CHAPTER I: INTRODUCTION

1.1. Background

Cancer is the leading cause of death and reduces life expectancy in all nations globally (Bray, 2021). It is also known as an emerging health issue on African continent that should be well addressed to reduce both incidence and mortality rates (Hamdi *et al.*, 2021).

Beside the decline of the incidence and death rates in the past- half century, gastric cancer (GC) is ranked the fifth most common cancer worldwide and the fourth main cause of cancer deaths (Li *et al.*, 2022).The incidence of **GC** is still high because it is often asymptomatic at its early stage and this makes it diagnosed at late stage which leads to unsuccessful treatment and the deaths of patients (Niyibizi *et al.*, 2023). The low survival rate indicates poor prognosis (Li *et al.*, 2022) and this call on different intensive studies to be carried out for better understanding the prognosis of the stomach cancer, its incidences, stages at diagnosis and survival especially in developing countries including Rwanda (Globocan, 2021).

Rwanda is a landlocked country that is located in the heart of East Africa. It is also known as the land of 1,000 hills that is bordered by Burundi, Uganda, Tanzania, and the Democratic Republic of Congo (Uwayezu, Nikuze and Fitch, 2020). Kigali is the capital city of Rwanda and it is highly populated with residents that are exposed to high risk factors of developing stomach cancer such smoking, high body mass index, overweight and consumption of heavy alcohol. In comparison to residents of other secondary cities and villages, the Kigalians are also known to mostly eat salty, fried foods on a regular basis, less consumption of

fruits and vegetables, consume street foods that maybe a potential source of *Helicobater pyroli* infection, high intake of sugar and do not involve in regular physical exercises (Hamdi *et al.*, 2021; Li *et al.*, 2022). Due to these life habits and living conditions, Kigalians are likely to have high incidences of GC (Rwanda Biomedical Center, 2019).

As per recent updates from Globocan, stomach cancer was reported to be among the top five cancers with high morbidity and mortality in Rwanda. Rwanda recorded 587 incidences of stomach cancer composed of 322 (54.85%) males and 265 (45.14%) females. It was also revealed that 67% of these incidents were recorded in the city of Kigali followed by the supporting cities(Rwanda Biomedical Center, 2019). It was also reported that gastric cancer claimed 517 people consisted of 297 (57.44%) males and 220 (42.56%) females with the 5-year prevalence of gastric malignancies of all ages was 6.31 % that accounts 817 stomach cancer cases (Globocan, 2021). High priority in regular screening was given to breast and cervical cancer, hence stomach cancer is among the cancers that are not regularly screened and end up diagnosed at advanced stage and increase the number of deaths (Rwanda Biomedical Center, 2019).

Conducting scientific studies on stomach cancer stages at initial diagnosis and associated survival contribute to the reduction of the cancer incidences by providing accurate data that serve as a baseline to inform the policy makers and health experts to design effective diagnosis, treatment modalities and preventive measures that trigger the reinforcement of cancer awareness and improve the cancer disease outcomes (Islami *et al.*, 2015). Parkin *et al* disclosed that the lack of

information on stage at diagnosis is a barrier to improving cancer clinical outcomes as the stages of cancer at initial diagnosis are the strong predictors of the patient's survival and direct the oncologists on the right treatments to administer the patients depending on the severity of the cases (Parkin *et al.*, 2021). This emphasizes the important contribution of early diagnosis to the survival rate of the cancer cases which lead to timely, accurate and effective disease burden management (Parkin *et al.*, 2021).

Cancer stages at initial diagnosis are important to be studied as they are good indicators that help to develop effective strategies to ameliorate cancer patients' outcomes (Parkin *et al.*, 2021). Stage at diagnosis also helps the oncologist to know the treatment of choice to administer to the patients' dependent to his clinical manifestations and the severity of the disease. In SSA, the majority of cancer cases have been diagnosed at advanced stages due to poor awareness, lack of programs for early diagnosis and poorly equipped health facilities to accurately diagnose and effectively treat the patients (Jedy-Agba *et al.*, 2016). A study that was conducted in twelve countries in SSA demonstrated that the patients diagnosed at the lower stages had a 3-year relative survival of 78% in contrast to 40.3% for the patients diagnosed at advanced cancer stages (Joko-fru *et al.*, 2020).

Survival studies are important to be carried out because they capture both how well the health systems are in detecting the disease and help to understand the quality and effectiveness of the adopted treatment modalities (Mariotto et al., 2014). The survival statistics are of vital importance in estimating cancer prognosis and burden in a population, comparing cancer outcomes over a period of time,

providing information on vital statuses of cancer patients within a defined catchment area and evaluating the implementation of cancer control strategies (Okuyama *et al.*, 2020).

Cancer stage at initial diagnosis and survival are related in a way that the cancer cases that are diagnosed at early stage demonstrate high survival rate than the cases that were diagnosed at advanced stages where the majority of the patients die soon after the diagnosis (Joko-fru *et al.*, 2020).The scarcity of data on cancer stage at diagnosis on population distribution in different in most African countries including Rwanda is attributed to the lack of funding to gather these data, limited availability and access to sophisticated diagnostic imaging and other tools that are crucial for staging purposes as it is in the HICs (Parkin et al., 2021).

