Frequency and Pattern of All Cancer Cases at Thika Level Five Hospital in Kiambu County, Kenya

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Authors' contributions

This work was carried out in collaboration among all authors. Author PKR conceived and designed the study, wrote the protocol, wrote the first draft of the manuscript and performed the statistical analysis. Authors EM, AO and FWM supervised and approved the study at any given stage. All authors read and approved the final manuscript.

Article Information

Original Research Article

ABSTRACT

Aims: To determine the frequency and pattern of cancer cases and provide baseline for the establishment of a cancer registry based on calculated incidence rates, prevalence, and morbidity of cancer cases.
Study Design: Descriptive, cross-sectional design was applied.
Place and Duration of Study: Thika Level Five Hospital cancer pain management department, between April 2019 and July 2019.
Methodology: A total of 574 records of cancer patients were examined from the clinical health registers of cancer patients for cancers that occurred between January 2013-December 2018 from the health records department of the cancer pain management department in the hospital. In Thika Level Five Hospital for data abstraction. Variables such as sex, age of patient, date of cancer incidence, primary anatomical sites of cancer origins including the county of patient residence were recorded in defined standardized abstraction forms specific for each noted cancer case. Proportionate cancer frequency, incidence rates and morbidity for every year under investigation

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was calculated. In each frequency it is absolute value and proportions are in percentages. The quantitative data was entered into Excel spreadsheet and cleaned, and after coding, the data was imported into SPSS version 21 for analysis. Approval was obtained from Mount Kenya University (MKU) Institutional Research Ethics Committee and a license obtained from National Commission of Science, Technology, and Innovation (NACOSTI). Authorization to collect data was obtained from Thika Level Five Hospital.

Results: Data was abstracted from 574 records out of which186 (32.4%) were for male patients while 387 (67.4%) were for female patients. The top ten cancers by site where cervix 146 (24.0%), breast 88 (14.0%), esophagus 88 (13.4%), stomach 49 (10.1%%), prostate 29 (5.1%), liver 26 (4.2%), colorectal 22 (3.8%), skin 20 (3.5%), pancreas17 (3.0%), and gall bladder 10 (1.7%). The proportionate cancer morbidity of both in-patient and out-patient prevalence between January 2013 and December 2018 for all ages was 49.6 per 100,000 population. Patient age ranged from 2-100 years, with a mean age of 57.2 years Kiambu County had most of the cancer patient at 43% followed by Murang'a County (38%) and Machakos County (4%).

Conclusion: Cervical cancer was identified to be the most common cancer generally while esophagus cancer and breast cancers were the major cancer types among females and males, respectively. Also, at the age of 55 - 69 years one is at higher risk of developing cancer as this age group accounts for more than 50% of the reported cases.

Keywords: Prevalence; incidence; cancer; registry.

1. INTRODUCTION

Globally the cancer incidence rate stands at about 18.1 million cases per year and the five-years prevalence is estimated to be 43.8 million people [1]. Worldwide the top four leading cancers are breast, lung, colorectal each accounting for 11.6%, 10.2%, 7.1%, 5.7% respectively [1,2].

A report by Bray et al., [2] on five-year incidence rates of cancer [3] shows that breast cancer is the most prevalent cancer with an incidence rate and proportion of 11.6% (181.78), followed by prostate at 7.1% (96.73) while cervix uteri is in the third position at 3.2% (38.98) [2]. In Africa, the 5-years prevalence indicates that breast followed by cervix uteri and prostate are the most prevalent cancer types at 57.40, 36.73, and 20.43, respectively. The trend is similar in Kenya where the top-three most prevalent cancers are breast, cervix uteri and prostate recording incidence rates of 51.68, 42.78, and 18.76 per 100,000 people, respectively. These figures are lower than the global figures and are almost the same as the African figures [2]. Although cancer incidences have been on the rise in the recent past, there is still lack of reliable data in most African countries including Kenya. This is fueled by inconsistencies in the reported data as well as the quality of data in the few cancer registries that are available. In addition, just like in other low- and middle-income countries (LMICs), health challenges such as poor health infrastructure, missing registration of cancer cases, poor public awareness and poor health seeking behaviors [4,5].

