

Alarming Cases of Cancer in Kenya: A Case for Meru and Tharaka Nithi Counties

Joshua Mutiso

Department of Zoological Sciences,
Kenyatta University, Nairobi, Kenya

Ciriaka Gitonga

Department of Zoological Sciences,
Kenyatta University, Nairobi, Kenya

Bulle Abdullahi

Department of Community Health and Epidemiology,
Kenyatta University, Nairobi, Kenya

Jemimah Simbauni

Department of Zoological Sciences,
Kenyatta University, Nairobi, Kenya

Michael Gicheru

Department of Zoological Sciences,
Kenyatta University, Nairobi, Kenya

ABSTRACT

Background: Cancer is one of the leading causes of morbidity and mortality worldwide. In Kenya, cancer as a disease ranks third as a cause of death after infectious and cardiovascular diseases and the cancer cases are increasing at an alarming rate. **Objective:** The current study was aimed at determining the prevalence trends of cancer in Meru and Tharaka Nithi Counties with an aim of putting proper infrastructural and human capacity development to combat cancer. **Methods:** A random selection of patients aged between five to eighty-two years clinically diagnosed as cancer patients who were visiting Meru and Chuka General Hospitals for a period of one year were recruited for the study. The participants were requested to give a verbal consent and respond to a brief questionnaire concerning their gender, age and the type of cancer they are suffering from. This study used retrogressive approach where the trend of cancer incidences and death rate were determined for the last eight years (2011 to 2018) using the hospital data. Data were analysed using statistical package for social sciences (SPSS). **Results:** This study established that the prevalence of cancer in people visiting hospitals in Meru and Tharaka Nithi Counties was 0.32% and 0.38% respectively. Further, the prevalence trends of cancer cases in the two counties have been increasing over the last eight years. **Conclusion:** The study concludes that cancer is prevalent in Meru and Tharaka Nithi Counties. It is therefore recommended that proper infrastructural and human capacity development be put in place to combat cancer.

Keywords: Cancer; Kenya, Meru and Tharaka Nithi Counties; Prevalence; trends, risk factors.

INTRODUCTION

Cancer is a group of diseases that result from uncontrolled proliferation of abnormal cells in the body. Uncontrolled cell growth is brought about by activation of oncogenes or deactivation of tumor suppressor genes leading to formation of tumors. Tumors can cause death if they disrupt the normal functioning of tissues and organs needed for survival [1]. In 2015, cancer caused 8.8 million deaths globally, making it the second leading cause of death after cardiovascular disease. Most of the deaths resulting from cancer occur in middle- and low-income countries [2]. Tobacco use is the major drug-based risk factor for cancer and is responsible for about 22% of cancer deaths.

Cancer is the third leading cause of morbidity in Kenya (7% of deaths in Kenya per year) after infectious and cardiovascular diseases. Sixty percent of Kenyans suffering from cancer are younger than 70 years old. The most leading cancers in women are breast cancer (34 per 100,000 people) and cervical (25 per 100 people) while in men prostate (17 per 100,000) and esophageal (9 per 100,000 people) are the most common cancers. Cancer is mainly diagnosed when it has already spread to other areas of the body due to lack of awareness, inadequate treatment and diagnostic facilities, high cost of treatment and high poverty index [3].

Out of all cases referred to Kenyatta National Hospital (KNH) in Nairobi for cancer therapy from other counties, 15% are from Meru County. The reasons for high cases of cancer in Meru County are not well documented. Brain and lung cancers are the most common in Igembe and parts of Tigania. The high incidences could be due to high consumption of Miraa and heavy smoking. Hospital data indicate that throat cancer and brain cancer are prevalent in Kiegoi, possibly due to excessive consumption of alcohol.

