Original Research

The surge of colorectal cancer in Sri Lanka

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Abstract

Introduction: The incidence of colorectal cancers is increasing in developed countries as well as in developing countries. A similar pattern was noted in Sri Lanka over the past decade.

Objectives: To determine the incidence trends of colorectal cancer in Sri Lanka from 2005 to 2019

Methods: Data from 2005 to 2019 on all newly diagnosed patients with colorectal cancers in Sri Lanka included in the National Cancer Control Programme (NCCP) Database were analysed to determine trends in incidence using Joinpoint regression program.

Results: This study analysed 24 263 patients with newly diagnosed colorectal carcinomas over the 15-years study period from 2005 to 2019. Approximately 52% (n=12 592) were females and 48% (n=11 835) were males. Female to male ratio was 1.06: 1. The increasing trend of age standardized incidence rates of colorectal cancer for both males and females over the study period was statistically significant. Annual percentage change (APC) was 8.4 for males (95% CI: 6.9, 9.9; p<0.001) and 7.9 for females (95% CI: 6.5, 9.4; p<0.001). Age specific rates of colorectal cancers were calculated for different age groups. The majority of cases were in the 70 to 74 years age group at the time of diagnosis, although there were cases presenting as early as 35 to 39 years. Men 49 years and less showed two times higher annual percentage increase (APC=15.15) than 50 years and above males (APC=7.7). Similarly, females showed a higher APC among 49 years and less age group (APC=11.86) when compared with 50 years and above female group (APC=7.87).

Conclusions & Recommendations: There is a statistically significant increase in the incidence of colorectal cancer in both males and females. The age at diagnosis in the majority was between 70-74 years. Annual percentage changes of age specific rates were higher in both males and females in the 49 years and less age group. A possible cause is the presence of modifiable risk factors related to lifestyle changes. Increase in trend is also affected by improvement of diagnostic and surveillance facilities. Considering a screening programme is timely.

Key words: *colorectal cancer, age standardized rates, cancer incidence, National Cancer Registry, Sri Lanka.*

Introduction

The global rates of colorectal cancer have increased in recent years. Colorectal cancer is the third most common cancer in the world and represents almost 10% of the annual global cancer incidence. It is equally common in both males and females. It is the fourth leading cause of cancer deaths in the world (1). Most colorectal cancers start as polyps. It can take 10 to 15 years to progress into cancer. Most are adenocarcinomas. According to world data lifetime risk of developing colorectal cancer is about 1 in 23 (4.4%) for men and 1 in 25 (4.1%) for women (2).

Modifiable as well as non-modifiable risk factors play major roles in developing colon cancer. Modifiable risk factors are overweight /obesity, physical inactivity, unhealthy eating patterns, tobacco smoking and use of alcohol. Non-modifiable risk factors are older age, history of colorectal polyps or colorectal cancer, history of inflammatory bowel disease and genetic predisposition (2). When considering the genes, inherited colorectal cancers are less common (<5%) but sporadic mutations are more common (3). Colorectal cancer is one of the clearest markers of epidemiological and nutritional transition as the incidence rates of this cancer – together with other cancers are linked to Western lifestyles (4).

There were over 1.93 million new colorectal cancer cases in the world in 2020 (5). Most number of cases is attributable to modifiable risk factors; therefore, they are potentially preventable. Thus, prevalence and morbidity could be minimized through public awareness, proper screening and a surveillance programme (6). In Sri Lanka, the incidence of colorectal cancers is rising and in 2019 it was the third common cancer among males and females. In 2019, Age standardized rate (ASR) of colorectal cancer for males was 11.3 and 9.4 per 100 000 population for females (7). Lack of a screening program was identified as a barrier for early detection of colorectal cancer. Further, late presentation to health services is a challenge (8). In this study, data on colorectal cancer in the National Cancer Registry, Sri Lanka (NCR-SL) were analysed from year 2005 to 2019. Cancer registries are the main source of cancer data of a country, which are used to monitor and predict changes in cancer incidence and survival. However, the coverage of the global population through such registries is suboptimal as only about 25% of the world's population is covered. (9). In the year 2019, there were 24 government cancer treatment centres involved in data collection. Relevant data were extracted from cancer patients' clinic records using 'National Cancer Surveillance Form - H 1256'. Data were extracted by the medical officers, nursing officers and development officers attached to the cancer treatment centres, trained pre-intern medical graduates. Cancer incidence data were entered into the CanReg5 database by the trained data entry operators attached to the NCCP. Duplicate checking was conducted using 'Person search' option of the CanReg 5, MS Excel and Linkpro Software (7). The objective of the study was to describe the trend of the incidence and pattern of colorectal cancer in the Sri Lanka.

