

## RESEARCH COMMUNICATION

# Impact of Socio-economic Class on Colorectal Cancer Patient Outcomes in Kuala Lumpur and Kuching, Malaysia

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### Abstract

**Objective:** Research over the past several decades has indicated that low socioeconomic class has a direct effect on health outcomes. In Malaysia, class distribution may differ with the region. The objective of this study was to compare the presentation and survival of colorectal cancer patients in two dissimilar cities, Kuala Lumpur and Kuching, Sarawak. **Methods:** All patients diagnosed with a malignancy of the colon or rectum in Sarawak General Hospital and University of Malaya Medical Center from 1<sup>st</sup> Jan 2000-31<sup>st</sup> Dec 2006 were recruited. Data on presentation, socio-economic class and survival were obtained. The survival duration was categorized into more than three years or three years and less. Testing for significance was performed using the chi-square test, with p values less than 0.05 considered statistically significant. **Results:** A total of 565 patients in UMMC and 642 patients in SGH had a new diagnosis of colorectal carcinoma. Patients in Kuching had a longer duration of symptoms and more advanced stage at presentation, but this was not statistically significant. Lower socioeconomic class was a significant factor for late and more advanced stage at diagnosis, as well as poorer three and five year survival rates. However, survival was lower for patients in Kuching compared to Kuala Lumpur, even after matching for socio-economic class. **Conclusion:** There is near-zero awareness of colorectal cancer screening in Malaysia. These findings support reaching out to communities of lower socioeconomic backgrounds to improve the colorectal cancer survival rates.

**Keywords:** Colorectal cancer - survival rate - socio-economic class - Malaysia - Kuala Lumpur - Sarawak

*Asian Pacific J Cancer Prev*, 11, 969-974

### Introduction

Colorectal cancer is the commonest cancer among males and second commonest among females in Malaysia. A total of 2,866 cases were registered nationwide with the Malaysian National Cancer Registry in 2006 and represent 13.2% of all cancer cases registered. The incidence of colorectal cancer in Malaysia increases with age, the overall incidence rate being 14.5 per 100,000 population. The incidence is slightly higher among males, 16.2 per 100,000 compared to females, 12.7 per 100,000 population. The incidence is highest among the Chinese where the incidence rate is 23.8 per 100,000 population, and lower in Indians and Malays, where the incidence rate was 9.1 per 100,000 and 6.9 per 100,000 respectively (Ministry of Health Malaysia, 2006).

The prognosis of the disease is good if detected at an early stage (Gatta et al., 2003), with a five-year survival rate of 90%. However, the disease is only localized in less than 40% of cases at the time of diagnosis (Greenlee et al., 2001). Therefore, colorectal cancer screening in average risk, asymptomatic individuals over 50 years of age has been advocated by many organizations, in order to detect

and treat colorectal cancer at an early stage.

Although screening is both effective and cost-effective (Winawer et al., 1997), it is not widely practiced and 85% of colorectal cancers are still diagnosed during the investigation of symptoms (Silverman et al., 1988). Despite the existence of a clinical practice guideline for screening of colorectal cancer in Malaysia, it is rarely applied by general practitioners (Malaysian Society of Gastroenterology & Hepatology, 2001). Thus, it remains crucial for physicians to have accurate and detailed information, based on sound research, regarding the clinical behavior of symptomatic colorectal cancer.

Kuala Lumpur, the capital city of Malaysia, is situated in West Malaysia and has an estimated population of 1.58 million in 2006. It has a population density of 6,502 inhabitants per square kilometer (16,840 /sq mi), and is the most densely populated administrative district in Malaysia (Department of Statistics, Malaysia, 2006).

The Gross Domestic Product (GDP) for Kuala Lumpur was estimated at RM 25,968 million in 2000 with an average annual growth rate of 4.2 percent. The per capita GDP for Kuala Lumpur in year 2000 was RM 30,727, an average annual growth rate of 6.1 percent. The per capita

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GDP for Kuala Lumpur was more than twice that of the national average and the average monthly household income for Kuala Lumpur was RM 5,011 in 2004 (Kuala Lumpur City Hall, 2009).

Sarawak state is located in the north-western part of Borneo in East Malaysia and its state capital is Kuching, which is the fourth largest city in Malaysia. The estimated population of Kuching was 0.58 million in 2006 (Department of Statistics Malaysia, Social Statistics Bulletin, 2005). The per capita GDP of Sarawak was RM 16,047 and the average monthly household income for Kuching was RM 2,725 in 2004 (Economy Planning Unit, Malaysia, 2009). Therefore, the per capita GDP and monthly household income of Kuala Lumpur is double than that of Sarawak.