2. MATERIALS AND METHODS

The study was carried out at Thika Level Five hospital situated in Kiambu County in central Kenya. Kiambu County, position at latitude -1° 10' 0.01" S and longitude 36° 49' 59.99" E. This public hospital has seven inpatient wards with a bed capacity of 300. It is a referral facility for Kiambu County. The hospital provides a wide range of services including cancer treatment and palliative care and serves both rural and urban populations [6].

We retrospectively abstracted archived data from patient clinical/health records held in files from cancer pain management department all cancer cases managed at the hospital between January 2013 and December 2018. A standard abstraction form was used to collect data and the variables recorded on the form included patient's gender, age, residence, and primary cancer site (Figs. 1, 2,3,4 and 6. Frequency and pattern were analyzed for all cancer cases under investigation. Pattern of cancer site was analyzed by time, place, and person. Place pattern the study uses counties, per time pattern yearly and person pattern age and gender were used. Graphs and pie charts used to present the results. The frequency will be absolute and the proportion percentage. The proportion of cancer morbidity per 100,000 population was calculated for the six years prevalence and result presented using simple line graph. Standard cancer codes

were used to code each cancer type. The data from abstract forms was entered into excel spreadsheet and using password protected computer for cleaning before transferring into SPSS version 21 for analysis.

3. RESULTS

A total of 574 cancer records were reviewed for data collection. These represented patients who had sort services at the hospital between 2013 and 2018. Analysis of data was based on gender, age, trends of incidence per year of the data abstracted from Thika Level Five palliative care department. The mean age was 57.2 years with a range of between 2 and 100 years. The distribution of all the cancer cases by gender showed that females had a higher number of cases 386 (67%) compared with males 188 (33%) as shown in Fig. 1.

The relative distribution of cancer cases by age was presented in age groups of 14 years each. As shown in Fig. 2, people aged between 55 and 69 (169/574, 29.4%) years are the most affected people followed by those aged between 70 and 85 years (130/574, 22.6%).

We analyzed the number of cancer cases reported per year to determine the trend for cancer cases over the years under study. The results showed that 2015 had the highest number of cancer cases. The cases increased

gradually from the year 2013 to 2015 after which the numbers declined with 2017 recording a much lower number than either 2016 or 2018 (Fig. 3)

The study further determined the relative frequency of the top-ten cancer sites reported within the period of interest. The results indicated that cervical cancer (26.7%, 146) was the top-most primary site followed by esophagus (16.3%, 89) while urinary bladder (2%, 11) was the last in the top-ten cancer sites (Fig. 4).

Moreover, frequency determination by gender was carried out. From the results, the five most frequent cancers among females were cervix (37.9%), breast (20.8%), stomach (7.5%), esophagus (7.5%), and colorectal (3.9%) cancers. In males, esophagus (31.7%), prostate (15.3%), stomach (10.6%), liver (6.3%) and colorectal (3.7%) cancers were the top-five cancers (Fig. 5).