Rwanda has made tremendous progress in cancer control through efforts to improve access to quality cancer healthcare and prevention, screening and curative modalities, however, there is a huge scarcity of data on stomach cancer stage at diagnosis and the patients' survival some years post diagnosis. In line with that, this study is intended to assess the stage at initial diagnosis, survival rate and to determine the association between them for the purpose of informing policy makers and public health institutions to give much attention to regular and consistent awareness, cancer research projects, development of infrastructure at health facilities (diagnostic tools, reagents, etc), capacity building of oncologists and health practitioners to curb the burden of stomach cancer.

1.2.Problem Formulation

General Problem

Increased number of incidences and deaths attributed to gastric cancer in Rwanda is a public health concern that needs to be appropriately addressed (Rubagumya *et al.*, 2020). Recent data disclosed that 67% of nationwide gastric cancer cases were reported in Kigali city (Globocan, 2021) and there is no published data on stage at initial diagnosis and patients survival to be used to figure out the problem's root causes. The lack of accurate information on stage at initial diagnosis of stomach malignancy and patients' survival rates in Rwanda contribute to poor capacity development of health facilities, poor patients' clinical outcomes, reduced survival rates and delayed screening and diagnosis, hence ineffective treatment. Increased cancer cases and deaths in Kigali city and the absence of information on stage at diagnosis and how long the cancer patients live post-diagnosis are the area of concerns that calls intensive research to be carried out to rule out the intensity of the problem and find effective ways to resolve it.

Specific Questions

Is there any relationship between the stages at diagnosis and the incidence of death in the first year, third year, and fifth year after diagnosis in gastric cancer patients diagnosed in Kigali city between 2014 and 2018?

1.3. Research Objectives

1.3.1. Main Objective

This research is mainly intended to prove a relationship between the stages at diagnosis and the incidences of death, and between stages at diagnosis and survival at first year, third year, and fifth years post diagnosis in gastric cancer patients diagnosed in Kigali city between 2014 and 2018.

1.3.2. Specific Objectives

To achieve the main goal of this study, the listed below specific objectives were put forward.

1. To prove a relationship between stages at diagnosis and the incidence of death in the first-year post diagnosis in gastric cancer patients diagnosed in Kigali city between 2014 and 2018

2. To prove a relationship between stages at diagnosis and the incidences of death in the third-year post diagnosis in gastric cancer patients in Kigali city between 2014 and 2018

3. To prove a relationship between stages at diagnosis and the incidences of death in the fifth-year post diagnosis in gastric cancer patients diagnosed in Kigali city between 2014 and 2018

4. To prove a relationship between stages at diagnosis and survival at 1 year,3 years and 5 years post diagnosis in gastric cancer patients diagnosed in Kigali city between 2014 and 2018

5. To calculate the survival rate of stomach cancer patients diagnosed in Kigali city between 2014 and 2018 at 1 year ,3 years and 5 years post diagnosis

1.4.Research Benefits

1.4.1. Theoretical Benefits

This study will provide a clear status of the clinical outcomes, stage at diagnosis and survival rate at 1 year, 3 years and 5 years post diagnosis of stomach cancer among patients diagnosed in Kigali City between 2014 and 2018.This will reveal the intensity of the problem and inform policy makers on what to do to curb

this health dynamic. The findings of this study will also be used to make data driven decisions and contribute to the improvement of screening, diagnosis and treatment modalities for better cancer clinical outcomes and development of health facilities infrastructure.

1.4.2. Practical Benefits

Practically, this research will be of great importance if the proposed research hypotheses are found to be true. If the results are found to be as hypothesized, the findings of this research will enrich literature and reveal the status of stomach cancer in Rwanda. They will also inform scientists to do more deep research and inform government to work on this health concern and provide effective strategies to manage it.

1.5. Research Authenticity

The proposed research has never been conducted in Rwanda before. Rwanda and other Sub- Saharan African countries are continuously facing increased rate of death attributed to stomach cancers, however the main hindrance to address this issue is the lack of updated data on cancer outcomes, stage at diagnosis and survival. To address this health burden of late diagnosis and reduced survivals of cancer patients, this research will disclose the intensity of the problem and suggest the modalities and recommendations that should be embraced to curb it down.

A study that was conducted on fourteen cancer registries in 12 countries located in the Sub-Saharan region demonstrated that the early diagnosis, the better

the survival rate (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).

The study conducted by Li et al, 2022 disclosed that there is a significant difference of stomach cancer survival rate between White and Asian patients and the Asian patients showed high survival compared to the patients from other human races. This should be attributed to the fact that some Asians are informed about the risk factors of GC and do regular screening to detect of cancerous lesions hence effective treatment. The same study that was conducted in the USA showed that old patients occupied the larger proportion of the study subjects with stomach cancer (Li *et al.*, 2022).

1.6. Scope

The limitation of the problem that is discussed in this research should be attributed to the lack of complete data on stage at initial diagnosis and clinical outcomes of the enrolled subjects due to the fact that some oncologists are not skilled enough to identify the stage at initial diagnosis, few cancer focal persons at the hospital, lack of sophisticated equipment to timely and accurately diagnose stomach cancer at early stages, absence of awareness for early and consistent cancer screening programs, lack of preventive strategies and lack of resources and financial stability to cover the treatment expenses. These limitations should be addressed by the intervention of health organizations, political will and the commitments of the citizens to do regular screening and medical checkups and to seek medical care early for better prognosis and effective treatment.