Methods

Data on colorectal cancers from 2005-2019 were extracted from the NCR-SL of the NCCP. Colorectal cancer was classified according to the ICD-10 classification (colon cancer- C18; rectosigmoid junction- C19; rectal cancer- C20) Adult cancers should be target more on prevention and paediatric cancers should be target more on cure. Colon and rectal cancers share distinct similarities, particularly in the way they manifest like, incidence, risk factors, symptoms, genetics and histology. Therefore, colon and rectal cancers were analysed together in this study (10).

Data were analysed according to the pattern of change by year, sex and age. Analysis was according to the ASR of colorectal cancer per 100 000 populations for each year by gender using the World Health Organization (WHO) age standardized population which allows comparison with other country rates (11). Age was categorized into two groups: <49 years and 50 years and above. Age specific rates and its trend were also calculated for the two age groups as WHO recommends screening asymptomatic adults for colorectal cancer at the age

of 50 years (12). Age at the time of presentation to health services was determined by calculating age specific incidence rates. The age-specific rate is calculated simply by dividing the number of new colorectal cancers observed in a given age category for 100 000 population for each year. Trends in the ASR and age specific rates of the incidence were analysed by joinpoint regression analysis using Joinpoint Trend Analysis Software (version 4.9.0.0). Both rates were analysed using maximum number of two joinpoints as specified Trend Analysis Software as specified options in the analysis. The best fitting number of joinpoints were selected after reviewing different charts with different number of joinpoints. APC was calculated to estimate the magnitude and the direction of change. APC is a measurement of trends in cancer rates over time (13). This article measured the yearly trends.

Results

This study analysed a total of 24 263 patients with newly diagnosed colorectal cancers over the 15-year study period from 2005 to 2019. Approximately 52% (n=12 592) were females and 48% (n=11 835) were males. Female to male ratio was 1.06: 1. According to the data, histology available in 91% of colorectal cancers reported form 2005-2019, the majority had adenocarcinoma (77%); 5% showed squamous cell carcinoma; 2% showed signet ring cell carcinoma; and 2% showed neuroendocrine tumour. In the majority of cases, the age at diagnosis was between 70 to 74 years although there were cases presenting as early as 35 to 39 years (Figure 1).

The zero ("0") joinpoint model was the final selection model to assess the trend of age standardized incidence rate for both males and females. The increase in ASR of colorectal cancer for both males and females were statistically significant over the study period. In males, ASR increased from 4.4 per 100 000 population in 2005 to 11.3 per population in 2019 and a statistically significant increase of 8.4% was observed annually (95% CI: 6.9, 9.9; p<0.001). Similarly, ASR females increased from 3.6 per 100 000 populations in 2005 to 9.4 per 100 000 populations in 2019 and the increase of 7.9% per year was also statistically significant (95% CI: 6.5, 9.4; p<0.001) (Figure 2).