Sarawak General Hospital is a 765-bed tertiary public referral center for the state of Sarawak, while UMMC is a 920-bed quaternary referral centre, teaching hospital in Metropolitan Kuala Lumpur.

So far, there is no published study looking into the relationship of socio-economic class on colorectal cancer patient outcomes in Malaysia. There is also no comparison made between the presentation and survival between colorectal cancer patients in East and West Malaysia. This study will look into the difference in demographics and clinical presentation of colorectal patients between Kuching and Kuala Lumpur and their survival rates. There is a common perception that many patients of lower socioeconomic groups in Sarawak only seek medical care when the disease process has reached an advance stage and therefore would have a poorer survival rate.

Research over the past several decades has indicated that social conditions, such as the socioeconomic class of the areas in which the individual lives, has a direct effect on health outcomes. Studies in Western countries have generally shown that individuals living in poorer areas often have worse health compared with individuals living in relatively wealthier areas (Hole and McArdle, 2002; Wrigley et al., 2002; Krieger et al., 2005; Birgitte et al., 2009). Studies for several cancer sites have shown that individuals living in poor areas are more likely not to utilize cancer screening services and present at a late stage compared with individuals living in affluent areas (Anderson et al., 1997; Stephen et al., 2004).

After adjustment for race/ethnicity, age, marital status, gender, diagnosis year, and prior cancer diagnosis, socio-economic class is a significant, independent predictor of colorectal cancer stage at diagnosis and there was a significant trend of increasing odds of late stage diagnosis with worsening socio-economic conditions (Rosengren and Wilhelmsen, 2004; Kevin et al., 2009). Studies have shown that deprivation appears to exert no significant impact on colorectal cancer prevalence but is a major factor explaining a person's participation in screening (Whynes et al., 2003).

## Materials and Methods

All patients diagnosed with malignancy of the colon or rectum at Sarawak General Hospital (SGH) and University of Malaya Medical Center (UMMC) from 1<sup>st</sup>

Jan 2000-31<sup>st</sup> Dec 2006 were recruited. The list of patients was obtained from the Information Resource Center of UMMC and Medical Record Office of SGH in order to make sure that all patients were included. Patient without histopathological diagnosis of colorectal carcinoma or already diagnosed or started treatment before 2000 were excluded.

Data was obtained from hospital in-patient records and Surgical Clinic records. The date of death was verified by the National Registration Department and calling patients' contact numbers where available. We used the ICD-10 classification C18-C20 colorectal carcinoma to collect all the patients with diagnosis of colorectal carcinoma (UK Cancer Research, 2008).

Information was collected on the duration between presentation and the onset of symptoms that are said to be associated with colorectal cancer. It was then divided into "short" if three months or less and "long" if more than three months. The stage of the cancer was recorded using the modified Dukes-Aster-Coller and TNM staging system (based on 6th edition American Joint Committee on Cancer Staging Manual (2003). Patients at AJCC stage I, IIa and IIB were categorized into "early" stage while stage IIIa, IIIb, IIIc and IV were grouped into "late" stage.

Socio-economic status was recorded from medical records if available or via interview. It was defined according to the National Statistics Socio-economic Classification (NS-SEC) (2004). For those who were retired, it was based on their previous longest occupation. For those who were unemployed or housewives, classification was based on that of the spouse or guardian's occupation where available. This is based on the concepts of employment relations and conditions rather than skill. Social class as defined by occupational class is traditionally considered one of the most important indicators to characterize people's socio-economic position. A previous study suggested that occupational class was more strongly associated with cancer mortality than educational level (George et al., 1998). Personal income was not included because income questions asked in the context of survey research are susceptible to high rates of inaccuracy.

We submitted a list of our patients to the National Registration Department to obtain their date of death. All deaths are required by law to be notified to the National Registration Department, which is a governmental organization under the Ministry of Home Affairs, Malaysia. The list was computed based on their registry on 31<sup>st</sup> October 2009. Therefore, a patient, whose name was not in the list of reported deaths, was assumed to be alive as of 31<sup>st</sup> October 2009.

The survival duration of each case was determined as the time difference between the date of presentation (index date) and the date of death. The survival duration was categorized into more than three years or less than three years. A sub-group analysis was done for patients who presented from 1<sup>st</sup> January 2000 to 31<sup>st</sup> October 2004 with symptoms associated with colorectal cancer. They were divided into two groups: those who survived more than five years or less than five years.

