Cost of Colorectal Cancer Care in Hospitalized Patients of Thailand

Jarin Chindaprasirt MD*, Aumkhae Sookprasert MD*,
Kosin Wirasorn MD*, Panita Limpawattana MD**,
Sumitr Sutra MD***, Yupa Thavornpitak MSc****

** Division of Oncology, Internal Medicine Department, Faculty of Medicine, Khon Kaen University, Khon Kaen, Thailand*
*** Division of Geriatric Medicine, Internal Medicine Department, Faculty of Medicine, Khon Kaen University, Khon Kaen, Thailand*
**** Department of Pediatrics, Faculty of Medicine, Khon Kaen University, Khon Kaen, Thailand*
***** Department of Biostatistics and Demography, Faculty of Public Health, Khon Kaen University, Khon Kaen, Thailand*

Background: *Colorectal cancer incidence rate is high and expected to increase in Thailand. But it is a preventable and curable disease if found in the early stage of development. The overall data regarding admission rates and healthcare cost in Thai patients are lacking.*
Objective: *To identify admission rates and healthcare cost of colorectal cancer.*
Material and Method: *Information on illness of inpatients and casualties came from hospitals nationwide and from hospital withdrawals from the 3 health insurance schemes in fiscal 2010. The data included 96% of the population and were analyzed by age groups, hospital level and insurance schemes in patients with colorectal cancer.*
Results: *Colorectal cancer occurred in 45,692 of all admissions, contributing to admission rates of 98.5 per 100,000 persons. These figures increased with age. The highest admission was found in the central region including Bangkok (43%) followed by the northeast region (23%). The average hospital charges per admission in three insurance schemes groups: government welfare, social welfare and universal coverage were 64,241, 49,490 and 28,588 Baht, respectively.*
Conclusion: *Admission rates showed that colorectal cancer increased with age. The highest rate was observed in sixty years and older. The hospital charges were extensive, especially in those on the government welfare scheme. Thus, screening programs, cost-effective analysis of treatment modalities and treatment protocol for the elderly should be examined.*

Keywords: *Colorectal neoplasm, Colon cancer, Clinical epidemiology, Cost of illness*

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Colorectal cancer is the third most common cancer in men and second in women worldwide in 2010[1]. Even though incidence rates have decreased in many western countries, they are growing rapidly in many Asian countries due to the change in diet and lifestyle[2]. Effective screening programs that have been implemented are key elements in the decline of the incidence rates in developed countries[3].

According to the hospital-based cancer registry 2010 of the National Cancer Institute of Thailand, colorectal cancer accounted for 21.5% of all male cancers and 10.4% of all female cancers[4]. Additionally, the number of cases of colorectal cancer is expected to increase over the next decade[5]. Thus, early diagnosis and effective treatment strategies are essential. Many modalities to detect early and potentially treatable lesions are available[6]. However, there is wide variation in surveillance among Thai surgeons and currently, there is no evidence to support the cost-effectiveness of screening programs in the country[7].

In general terms, the cost associated with diagnosis, treatment and follow-up of colorectal patients are extensive[8]. The expenditure increases greatly from low-risk polyp to stage IV colorectal cancer[9]. Moreover, with the availability of many novel agents targeting specific sites, such as Bevacizumab and Cetuximab, the price for treating colorectal patients becomes prohibitively high[10-12].

The three main insurance schemes for Thai

Correspondence to:
Chindaprasirt J, Division of Oncology, Internal Medicine Department, Faculty of Medicine, Khon Kaen University, Khon Kaen 40002, Thailand.
Phone: 043-363-664
E-mail: jarich@kku.ac.th

citizens are government welfare for government officers and first-degree relatives, social welfare for workers, and universal coverage for the remainder of the population. The main treatment options for colorectal cancer among these three schemes are similar, however, the availability of chemotherapeutic agents and targeted therapy differs. Oxaliplatin, Irinotecan, Bevacizumab and Cetuximab are not listed in national list of essential medicine in 2011. As a result, patients under universal coverage could obtain these drugs if they had the financial resources but those who are poor and under social welfare must apply for individual consideration to the contract hospital.