Increased cancer cases in the County have partly been blamed on poor post-harvest handling of cereals. Cereals develop aflatoxin due to high moisture content because farmers who rely on irrigation rush to harvest their crops when the rains start. Even if the grains with aflatoxin are given to livestock and a person consumes meat from that animal, he stands a chance of ingesting aflatoxin. Cool weather in Meru County favours proliferation of pests and weeds. Farmers are forced to use high concentration of agrochemicals which are not regulated. When people feed on these foods, they incorporate in their bodies heavy metals that can lead to cancer. Poor eating habits are predisposing many to lifestyle diseases [4]. Six out of every ten people are either obese, overweight or underweight. Many farmers take bread and tea with little milk as breakfast. In the evening because they are tired, they buy sliced cabbage mixed with carrots and white rice. They then consume large servings as supper worsening the situation. They fail to take balanced diets in right proportions resulting to high cases of cancer, diabetes and high blood pressure. Health experts have blamed the high incidences of cancer on unexploded ordnance (UO) dropped into forest hills by the British air force during the independence struggle which polluted water sources [5].

Cancer grows when a cell's DNA is damaged [6]. The DNA could be damaged by either genetic or environmental factors. Race, gender, age, hereditary factors in families and mutations in certain genes such as BRCA1 and BRCA2 are some of the genetic factors that predispose an

individual to breast cancer [7]. Environmental risk factors include lack of physical activity, drinking alcohol, radiations and hormone replacement therapy. Other risk factors for cervical cancer include infection by human *papilloma* virus, deficiency in the immune system, age, smoking, oral contraceptive and exposure to diethylstilbestrol (DES) [6]. The prevalence of cancer in Meru County is not known, so proper infrastructural and man power are not put in place at local hospitals to handle the pandemic. This study aimed at determining the prevalence trends of cancer in Meru and Tharaka Nithi Counties so that proper infrastructural screening and treatment facilities as well as human capacity development are put in place to combat cancer.

METHODS

Study Area

The current study was carried out at Meru General Hospital, Imenti Central Constituency, Meru County and Chuka General Hospital, Maara Constituency, Tharaka Nithi County. Meru General Hospital is located at latitudes 0° 02' 46" N and longitudes 37° 39' 21" E and is at altitude of 1,579 m above sea level. This hospital handles most of the cancer cases in the County. Meru County is located in the eastern region of Kenya approximately 225 km North East of Nairobi. It has a population of 1.4 million people [8]. Meru County is characterized by warm and cool climate. The annual rainfall ranges between 500mm and 2,600mm while temperature ranges between 16.0°C to 23.0°C. The economic activity in the region is agriculture where farmers grow foods such as bananas, beans, maize, cabbages, fruits, millet and sorghum. The cash crops for this County are coffee and tea. The County is well known for its large scale growing of the miraa (khat). The khat is grown in Maua, Igembe and Tigania. Livestock reared include cattle, sheep, chicken and goats. Chuka General Hospital is located at latitudes 0° 19' 59" S and Longitude 37° 38' 45" E and is at altitude of 1445 m above sea level. The hospital has a palliative care unit for the terminally ill cancer patients. Tharaka Nithi County is located in eastern region of Kenya approximately 182.6 km North East of Nairobi. It has a population of 393,177 people as of the 2019 census. The county lies on a semi-arid area. The annual rainfall averages between 200 mm and 800mm while temperature ranges between 11.0 °C and 25.9 °C during cold and hot seasons respectively. The primary economic activities are coffee and tea farming as well as sheep and goat keeping.

Research Design

The present study utilized a longitudinal research design and involved 196 participants aged five years and above. Individuals clinically diagnosed as cancer patients and the health controls were asked to give consent and respond to a brief questionnaire about age and the type of cancer they were suffering from. The present study also used retrogressive approach where the trend of cancer incidences and death rate were determined for the last eight years using the hospital data. The trends of cancer over the years were obtained from hospital records. Further, the age groups and gender that are most affected by specific type of cancer were studied.

Statistical Analysis

Raw data were entered into Microsoft Excel. International business machines corporation statistical package for the social sciences (IBM SPSS) statistics version 21.0 was used for statistical analysis. Data analysis involved calculation of descriptive statistics; frequencies, standard deviations and means. An output of statistical analysis was presented in form of tables, graphs and charts.