Statistical analysis was performed with SPSS® Version

17.0. Testing for significance was performed using the chi-square test and p values less than 0.05 considered statistically significant.

## Results

From 1<sup>st</sup> January 2000 to 31<sup>st</sup> December 2006, a total of 565 patients presented to UMMC and 642 patients to SGH with a new diagnosis of colorectal carcinoma. However, complete hospital records could be collected and analyzed in only 412 (72.9%) at UMMC and 419 (65.3%) at SGH. The folder of 61 patients in UMMC and 118 patients in SGH were no longer available in archives and untraceable. Ninety-two records in UMMC and 105 in SGH were incomplete and excluded from the analysis.

No significant difference between the two centers in terms of age, gender, ethnic group, socio-economic class, duration of symptoms or clinical stage at presentation.

In terms of socio-economic class, patients in higher socio-economic classes had significantly shorter duration of symptoms before presentation compared with lower socio-economic classes ( $p < 0.05$ ) as shown in Figure 1.

A total of 29 (3.5%) patients could not be staged owing to the poor advanced clinical status of the patients on presentation, which prevented any further investigation; in the results, these cases have been considered together with stage IV lesions.

From Figure 2, we can see that proportionally more patients from higher socio-economic classes present in the earlier stages of the disease compared with lower socio-economic classes. This was statistically significant ( $p < 0.05$ ).

A sub-group analysis was done to obtain five-year survival rates for patients who presented from 1<sup>st</sup> January 2000 to 31<sup>st</sup> October 2004 with symptoms associated with colorectal cancer.

The sub-group analysis totaled 549 patients. Out of this, 291 patients or 53.0% survived more than five years in average. From Figure 3, we can conclude that UMMC has a higher five-year survival rate (60.5%) compared with SGH (45.7%), which was statistically significant ( $p < 0.05$ ).

Figure 4 shows that the survival rate according to each AJCC stage. The five-year survival rate at UMMC diminished from stage I (78.6%) to stage IV (9.3%). Meanwhile, at SGH, it lessened from 74.5% at stage I to 5.2% at stage IV. Chi-square analysis showed it was significant for stages II to IV ( $p < 0.05$ ) but not significant for stage I ( $p = 0.624$ ).

## Discussion

None of the patients in our sample were asymptomatic at presentation or diagnosed from a screening test. This showed the near-zero awareness of colorectal cancer screening clinical practice guidelines among the primary care physicians in Kuala Lumpur and Sarawak. Primary care physicians can easily perform faecal occult blood test for at-risk populations and refer them accordingly for sigmoidoscopy or colonoscopy.

The study showed that there is no statistically significant difference between the UMMC and SGH

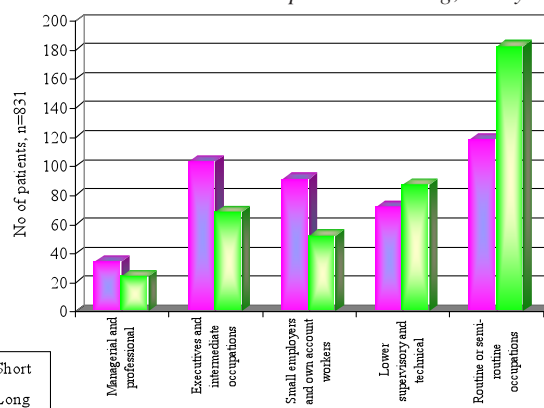


Fig 1: Duration of symptoms before presentation of colorectal patients according to socio-economic class ( $p < 0.05$ )

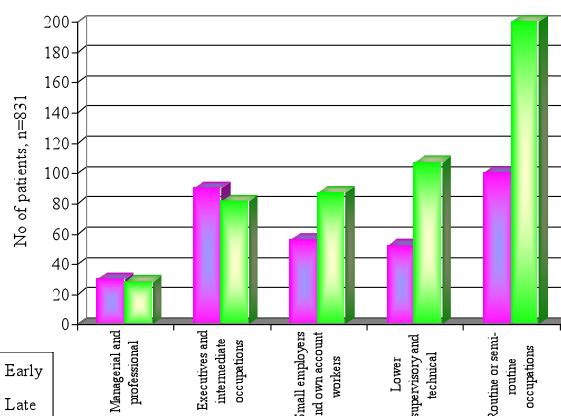


Figure 2: Stage at presentation of colorectal patients according to socioeconomic class ( $p < 0.05$ )