In an attempt to analyze incidence trends in different age group categories, age specific rates were used in the joinpoint model, and it selected "1" for males 49 years and less. The age specific rates showed an increase from 2005 to 2016 and thereafter a decreasing trend. The increasing trend from 2005 to 2016 was statistically significant and the APC was 15.15 (95% CI: 10.9, 19.6; p<0.001). Thereafter, there was a decreasing trend from 2016 to 2019 and that decrease in trend was not statistically significant and the APC was -9.4 (95% CI: -31.5, 19.8; p=0.449) (Figure 3). A different pattern was seen among females 49 years and less. The zero ("0") joinpoint model was the final selection model to assess the trend of age specific rates for this group. The increasing trend was consistent and was statistically significant from 2005 to 2019 and the APC was 11.96 (95% CI: 7.6, 16.2; p<0.001) (Figure 3). The "0" joinpoint model was selected for both males and females in the 50 years and above age group. In males 50 years and above, the age specific rates of colorectal cancer showed a consistent statistically significant increasing trend throughout the study period of 2005-2019 with an APC of 7.7 (95% CI: 6.3, 9.1; p<0.001) in contrast to the trend among the 49 years and less age group. Females in the +50 year-age group also showed a statistically significant increasing trend in the age specific incidence rate with an APC of 7.87 (95% CI: 6.2, 9.5; p<0.001). Interestingly this trend was similar to the observed increase in the younger female group (+49 years and less) and 50 years and above male group (Figure 4).

Figure 1: Age specific colorectal cancer incidence rates by age group in Sri Lanka, 2010-2019

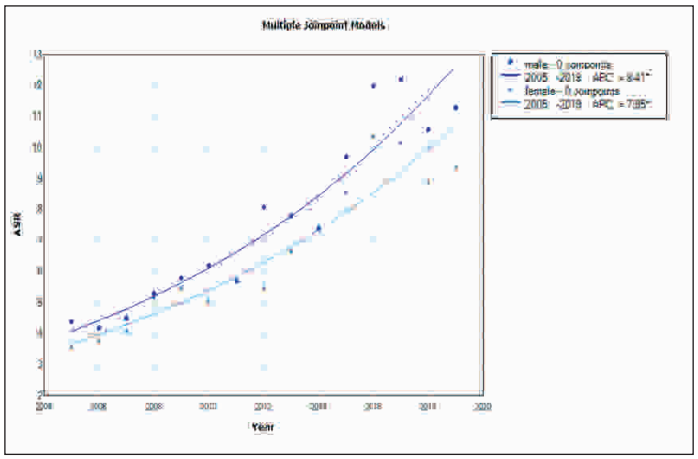


Figure 2: Joinpoint regression analysis of trends of age standardized rates (ASR) in colorectal cancer in males and females in Sri Lanka, 2005-2019

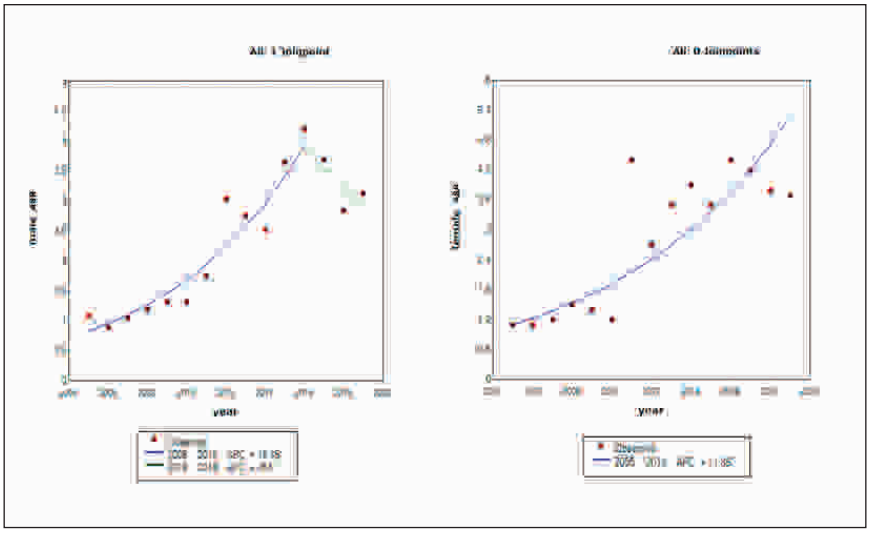


Figure 3: Joinpoint regression analysis of age categorised trends of colorectal cancer in males and females aged <49 years in Sri Lanka, 2005-2019