Ethical Consideration

The study obtained ethical approval from Kenyatta University Ethical Review Committee. Meru and Chuka District Hospital Ethical Committee gave permit to conduct the study and Informed consent was sought from research participants.

RESULTS

Prevalence and Trends of Cancer in Meru and Tharaka Nithi Counties in the Year 2011 to 2018

In 2018, the prevalence of cancer among the people visiting hospital in Meru County was found to be 0.32% whereas Tharaka Nithi County had a prevalence of 0.38% as presented in Figure 1. The present study further established that in Meru County, there exists a statistically significant relationship between the number of cancer cases and the period under study (F-test=7.560; P=0.033).

The coefficient of determination of 0.558 implies that 55.8% of variation in the number of cases is explained by the period under investigation. The results showed that there has been a significant increase of cancer prevalence in Meru County over the years under consideration, with the largest increase being experienced in 2018.

Findings in Tharaka Nithi County indicated a marginally significant relationship between the number of cancer cases and the period under study (F-test=5.764; P=0.053). The coefficient of determination was found to be 0.49 implying that 49% variation in the number of cases in Tharaka Nithi County is explained by the period under consideration. Similar to the findings in Meru County, the present study reports an increasing trend in cancer cases over the years from 2011 to 2018, in Tharaka Nithi County with the largest increase being experienced in 2018.

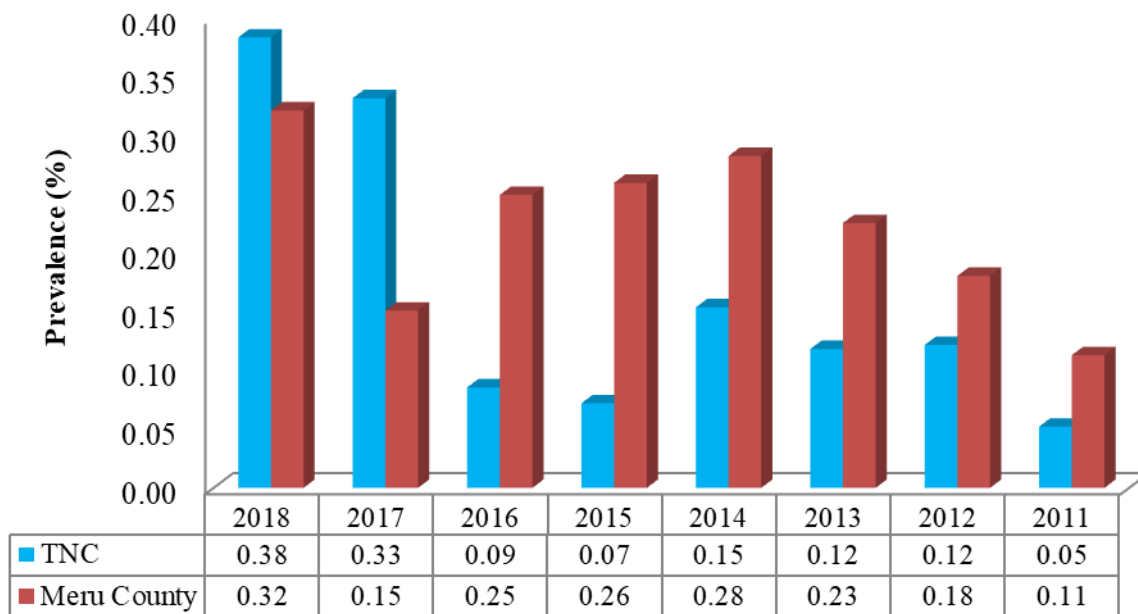


Figure 1: Prevalence trends of cancer in Meru and TharakaNithi Counties (TNC) in the year 2011 to 2018.

Cancer Types Among the Respondents

The study sought to establish the most common types of cancers the respondents were suffering from. The most common type of cancer in female was breast cancer followed by cervical cancer, stomach cancer, esophageal and ovarian cancer in that order. In males, prostate cancer was the most prevalent followed by esophageal cancer, stomach cancers, mouth and throat cancers in that order. Brain cancer, leukemia and urothelial cancers were less common at 1% each. Meru County had more cancer cases than Tharaka Nithi County. The result showed that the prevalence of cancer in males and females is the same (Figure 2a, Figure 2b, Figure 3 and Figure 4).