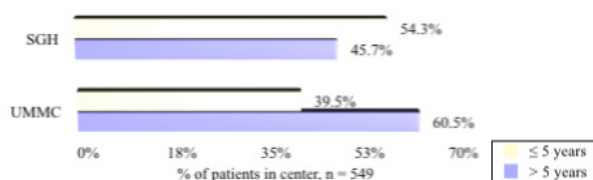


Figure 3. Five-year Survival of Colorectal Cancer Patients According to Center ( $p < 0.05$ )

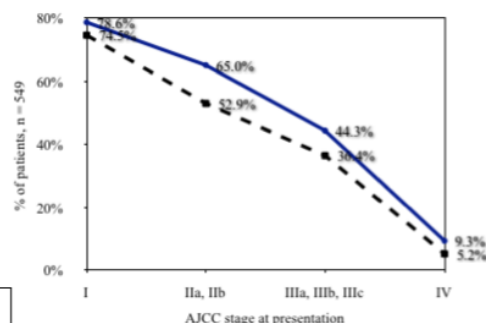


Figure 4. Five-year Survival Rate of Colorectal Cancer Patients According to Stage and Center

patients in terms of duration of symptoms and stage at presentation. The assumption is that the lower socio-economic groups of both centers share the same mentality, which prompts them to seek treatment. On the other hand, higher income groups in both Sarawak and Kuala

**Table 1. Five-year Colorectal Cancer Survival Rate According to AJCC Stage**

	Year of diagnosis	Stage I	Stage IIa, IIb	Stage IIIa, IIIb, IIIc	Stage IV	Life- expectancy <sup>1</sup>
Kuching (present study)	2000-2004	74.5%	52.9%	36.4%	5.2%	71.7
Kuala Lumpur (present study)	2000-2004	78.6%	65.0%	44.3%	9.3%	71.7
United Kingdom <sup>2</sup>	1996-2002	93.2%	77.0%	47.7%	6.6%	78.1
United States <sup>3</sup>	1991-2000	93%	78.5%	63.7%	8%	76.8
United States <sup>4</sup>	1985-1990	70%	59%	44%	11%	75.4
Italy <sup>5</sup>	1990-1991	82%	71%	42%	11%	77.1
Minnesota <sup>6</sup>	1980-1999	75%	63%	49%	3%	73.7
Greece <sup>7</sup>	1993-1998	88.9%	78.8%	50%	NA	77.5
India <sup>8</sup>	1987-1991	NA	61.2%	31.9%	9.0%	53.2

<sup>1</sup>Data from CIA World Factbooks (2009); <sup>2</sup>Data from UK Cancer Research (2009); <sup>3</sup>Data from US National Cancer Institute (2009); <sup>4</sup>Data from Glenn D Steele (1994); <sup>5</sup>Data from Ponz et al. (2000); <sup>6</sup>Data from Amit et al. (2005); <sup>7</sup>Data from Wichmann et al. and The Colorectal Cancer Study Group (2001); <sup>8</sup>Data from Yeole et al. (2001)

Lumpur would have been exposed to similar education and standards of living, which could have resulted in similar outcomes.

However, patients from Sarawak had a significantly poorer three-year (52.5%) and five-year (45.7%) survival rate compared to Kuala Lumpur (65.5% and 60.5%). There are several factors involved. Firstly, there are no colorectal-trained surgeons at SGH. All the surgeries were done by general surgeons who do not have a special interest in colorectal cancer. General surgeons at SGH are relatively more junior in term of years of experience than those at UMMC. All of them are newly gazetted surgeons with less than 5 years of surgical experience. Meanwhile, there are several colorectal-trained surgeons in UMMC, including some who underwent years of training in more developed countries.

Besides that, colorectal cancer patients at Sarawak had limited options for adjuvant treatment. The average household income of Sarawak in 2004 was RM 2,725 which is almost half of that in Kuala Lumpur with average household income of RM 5,011. Therefore, they could not afford most of the newer chemotherapeutic agents, which could prolong their life. Moreover, some of the patients in UMMC were recruited into clinical trials where chemotherapeutic agents were given free and they were under close surveillance. These facilities were not available to the patients in Sarawak.

Another factor is possibly due to the distance between their home and health service. Sarawak is the largest state in Malaysia with its vast land area but scattered population. Therefore, there are certain communities situated far away from a health center. They also had to travel a greater distance to reach a specialist center.

The result of this study agrees with the majority of findings from previous studies conducted in Europe and the US (Ionescu et al., 1998; Wu et al., 2006) that lower socio-economic class had an impact of shorter survival. It is significantly due to late presentation and advanced stage at diagnosis. This is consistent with most Western literature. Besides that, patients from lower socio-economic backgrounds are more likely to have greater confidence in traditional cultural beliefs, where they will seek alternative medicine before seeking treatment from Western medicine.