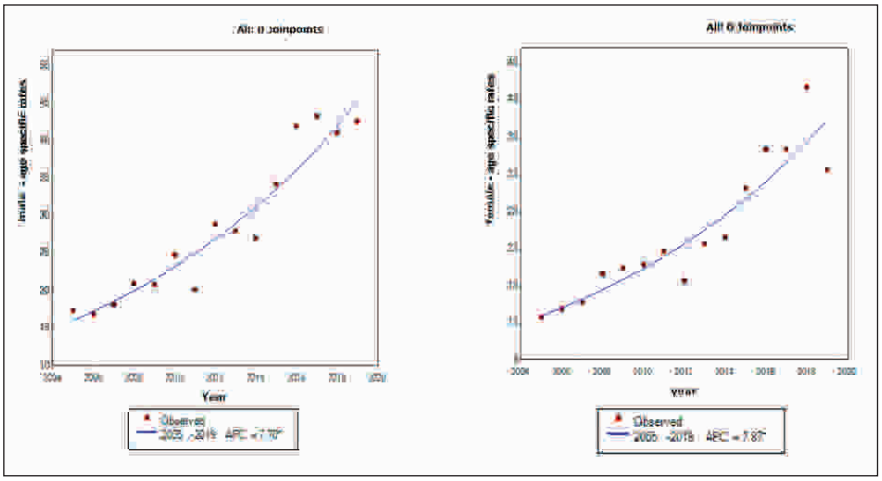
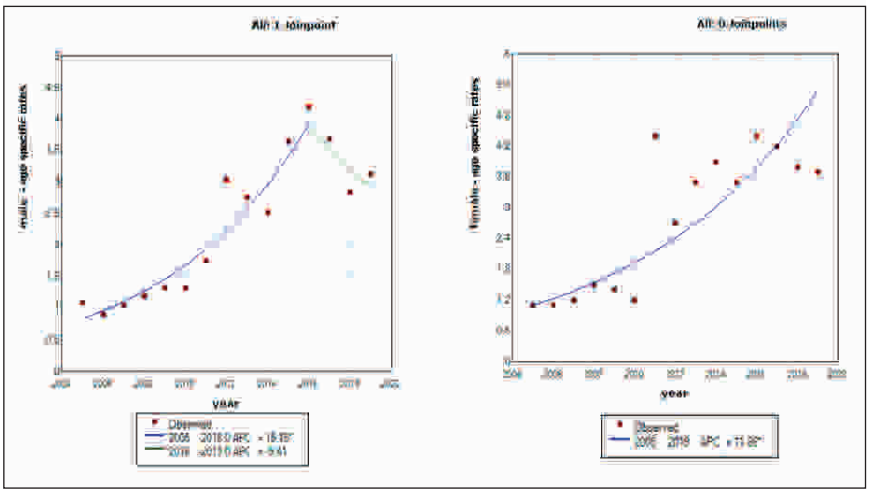


Figure 4: Joinpoint regression analysis of age categorized trends of colorectal cancer in males and females aged > 50 years in Sri Lanka, 2005-2019



Discussion

This study was based on available data at the NCCP, Sri Lanka. The World and Southeast Asia estimates of ASR for colorectal cancer for both males and females is higher than the observed figure of 11.3 per 100 000 population for males and 9.4 per 100 000 population for females for the year 2019 (14). The increase in ASR over the study period of 15 years for both males and females were statistically significant. The increase of APC of incidence in males (APC=8.4) and females (APC=7.95) was statistically significant.

Increasing incidence trends of colorectal cancer is reported in Latin American and Caribbean countries like Brazil, Costa Rica and Colombia. Asian countries like Singapore, China and Philippines also show a similar pattern (1). India shows a very low prevalence but with an increasing trend in the incidence (15). Countries like Australia, New Zealand and Japan show a decreasing trend over the years. Reasons for recent decline in trends are ill defined, may be numerous, but early detection programmes, detecting polyps and prevention through polypectomy before they become malignant, plays an important role (1).