An analysis based on residence showed that Kiambu County had the highest percentage (43%) of patients treated at the hospital, followed by Murang'a County (38%). Other counties included Machakos County (4%), Nyeri County (2%), Kitui County (1%) and others (12%). The counties in the others category include Bungoma, Busia, Embu, Homabay, Kajiado, Kirinyaga, Kisii, Kisumu, Laikipia, Makueni, Meru, Nairobi, Nakuru, Trans-Nzoia, Vihiga and Uasin Gishu County.
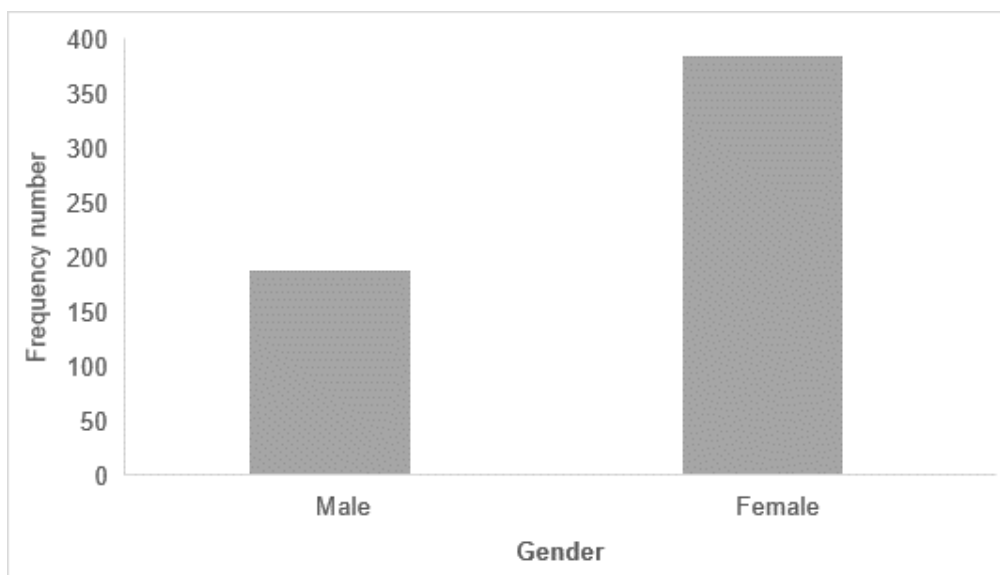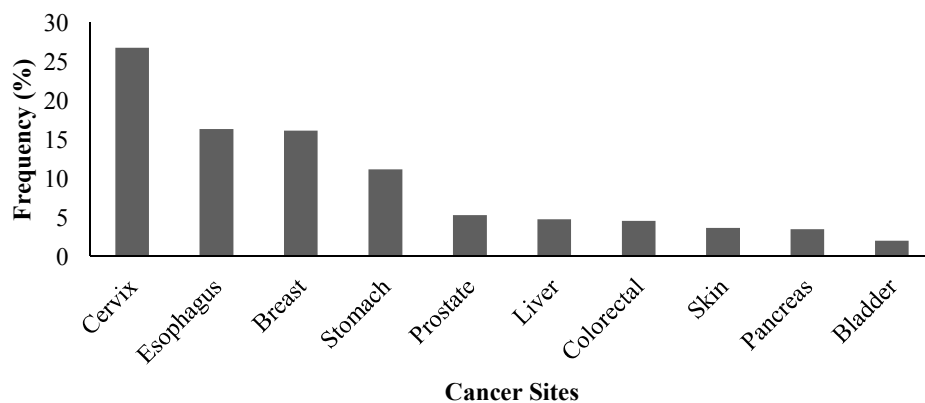

Fig. 1. Relative frequency distribution of cancer cases by gender reported at Thika level five between January 2013 and December 2018
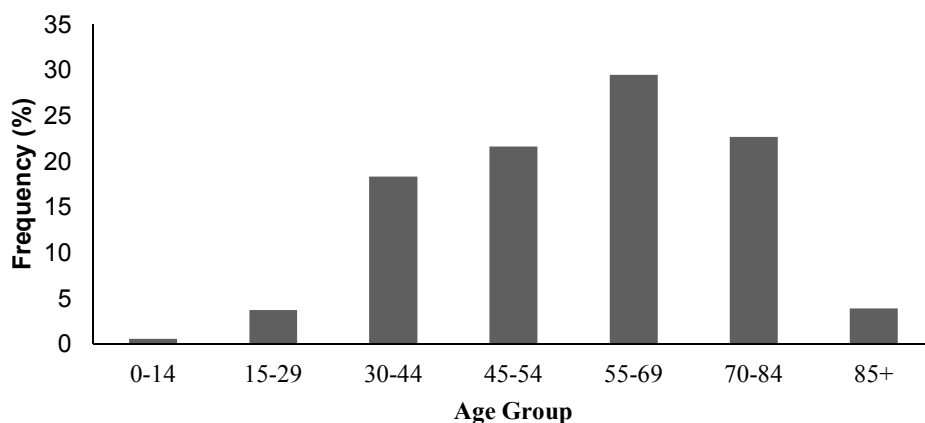
Fig. 2. Relative frequency distribution by age of cancer cases reported at Thika level five from January 2013 to December 2018
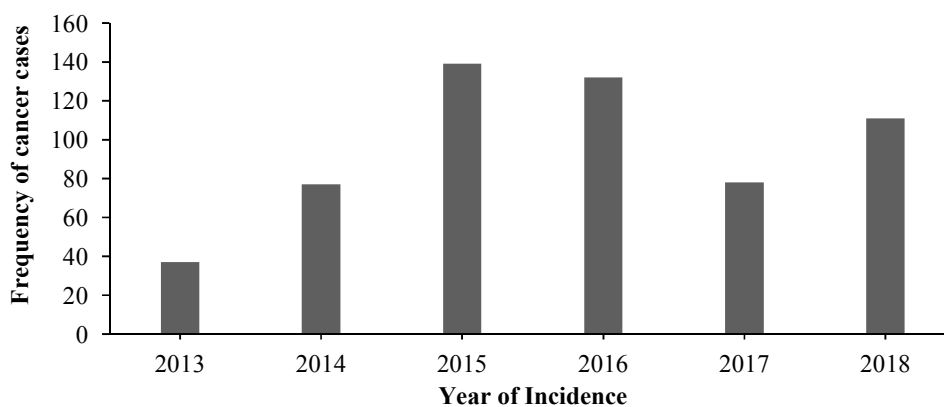
Fig. 3. Trend of cancer cases at Thika level five by years of incidence between January 2013 and December 2018