Among the cancer control community, it is known that tracking the rates of early versus late-stage cancers is a good way to monitor the impact of who is utilizing

and benefiting from screening (National Cancer Institute, 2007). A diagnosis of colorectal cancer at a late stage should be viewed as a preventable, adverse health outcome. Hence, characterization and identification of populations needing enhanced screening efforts to increase early colorectal cancer detection and reduce the number of late stage diagnoses is supported by a number of US national initiatives (US Department of Health and Human Services, 2000).

Exactly how area-based socioeconomic conditions influence the stage at which an individual is diagnosed with cancer is complex. In Sarawak, it is mainly due to physical access (i.e. transportation, proximity to screening services) and socio-cultural access (i.e. health literacy, ability to navigate the medical system, and communication with healthcare professionals). Lower education levels among residents living in poor areas could also create barriers to receiving recommended screening. Several studies have shown that low health literacy, education levels, and language barriers influence an individual's ability to navigate the medical system, understand screening options and recommendations, and communicate with healthcare professionals (Matthews et al., 2005; James, 2006).

Individuals living in areas of low socioeconomic conditions may need to travel further for healthcare or lack access to specialists because impoverished areas might have difficulty attracting investments in medical services. As radiotherapy centres are located in urban areas, patients living in rural and remote areas have relatively poorer access to the standard of cancer treatment services available to their urban counterparts (Xue et al., 2005).

Referring to Table 1, the five-year survival rate Kuala Lumpur patient with colorectal cancer AJCC stage I, II, III is comparable to that of patients in United States and Minnesota diagnosed in 1980s. However, comparing with patients from United States, United Kingdom, Italy and Greece diagnosed in 1990s, the patients in Kuala Lumpur had poorer survival rates. The five-year survival rate of colorectal patients in Kuching is worse than those at Kuala Lumpur.

This is most likely due to better medical care including surgical skill and adjuvant treatments available at Western countries from 1990s onwards. Patients at stage IV generally present with weak overall health and treatment at this stage was not aimed for cure. From the literature, less than one-tenth of them are able to survive until five

years after diagnosis.

Besides that, Malaysia has a lower overall average life-expectancy compared to other countries at the particular time of the research. Our life-expectancy in the study period was closer to Minnesota, US in the 1980s, which may partially explain our lower five-year colorectal survival rate. So, a Malaysian who was diagnosed at age 68 would not be expected to survive 5 years even if they didn't have the cancer because they could die of non-cancer related causes.

In conclusion and as recommendations, the guidelines for the detection of adenomatous polyps and colorectal cancer in asymptomatic average-risk adults should emphasize that when possible, clinicians should make patients aware of the full range of screening options (Winawer et al., 2003). Now that we have identified that low socio-economic class is indeed related to high rates of late stage disease, the next focus of investigation could be comparing various differences in demographics and resources.

More public health attention should be paid to promote colorectal cancer screening especially to the lower socio-economic group and to the population of Sarawak. Resources for screening such as faecal occult blood test and colonoscopy should be more accessible at the smaller district hospital in Sarawak to enhance assessment of at-risk patients.

Other local research could be carried out to identify all the factors contributing to late presentation and poorer survival among the lower socio-economic class. Campaigns and health education can be carried out to educate the public about risk factors and early symptoms of colorectal cancer and the benefit of early detection.

As the average household income in Sarawak is generally lower than in Kuala Lumpur, more funds should be allocated to Sarawak to subsidize adjuvant therapies. For example, the hospital charges for colorectal cancer surgery and other treatments should be lower or waived.

These findings showed the significance of reaching out to communities of lower socio-economic backgrounds to improve colorectal cancer survival rates. Thus, general practitioners should pay more attention on primary and secondary prevention of these communities.

## Acknowledgements

The authors would like to thank the Medical Record Department, University of Malaya Medical Center and Sarawak General Hospital for their help in tracing medical records, the National Registration Department, Malaysia, for providing data on date of death, and the patients for their participation and co-operation in the study.

The authors state no conflict of interest and no financial grants and other funding were obtained. The research was done as the corresponding author's thesis for the fulfillment of the Master of Surgery program, University of Malaya. The study was approved by the Ethics Committee of University Malaya Medical Center and it conforms to the provisions of the Declaration of Helsinki in 1995 (as revised in Tokyo 2004).

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