking, and infection with *Helicobacter pylori* (Hamdi *et al.*, 2021; Li *et al.*, 2022).

Records of cancer cases from all African countries are accessible on GLOBOCAN website and these records are compiled from the cancer registries that mainly register the cancer cases from health facilities and cancer centers. In Africa, this non-communicable disease is an emerging health burden that should be appropriately addressed to reduce its incidence and mortality rates (Hamdi *et al.*, 2021). The literature reported that there is an absence of committed individuals and institutions to fight cancer because much attention was given to communicable diseases. Due to the absence of facilities, cost of care, low number of specialized oncologists and late diagnosis, the incidence and mortality rates attributed to cancer are gradually expanding in Africa (Chen *et al.*, 2020). The rates of death caused by

cancers in Africa continent are projected to go beyond the world average by 30% in the next 20 years (Hamdi *et al.*, 2021).

Cancer is linked to genetics and it was reported to have increased incidences in Africa as this continent is populated with people from various ethnic groups and that present a variety of cancers associated to genetic materials and the genetic associated cancers were reported to claim a larger toll of life (Hamdi *et al.*, 2021). By considering the age as a risk factor to develop gastric malignancy, it was reported that people with young age have less probability to suffer from stomach cancer (Li *et al.*, 2022).

The prevalence of *H. pylori* infection in Africa is 70.1% and this increased prevalence contributed to the elevated number of gastric cancers that are reported on African continent. Moreover, the Lynch syndrome, familial adenomatous polyposis, and genetic mutations were reported to be strong risk factors of stomach cancer on a family level (Li *et al.*, 2022).

Knowing the stages at which cancer types were diagnosed and the survival rate have great importance in diagnosis, curative and palliative treatments and to reinforce the prevention procedures that should be put in place to mitigate these non-communicable diseases. The stages at diagnosis and associated treatment outcomes determine cancer survival whereby the survival rates capture both how well health systems are in detecting the disease and whether people have timely access to effective treatment (Mariotto *et al.*, 2014).

2.2. Stage at Diagnosis of Stomach Cancer

The stage at diagnosis and treatment outcomes determines cancer survival. In SSA, the majority of cancer cases have been diagnosed at advanced stages due to poor awareness, lack of detection programs and poor health facilities (Jedy-Agba *et al.*, 2016). A study that was conducted 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 (Joko-fru *et al.*, 2020). In evaluation of 17 SSA countries, 74.7% of all cancers were diagnosed at late stages (Jedy-Agba *et al.*, 2016).

2.3. Survival of Stomach Cancer

Survival rates capture both how well health systems are in detecting the disease and whether people have timely access to effective treatment (Mariotto *et al.*, 2014). Survival rates may help to better understand how likely the adopted treatment modalities will be successful. There is a huge difference in survival for cancer patients that reside in high income countries (HIC) and low-and-middle income countries (LMIC). The poorer cancer survival in LMIC especially in African countries compared with HICs is linked to the big number of patients diagnosed at late stages. However, the unavailability of data on cancer stage at initial diagnosis in Africa is due to tiny funds for data collection, limited treatment options, unavailability of imaging tools and other main components of the TNM staging systems adopted by HICs (Parkin *et al.*, 2021).

The survival rate of stomach patients was found to be directly proportional to socioeconomic statuses as demonstrated by the improvement that happened in the period of 2002–2016 and 2017– 2021. As the big number of global citizens are falling into poverty level due to wars, inflation and pandemics, the reduction in survival for stomach cancer cases was remarked. People with low socio-economic status have reduced survival outcomes because of various constraints to access medical care services, limited social support, inaccessibility to health information and late treatment (Huang *et al.*, 2020).

The study conducted by Li et al, 2022 disclosed that there is a huge difference in survival between white and Asians, however Asians demonstrated high survival compared to other human races. This should be attributed to the fact that some Asian are skilled about the risk factors of the stomach cancer and have routine screening for detecting cancerous lesions hence effective treatment (Li *et al.*, 2022).

2.4.Epidemiology of Stomach Cancer

By considering data that were published in 2020 on all cancer types, an estimate of 19.3 million incidences and 10 million cancer deaths were recorded worldwide. Over ten million of new cases and 5.5 million deaths were reported among males whereas 9.2 million of cancer incidences and 4.4 million of deaths were reported among female patients (Sung *et al.*, 2021). Europe represents 9.7 % of the global citizens and the percentage of cancer cases that were reported on this continent is 22.8% of the total global cancer cases and 19.6% of deaths associated with cancer. Europe is followed by the Americas' 20.9% of new cases and 14.2% of death

globally. The death toll in Asia (58.3%) is higher than the rate of incidence (49.3%) due to variability in cancer types distribution and elevated fatality in this region (Sung *et al.*, 2021).The continent with least incidence cases is Oceania that occupies 1.3 % of global incidences and 0.7% of the global cancer deaths.

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 % incidences and 5.9 % of mortality. By emphasizing on the percentage of malignancies that affected females, Africa reported 6.9 % of the new cases and 8.7% of cancer deaths (Sung *et al.*, 2021).

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 mortality worldwide. In males, the new cases of stomach malignancy 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 (Sung *et al.*, 2021).

As per the recent report of Globocan, Rwanda recorded 587 incidences of stomach cancer composed of 322(54.85%) males and 265 (45.14%) females. 517 deaths of gastric cancer were recorded and disclosed the 5-year prevalence of all ages of 6.31 % (817 cases) attributed to gastric malignancies (Globocan, 2021).