Fig. 4. Relative frequency distribution of the top-10 cancer sites reported at Thika level five hospital between 2013 and 2018
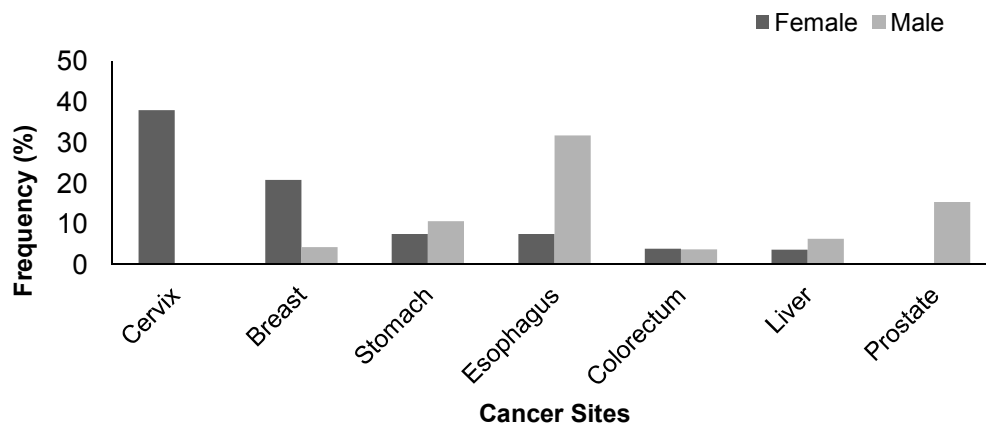
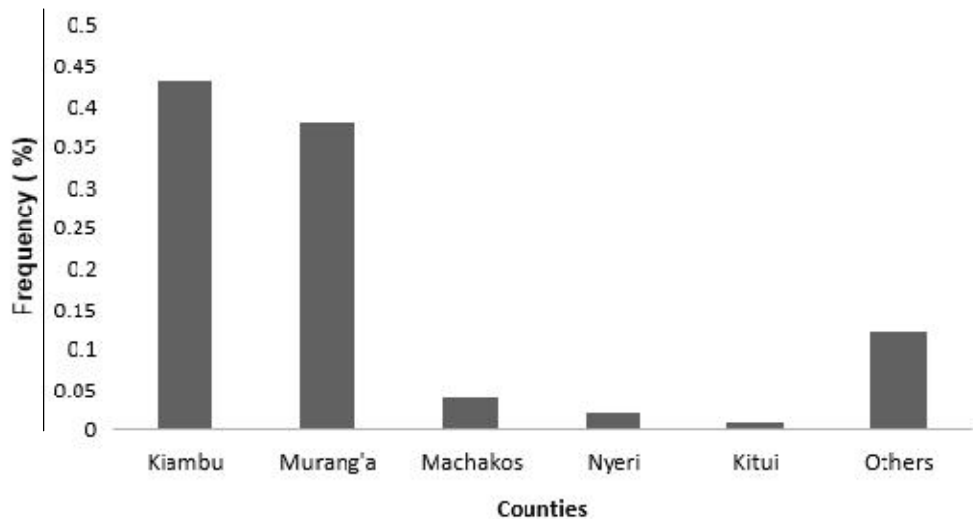**Fig. 5. Top-four cancer sites in both male and female**

Fig. 6. Distribution of cancer by the county of origin

The proportion of cancer cases for the six-year period under investigation was calculated by expressing the cases per 100, 000 of the total number of patients that attended the facility during the same period. The proportion of cancer morbidity increased from 2013 (23.3) to 2015 (73.7) after which the prevalence reduced consistently from 2016 (66.0) to 2018 (58.1).