The prevalence and the cost of colorectal cancer treatment in Thailand to date are not known. Thus, the primary objective of the present study was to identify the admission rate of colorectal cancer according to age group as the prevalence rate cannot be identified from the current database. The secondary objective was to identify the impact of colorectal cancer in the context of healthcare costs and compare the results among the three insurance schemes.

Material and Method

Patient population

Data included inpatient Medical Expensing Forms for the fiscal year 2010 (October 1, 2009 and September 30, 2010) from the National Health Security Office (NHSO), Thailand and inpatient data from the Civil Servants Benefit System from the Comptroller General's Department and the Social Security Office.

Data received by the analyst team was checked for accuracy by looking for (a) overlapping information (b) visit dates (c) missing items (d) incorrect coding and (e) dating with the correct fiscal year.

Patients who were diagnosed with colon or rectal cancer (ICD-10 C18, C19 and C20) were included in the present study.

Patient demographics and clinical characteristics

Baseline characteristics of colorectal cancer patients including age, gender, level of hospital, regions of hospital, admission rate and hospital costs were captured from enrollment data.

Outcome measures

The present study outcomes were admission rates per 100,000 populations in age groups, region, and hospital level. Length of stay in days and healthcare costs in Thai Baht were compared between patients in three insurance groups; government welfare, social welfare and universal coverage.

Statistical analysis

The explanation of variables, tables of frequency enumeration and interrelationships were written using the SPSS program and checked before analyzing. After analyzing the data, the research team passed the primary analysis to ten medical specialists in order to check the validity of the information. Upon confirmation of validity, the data were compared to the Ministry of Public Health's Statistics Report 2010 for trend congruence as well as the hospital's mortality reporting for each age and disease group for comparison with the national Death Registration of the Registry Administration, Ministry of Interior Affairs[13]. Ethics approval was provided by Ethic Committee of the Faculty of Medicine, Khon Kaen University, under the guidelines of the Helsinki Declaration.

Results

Baseline characteristics and admission rates

Baseline characteristics of the present study population are shown in Table 1. Colorectal cancer occurred in 45,692 of all admissions, contributing to admission rates of 98.5 per 100,000 adult persons. The admission rates increased with increasing age, especially in patients over 60 years old as shown in Fig. 1. The average male-to-female ratio was 1.17.

The majority of the patients that were admitted to hospital in the central region of the country, including Bangkok, are shown in Fig. 2.

Healthcare costs of colorectal cancer

The overall hospital charge of colorectal cancer was 1,729,912,359 THB. The average hospital charge per admission of persons with colorectal cancer was 41,052 THB. Comparisons of the hospital charges among three insurance groups are shown in Fig. 3. The mean hospital charges in government welfare, social welfare and universal coverage were 64,241, 49,490, 28,588 THB respectively.

Discussion

The admission rates of colorectal cancer increased considerably with increasing age. Though its incidence is low in Thailand compared with other western countries, the incidence is increasing[1-3]. The present study showed that colorectal cancer is uncommon before age 50 in Thailand. This, however, could be an underestimation because of the lack of screening in the younger group, therefore asympto-

Table 1. Baseline characteristics of the study population

Characteristics	No. of admission (Total 45,692)	Admission rate (Total average 98.5)
Age (years)		
19-25	216	3.46
26-40	2,727	10.74
41-60	18,822	109.67
61+	23,927	325.93
Male, No.(%)	24,068 (53.9)	107.6
Hospital level, No.(%)		
Primary	3,349 (7.33)	
Secondary	9,330 (20.42)	
Tertiary	30,099 (65.87)	
Private	2,914 (6.38)	
Region, No.(%)		
Northern	9,712 (21.25)	
Northeast	12,099 (26.48)	
Central	19,491 (42.66)	
Southern	4,390 (9.61)	