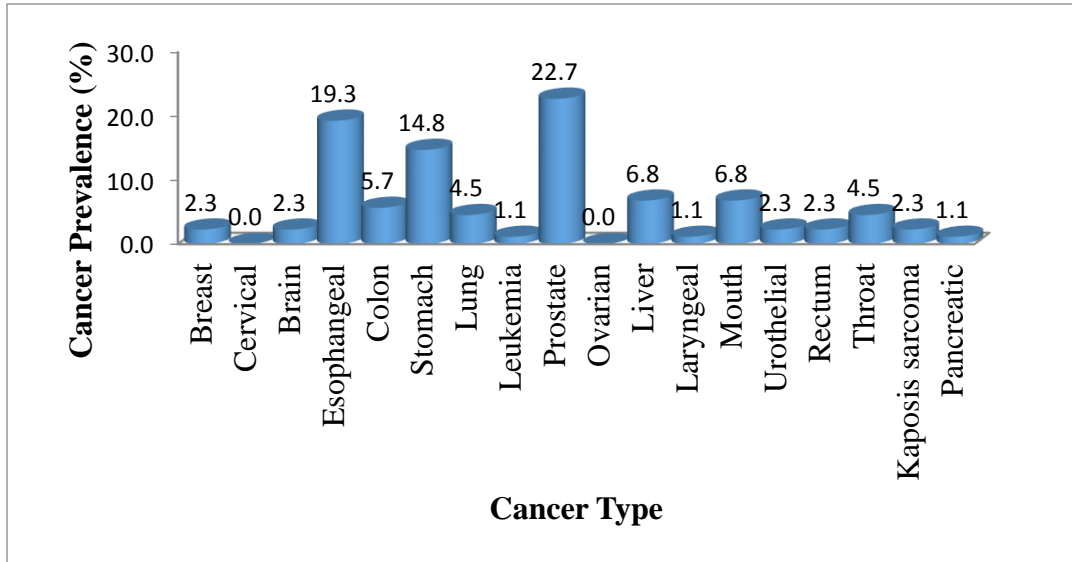


Figure 2a: Cancer type among the Male respondents

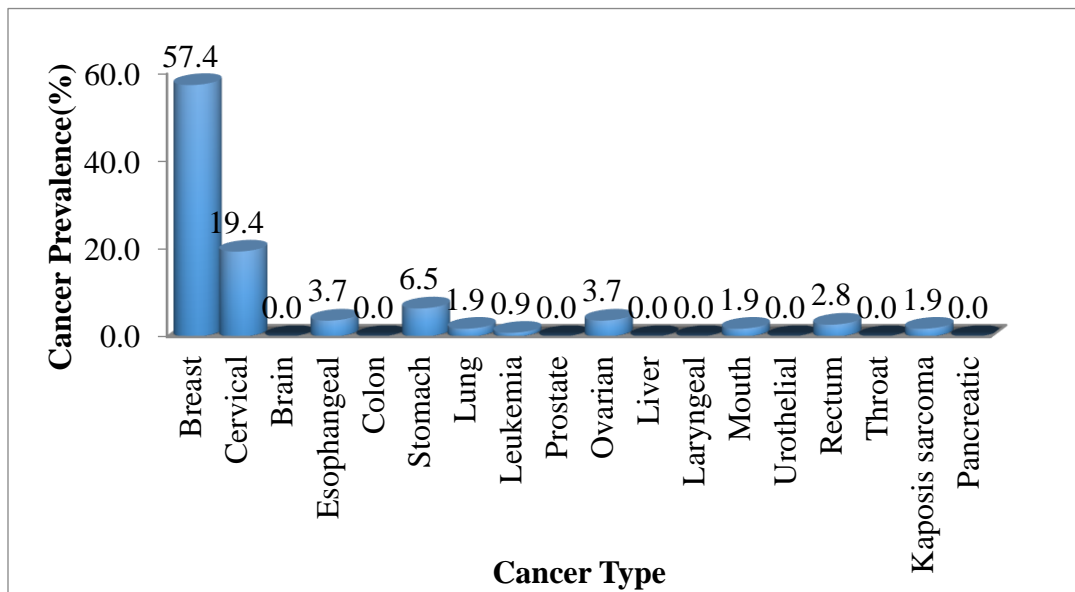


Figure 2b: Cancer type among the Female respondents