4. DISCUSSION

The age of cancer patients at diagnosis ranged from 30 to 84 years (Fig. 2). This is mainly because age is a risk factor of developing cancer with chances of developing cancer increasing with age [7]. These finding are comparable with a previous study research done in United States of America in 2017 which indicated that 9.7% of the American women diagnosed with breast cancer were under 45 years [8]. Also other studies indicated that 66 years is the median age for cancer diagnosis, prostate, lung, colorectal and breast cancer are 66, 70, 68 and 61 years respectively [9]. Further, it is estimated that 65 years and above, 70% of all cancer cases will occur by the year 2030 [10]. This could be because of increased life expectancy in male 79 years and women 84 years which contributed 34% in male of all cancer site and women 35% respectively in 2013 [11]. Moreover, the study agreed with other researcher that as woman aged there is high risk of developing cervical cancer [12]. Further, pancreatic cancer has been shown increasing with the age [13]. Female

develop breast cancer at young age may have little chances of getting better [14]. The study concurs with previous researcher where cancer among children 0 to 14 years has been increasing by 2.4% change annually between 1999 to 2011 [15].

The current study reports women to have a higher number of cancer cases compared with men (Fig.1). The trend is similar in Kenya where women have been shown to account for 54% of all the cancer cases [3]. In a study conducted at Kenyatta National Hospital (KNH) 17,584 and Moi Teaching and Referral Hospital (MTRH) 4,304 cancer files, the proportion of women to men was reported to be 60%, 40% and 56%,44% respectively [16]. Study from other researchers indicated that the life expectancy in women are higher than male 84 and 97 years respectively may have contributed as to why women had high cancer of all site as compared to male [11]. Further, the study agreed with the report from other scholars that male developing breast cancer is low compared with women developing the same cancer [14].

The trend of cancer cases with time showed an increase from 2013 to 2015 (Fig. 3). Although different factors like upgraded health facilities [17] may have contributed to a decrease in the number of cancer patients seen from 2016 to 2018, improvement of lower level health facilities could have resulted in reduced referrals to Thika Level Five Hospital. The study compared the results with previous researcher which confirmed that .The study results was contrary to previous researcher where in 2013 an estimate of 11,200 cancer case were reported in patient above 75 years [18].

In this study, cervical cancer is reported to be the top-most prevalent cancer among the cancer patients attending Thika Level Five Hospital (Fig 4 and 5). This is followed by esophagus, breast, stomach, and prostate. The trend was contrary to what is seen globally where the top-5 cancers are lung (11.6%), breast (11.6%), prostate (7.1%), colon (6.1%) and stomach (5.7%) while in African, top-five cancers breast (16%), cervix uteri (11.3%), prostate (7.7%), liver (6.1%) and Non-Hodgkin lymphoma at 4.6%. However, the trends are similar to Kenya national trends where the top-five cancers are breast (12.5%), cervix uteri (11%), esophagus (9.1%), prostate (6%), and stomach (4.4%) [2,3,19]. The study

conducted in Nakuru agreed with the study done at Thika level five hospital where cervical cancer is top cancer in women [12]. The study results were contrary to the reports from other researchers where lung cancer is the leading cancer in male followed by prostate [20] even though the 2018 report indicated that prostate cancer is the leading in male [21]. Similar studies conducted at KNH reported cervical (12.4%), breast (11.8%), colorectal (6.2%), chronic leukemia (5.4%) and stomach cancers (5.2%) as the top-5 types of cancer. There is, therefore, a similarity between the types of cancers that are reported at Thika Level Five hospital and other facilities in Kenya, or in other places in Africa. However, differences in the top-5 cancers were noted when the results were compared with results reported at MTRH. In MTRH the five most common types of cancer were Kaposi's sarcoma (18.6%), breast (15.4%), cervical (8.2%), non-Hodgkin's lymphoma (7.4%) and colorectal cancer (5.4%) [22]. Differences in trends could be attributed by differences in geographical location as well as social practices between the two study populations.