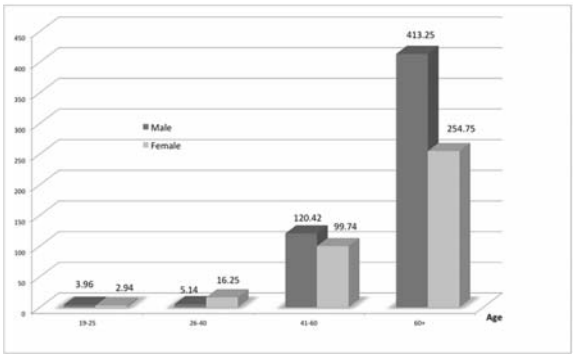

Fig. 1 Admission rate per 100,000 of colorectal cancer by age group

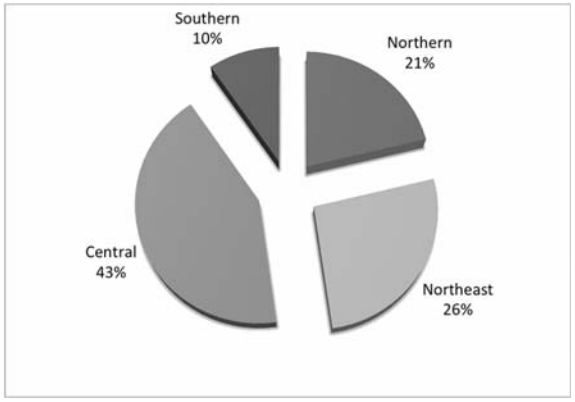

Fig. 2 Admission number of colorectal cancer by region

matic cancer patients would not be detected.

Thus, implementation of screening period

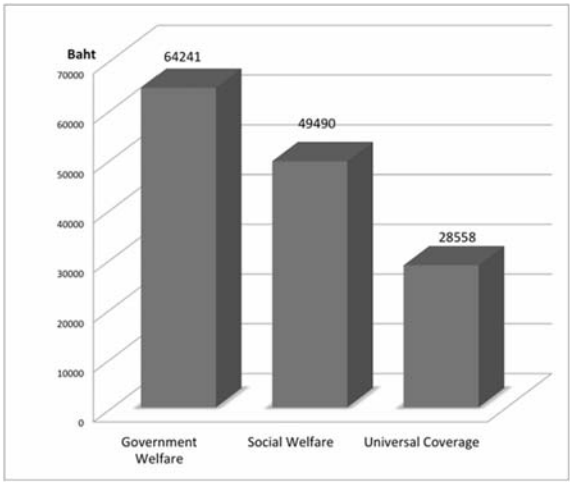

Fig. 3 Average hospital costs among the three insurance groups

recommended by the US preventive task force would be prudent[5]. Since colorectal cancer is a major public health issue, effective mass screening would be of benefit as detection of premalignant lesion, colonic adenoma, can prevent the disease and the early stage of cancer can be cured[14]. The method of screening is another issue requiring discussed and examination as it is dependent on both the availability of gastroenterologists and surgeons to do colonoscopy, as well as the adherence to the screening program of asymptomatic adults and cost-effectiveness in Thai population[15].

Regarding the impact of colorectal cancer on

hospital costs of the present study, the hospital cost was high, supporting the previous studies from other countries[8-10]. As the data about staging of the disease could not be obtained, the authors could not draw a conclusion about stage-related costs. According to study by Wong CKH et al[9], there is a trend toward increasing the price with advanced disease, which further adds support to the importance of implementing a tumor screening program.

The cost of treatment varies greatly among the three insurance schemes with the highest charges being in government welfare and lowest in universal coverage as expected because of the difference between the availability of novel drugs; Oxaliplatin, Irinotecan, Bevacizumab, and Cetuximab. However, these drugs, which are not listed in national drug list, have been shown to prolong survival in colorectal cancer and currently are a part of the standard treatment guidelines[16]. Policy makers should consider treatment regimens thoroughly specifically cost-effectiveness and social equality aspects and for the development and introduction of new treatment agents.

Since most of the patients were sixty years and over, developing treatment protocol for the elderly is crucial. Elderly patients differ from the younger ones in drug metabolism, immune response and organ function. More clinical data about chemotherapeutic usage for elderly people with colorectal cancer need to be obtained from future studies.