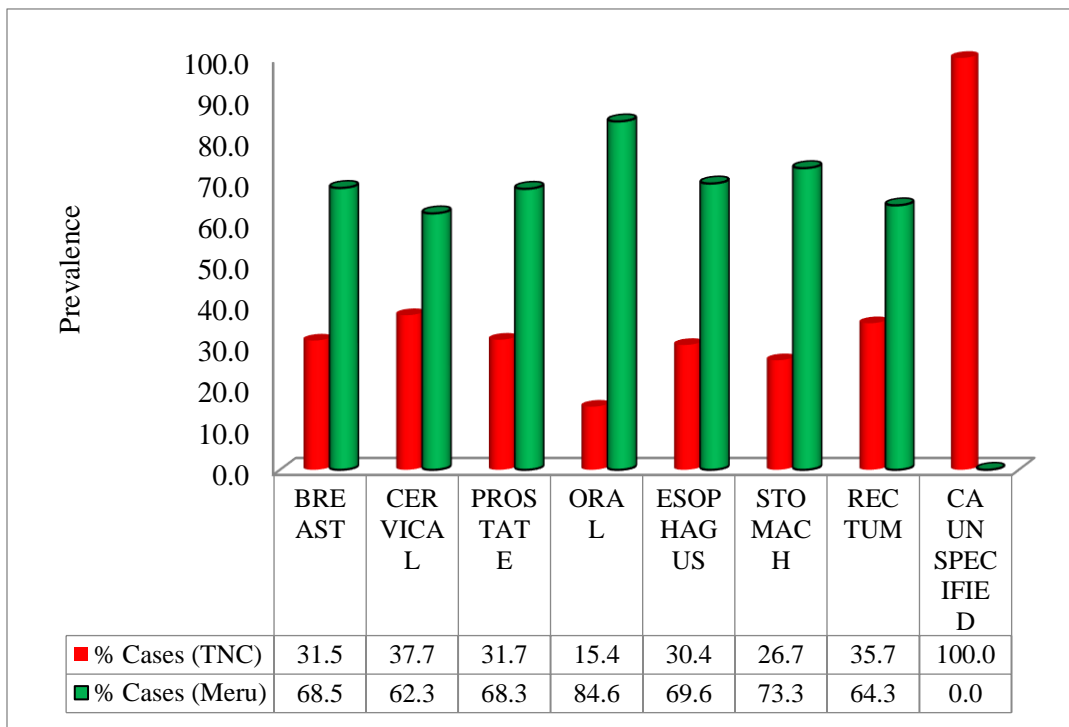


Figure 3: Prevalence of different cancer types in Tharaka Nithi and Meru Counties among the study population. TNC: TharakaNithi County.