Distribution of cancer by County of origin indicated that majority of cancer patients were from Kiambu County (Fig 6). Thika being cosmopolitan attracts people from various counties and may seek health services from Thika level five hospital [23]. Muranga being a nearby county, many of the residences may have opted to seek health services from Thika. Furthermore, employees and student may have mentioned their country of origin when they are seeking health services in state of their current place of residence. This may explain reason as to why other counties were mention in the study.

In 2015 the proportion of cancer morbidity was the highest 73.7and in 2013 was the lowest 23.3 (Fig. 7). The morbidity of cancer has been increasing globally [24].similar pattern has been seen in Australia and New Zealand [12, 25].Although other factors may have led to decrease in the last three years for example age, those with below 50 years the prevalence is estimated to be 1% and those above 70 years 6% worldwide [26].

Cancer registry (CR) is an information system used systematically to collect, store, manage, and analyze cancer patient data. Globally
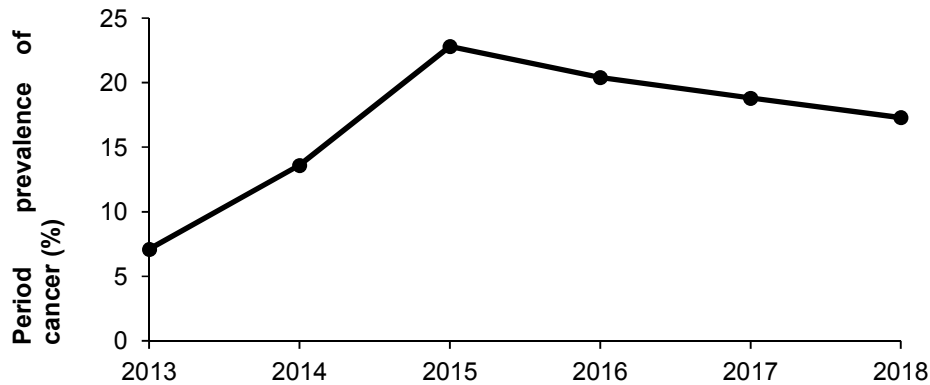
Fig. 7. Trends in proportionate cancer morbidity per 100,000 in- and out -patients

Britain is thought to have the best cancer registry known as the Scottish Cancer Registry. It is estimated that about 85% of the world lack quality cancer registries. Cancer registries are categorized as either population-based or hospital-based depending on the populations they serve. While the population-based registries are involved in recording all cancer cases in a defined population within a given geographical area, hospital-based registries collect and maintain data on all cancer patients seen at a healthcare facility. Having a well-maintained cancer registry helps strategize and at the same time evaluate cancer control measures that are being put in place. Data from the registry provides valuable information on the general incidence, morbidity and mortality caused by cancer and helps guide patient needs at the hospital or in each population depending on the type of the registry. In Kenya, there are only two fully functional population cancer registries - Nairobi Cancer Registry and the Eldoret Cancer Registry. Nairobi cancer registry serves Nairobi County while the Eldoret one serves Uasin Gishu County. There are very few hospitals with cancer registries, but they do not share their data with the Nairobi Cancer Registry which is acting as the national cancer registry. Considering the immense resources needed to establish and maintain a cancer registry, there is need to support hospitals in their efforts to establish functional hospital-based registries [27,28,29].

5. CONCLUSION

The current study aimed at establishing the frequency and pattern of all-cause cancer cases Cervical cancer was identified to be the most common cancer generally while esophagus cancer and breast cancers were the major

cancer types among females and males, respectively. Although the number of cancer patients increased with time until 2015 in the first years under investigation, the numbers have been reducing from 2016. As reported in other studies, female patients are still more in these clinics compared with male. The hospital noted the frequency and pattern of all cancer cases that may informed decision making in setting up cancer registry. The data collected may be used as baseline for the upcoming cancer registry. Also, cancer management department may use the information to make informed decision about daily activities.

CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

Approval was obtained from Mount Kenya University (MKU) Institutional Research Ethics Committee Board Ref No. MKU/ERC/1241 and National Commission for Science, Technology, and Innovation (NACOSTI) Ref No. NACOSTI/P/19/15168/31274 as well as Thika Level Five. Patient information in the hospital records was protected under key and lock.

ACKNOWLEDGEMENTS

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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