Limitations

There are some limitations of the present study. Because of the limited data, it is difficult to analyze prevalence rates of colorectal cancer by only admission rates. Moreover, the impacts of colorectal cancer on many aspects are lacking, such as caregiver burden, cost-effective analysis, and pre- and post-hospital costs.

Conclusion

Admission rates of cancers of colon and rectum were found to be high. The highest rate was observed in sixty years and older. The hospital charges were extensive, especially in those who were on a government welfare scheme. Thus, appropriate screening programs, and cost-effective analysis of treatment modalities and treatment protocol for the elderly should be studied.

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Potential conflicts of interest

None.

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ค่ารักษาพยาบาลมะเร็งลำไส้ใหญ่ในผู้ป่วยที่เข้ารับการรักษาในโรงพยาบาลในประเทศไทย

จาริญญ์ จินดาประเสริฐ, เอื้อมแข สุขประเสริฐ, โกสินทร์ วิระษร, ปณิตา ลิมปะวัฒนะ, สุมิตร สุตรา, ยุพา ถาวรพิทักษ์

***ภูมิหลัง**: อัตราการเกิดโรคมะเร็งลำไส้ใหญ่ในประเทศไทยนั้นสูงและคาดว่าจะเพิ่มขึ้นเรื่อยๆ แต่โรคนี้สามารถป้องกันได้และรักษาหายได้หากตรวจพบตั้งแต่ระยะเริ่มต้น ข้อมูลภาพรวมเกี่ยวกับอัตราการรักษาในโรงพยาบาลและค่าใช้จ่ายผู้ป่วยไทยนั้นยังมีไม่เพียงพอ*

***วัตถุประสงค์**: เพื่อทราบอัตราการนอนพักรักษาในโรงพยาบาล และค่าใช้จ่ายในการรักษามะเร็งลำไส้ใหญ่*

***วัสดุและวิธีการ**: ข้อมูลการเจ็บป่วยของผู้ป่วยในและผู้ที่เสียชีวิตในโรงพยาบาล มาจากข้อมูลที่โรงพยาบาลส่งเบิกจ่ายจากระบบประกันสุขภาพ 3 แหล่งในปีงบประมาณปี พ.ศ. 2553 ซึ่งครอบคลุม ร้อยละ 96 ของประชากรของประเทศ ข้อมูลที่ได้ถูกวิเคราะห์ตามกลุ่มอายุ ระดับโรงพยาบาลและสิทธิการรักษาในผู้ป่วยมะเร็งลำไส้ใหญ่*

***ผลการศึกษา**: ผู้ป่วยมะเร็งลำไส้ใหญ่เข้ารับการรักษาในโรงพยาบาล 45,692 ครั้ง คิดเป็นอัตราการนอนรักษา 98.5 ครั้งต่อประชากร 100,000 คน โดยพบอัตราดังกล่าวสูงขึ้นเมื่ออายุมากขึ้น อัตราการพักรักษาในภาคกลางรวมกรุงเทพมหานครสูงที่สุด (43%) อันดับถัดมาคือภาคตะวันออกเฉียงเหนือ (23%) ค่ารักษาพยาบาลเฉลี่ยใน 3 ระบบประกันสุขภาพคือ ระบบสวัสดิการข้าราชการ ระบบประกันสังคม และระบบประกันสุขภาพถ้วนหน้าเท่ากับ 64,241บาท 49,490 บาท และ 28,588 บาทตามลำดับ*

***สรุป**: อัตราการนอนพักรักษาในโรงพยาบาลด้วยมะเร็งลำไส้ใหญ่สูงขึ้นตามอายุที่มากขึ้น โดยพบมากที่สุดในช่วงอายุ 60 ปีขึ้นไป ค่ารักษาพยาบาลนั้นมีราคาสูงโดยเฉพาะผู้ที่มีสิทธิการรักษาสวัสดิการข้าราชการ ดังนั้นควรมีการศึกษาวิธีการตรวจคัดกรองและการวิเคราะห์ความคุ้มค่าในการรักษาในผู้สูงอายุ*