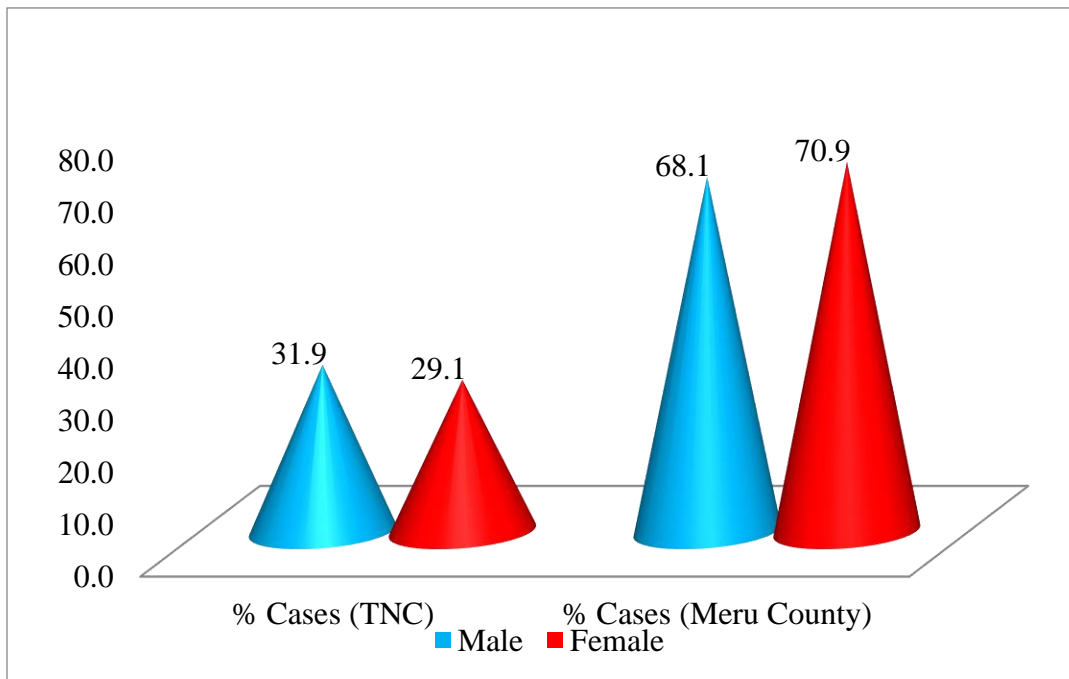


Figure 4: Prevalence of cancer in males and females in the study population. TNC: Tharaka Nithi County.

DISCUSSION

Data obtained from the current study shows that the prevalence of cancer in people visiting hospitals in Meru County in 2018 was 0.32% whereas Tharaka Nithi County recorded a

prevalence of 0.38% in the same year. These results point to high prevalence globally basing on 2020 World cancer research fund international which reported Denmark as leading the world with 0.33% [9]. Previous years showed relatively lower cancer prevalence in the two counties.

The increase in cancer prevalence over the years supports a recent study by Wenpeng and Maciej (2019) that reported an increasing cancer incidence globally describing it as being a consequence of relaxed natural selection [10]. The increase in cancer prevalence could be explained in terms of accumulation of mutant alleles that are now more common, which are then inherited along family lines. Many cancers are detected in people above 55 years of age.

Due to better medical care, there is an increasing life expectancy, meaning there is more population of old people, therefore, more cancers are detected. Most people in these two Counties are farmers and they are exposed to some risk factors like pesticides, UV light, charcoal smoke and contaminated water. Poor diet patterns coupled with cigarette smoking and khat chewing have further compounded the risk. Due to industrialisation and urbanization, people are now exposed to various environmental pollutants that are carcinogenic [11]. The increase in prevalence trends of cancer over the years could be due to availability of cancer-specific diagnostic test that were not previously available, that are able to detect cancer. A change of lifestyle coupled with poor diet has lead to more people being overweight which is a risk factor for cancer and these findings are in conformity with World Cancer Research Fund International 2020 which estimated 40% of cancer cases to be preventable by observing diet related risk factors [9].

The current study established that breast cancer was the most prevalent cancer among women at 32.7% followed by cervical cancer at 10.7%. These findings are in line with study carried out by Mahshid *et al.* (2021) in Bhutan which found that breast cancer is most common cancer in women followed by cervical cancer [12]. Screening programmes have been organized for breast and cervical cancers, leading to increased cases of these cancers being detected. Most women are overweight due to living sedentary lifestyles and taking poor diets. Body fat secretes eostrogen that stimulates cell proliferation causing cancer. Some patients who had breast cancer reported to have a member of family, either a mother or daughter who had breast cancer so it could have been a case of genetic transmission [13]. The high breast cancer cases could be because most women are giving birth to fewer kids and are working, so they do not have enough time to breast feed increasing the risk of breast cancer. A study by Vesna *et al.* (2021) reported a decreased risk of developing breast cancer in multiparous women [14]. These women produce fewer cancer inducing hormone that can stimulate cell proliferation. Mothers who breast feed have lower chances of developing pre- and post-menopausal breast cancer. Hormonal changes occur during lactation that ensures a woman is less exposed to hormones like estrogen that can stimulate growth of breast cancer cells. During pregnancy and breast feeding, breast tissue is shed and this helps to shed cells that may carry mutated DNA, thereby reducing the chances of developing breast cancer. Most breast cancer patients reported to have started menopause after age of 50 years. This could have exposed them to eostrogen hormone for a long time predisposing them to cancer [15]. Some patients reported to have used oral contraceptive pills after age of 40 years. This has been associated with cases of breast cancer [16].