The increasing trend among both males and females could be due to increase in modifiable risk factors in Sri Lanka such as overweight, low fibre diet, low consumption of fruits and vegetables, use of alcohol and red/processed meat and physical inactivity (16). Socioeconomic development, urbanization, shift in occupational structures, popularization of processed food companies, more women entering the work force have significantly affected the dietary pattern of Sri Lanka (17).

Age is the one major non modifiable risk factor which contributes largely to colorectal cancer. Sri Lanka has one of the fastest aging populations (18). During the study period the age at diagnosis for most male and female cases were 70-74 years although there were cases reported as early as 35-39-year age group. According to American Society of Clinical Oncology (ASCO) average age at the time of diagnosis of colorectal cancer for men is 68 years and for women is 72 years (3). It should be noted that in this study, incidence over the years from 2005 to 2019 showed an increasing trend in all age groups but males 49 years and less shows two times higher annual percentage increase than the above 50 years' male group. A similar pattern was seen among females also as the APC was higher among 49 years and less age group when compared with more than 50-year age group. This highlights the changing epidemiology of colorectal cancers (19), and it could be an influence of genetic and lifestyle factors, but the exact reason is unclear (20). Increase in incidence might also be influenced by better diagnostic scrutiny, improvements in surveillance, improved reporting and increase in public awareness (21).

In Sri Lanka, colorectal cancer is the third commonest cancer among males and females with a rising trend, it is timely to introduce a screening programme for asymptomatic adults. Age cut-off point and the type of screening programme have to be decided by an expert technical committee with evidence. The WHO recommends faecal occult blood test (FOBT) for both men and women aged 50-74 years (22). American Cancer Society recommends screening at the age of 45 years (23).

There are variations in screening programmes in different countries. Screening average-risk individuals between ages 50 and 75 using colonoscopy (every 10 years), flexible sigmoidoscopy (every 5 years) and faecal occult blood test (annually or biannually) are current screening methods which are recommended. It is worth mentioning that disparities throughout the different guidelines are found relating to the use of colonoscopy, rank order between test, screening intervals and optimal age ranges for screening(24).

There are several limitations in this study. Coverage of the NCR-SL database has changed over the study period from 2005 to 2019. The database has incomplete records regarding staging of tumours, risk factors, treatment details and data regarding survival. Yet, the analysis done in this study is useful as baseline data. As one of the most important databases in Sri Lanka, it is important to include these criteria in the registry in the future.

Conclusion and Recommendations

There is a rising trend of colorectal cancer in Sri Lanka based on NCR-SL data. It is likely to be a true increase. This study highlights two very important observations for policy and programme planning 1) There is an increasing trend in the incidence among both males and females in the 49-years and less age group 2) Majority were diagnosed at a later age of 70-74 years. Older age groups with colorectal cancer will end up with more challenges when treating cancers.

It is important to implement prevention programmes for lifestyle risk factor reduction. There is also a need for a regular screening programme for colorectal cancers. Surveillance data of the NCR-SL need to be more complete with staging of tumour, risk factors, treatment details and data regarding survival. Though this was done as a baseline study, if these data were available, we could analyse more preventive and curative factors.

Public Health Implications

- Colorectal cancer is showing an increasing trend over the years. It is recommended to initiate a colorectal screening programme for asymptomatic adults.
- Majority were diagnosed at a later age of 70-74 years. Late age at diagnosis reveals that there is a need to create public awareness and clinical suspicion among health care.

Author Declaration

Competing interests: The authors declare that they have no competing interests.

Ethics approval and consent to participate: All these data were secondary data from National Cancer Registries from 2005 to 2019. Ethical approval was obtained from the Ethics Review Committee of the Faculty of Medicine, University of Colombo on 22.11.2010 (EC-10-106) for population-based cancer registry publication. Data were analysed without any personal identification.

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Author contributions: CJK participated in the design of the study, coordinated data collection, performed the statistical analysis and helped to draft the manuscript. TAW participated in the design of the study, performed the statistical analysis, interpreted the data and drafted the first version of the manuscript. All authors read and approved the final manuscript.

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