The most prevalent cancer in men was prostate cancer at 10.2% followed by esophageal cancer, a finding that concurs with a study carried out by Prashanth (2019) which found out that prostate cancer is most common type of cancer in men above 65 years of age [17]. The current study established that 84.21% of prostate cancer cases occurred in males above 55 years old. Older population has the greatest risk of prostate cancer [18]. Due to good health care system, there is an increase in life expectancy, therefore, people are living to 70 years, 80 years and 90 years therefore, more cases of prostate cancer are detected. Esophageal cancer is the second most common cancer, a finding that is in line with a study by Daniel (2021) which found that esophageal cancer is the most common cancer in men due to alcohol consumption and smoking [19]. Most men with this cancer in the current study reported to have engaged in smoking and chewing of khat which could have predisposed them to esophageal cancer.

A high proportion of respondents who presented with cancer in the current study were females (55.1%) while males were 44.9%. The current study was hospital based and the observation that fewer males seek medical care may draw some analogy from a study by Courtenay (2020) which established that due to traditional view about men's masculinity that requires them to be self-reliant and strong, there is tendency for them not to seek healthcare more often [20]. Men tend to fear the outcome of a diagnosis, so they prefer to avoid any screening at whatever means, so they keep postponing medical check up until the symptoms are severe and disease has progressed to late stages [21]. Certain body examinations for example, colonoscopy, makes men uncomfortable hence avoid it altogether. Men do not have support groups and their knowledge on health matters are limited [22].

Lack of proper information on the causes of cancer has made people to engage in risk behaviours like smoking, lack of physical activity, alcohol use and eating poor diet. The finding supports a study carried out by Mohammed (2019) who established that lack of awareness on the causes of cancer has hampered the fight on cancer increasing cancer morbidity and mortality [23]. Lack of proper awareness that HPV infection, obesity, air pollution, poor diet and smoking can lead to cancer as has been established in the current study, a finding that supports a study by Somdatta and Baridalyne (2020) in which respondents showed a low awareness about the risk factors for cancer [24]. Having basic knowledge on causes of cancer decreases the burden of cancer diagnosis and treatment. Lack of public sensitization on importance of routine screening has resulted to many cancers being detected at late stages.

Poor cancer diagnosis and delay in seeking cancer treatment could have resulted to the cancer progressing to advanced stages that lead to poor treatment outcome, a finding that supports previous finding by Steven (2020) that associated late cancer treatment with low survival rate due to rapid disease progression [25]. However, persistent symptoms that necessitated frequent visit to the hospital by respondents prompted the healthcare professional to order for a cancer diagnosis which lead to cancer being detected. The availability of healthcare facilities has made it possible for most cancers to be detected [26].

CONCLUSIONS

The current study established that the prevalence of cancer in people visiting hospitals in Meru and Tharaka Nithi Counties were 0.32% and 0.38% respectively. The most prevalent cancer in female was breast cancer followed by cervical cancer, stomach cancer, ovarian and esophageal cancers in that order. In males, the most prevalent cancer is prostate cancer followed by

esophageal cancer, stomach cancer, mouth and throat cancers in that order. In addition, it is clear that, the prevalence trends of cancer cases in Meru and Tharaka Nithi Counties has been increasing over the last eight years.

Data Availability

Data used in writing this article is incorporated into the manuscript.

Conflict of Interest

Authors declare no conflict of interest.

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