RESEARCH ARTICLE

Attitudes Towards Colorectal Cancer (CRC) and CRC Screening Tests among Elderly Malay Patients

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Abstract

Background: Colorectal cancer (CRC) is the third most common malignancy in Malaysia, where data are limited regarding knowledge and barriers in regard to CRC and screening tests. The aim of the study was to assess these parameters among Malaysians. Materials and Methods: The questionnaires were distributed in the Umra Private Hospital in Selangor. The questionnaire had four parts and covered social-demographic questions, respondent knowledge about CRC and colorectal tests, attitude towards CRC and respondentaction regarding CRC. More than half of Malay participants (total n=187) were female (57.2%) and 36.9% of them were working as professionals. Results: The majority of the participants (93.6%) never had a CRC screening test. The study found that only 10.2% of the study participants did not consider that their chances of getting CRC were high. A high percentage of the participants (43.3%) believed that they would have good chance of survival if the cancer would be found early. About one third of the respondents did not want to do screening because of fear of cancer, and concerns of embarrassment during the procedure adversely affected attitude to CRC screening as well. Age, gender, income, family history of CRC, vegetable intake and physical activity were found to be significant determinants of knowledge on CRC. Conclusions: The major barriers identified towards CRC screening identified in our study were fear of pain and embarrassment. The findings have implications for understanding of similarities and differences in attitude to CRC amongst elderly patients in other cultural/ geographic regions.

Keywords: Colorectal cancer (CRC) - barriers - practice - elderly patients - Malaysia

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Introduction

Colorectal cancer (CRC) is the third most common malignancy and the fourth leading cause of mortality worldwide (Ferlay et al., 2010). There is dramatic increase in incidence of CRC in many Asia Pacific countries, including China, Japan, Korea, Singapore and Taiwan (Sung et al., 2005).

There is growing emphasis on CRC screening. In 2001, the Canadian Task Force on Preventive Health Care concluded that there is good evidence to include annual or biennial fecal occult blood testing (FOBT) and fair evidence to include flexible sigmoidoscopy in the periodic health examination of asymptomatic people over 50 years of age (Canadian Task Force on Preventive Health Care, 2001). This followed the lead set by other professional societies, organizations and cancer agencies (Winawer et al., 2003). Currently, recommendations advise that adults 50 years and older and younger adults with increased risk for those with family history or previous cancer detection for CRC are to be screened using tests that are both preventive and diagnostic, namely flexible sigmoidoscopy, or colonoscopy (Levin et al., 2008).Recommended screening tests for CRC include fecal occult blood test (FOBT), fecal immunochemical test (FIT), double-contrast barium enema, flexible sigmoidoscopy, and the gold-standard, colonoscopy (Rex et al., 2009). Colonoscopy is often promoted as the "gold standard" of screening tests due to its superior sensitivity leading to a reduction in mortality and decreases CRC mortality by 76% to 90% (Levin et al., 2008; Rex et al., 2009). As a consequence, CRC screening is among the most efficacious cancer screening programs available today. The US Preventive Services Task Force, the American College of Gastroenterology, and the American Cancer Society all recommend that men and women age 50 years and older should be regularly screened for CRC with yearly fecal occult blood testing (FOBT) and/or every 5-year use of periodic flexible sigmoidoscopy, colonoscopy, or barium enema (U.S. Preventive Services Task Force, 2002).

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CRC screening rates are dismally low, lagging far behind those of all other cancer screening tests. According to the available data, in 2001, only 43% of adults aged 50 years had received a lower endoscopy (flexible sigmoidoscopy or colonoscopy) in the preceding 10 years; 23.5% had an FOBT in the preceding year(CDC 2003). Screening for CRC using fecal occult blood tests (FOBT) has been shown to reduce the mortality of CRC by up to 33% (Mandel et al., 1993, Hardcastle et al., 1996). The US Preventive Task Force and the Asia Pacific consensus statements have recommended FOBT as one of the screening tools for CRC screening(Sung et al., 2008). Notwithstanding, adherence to screening and uptake rates have been reported to be still low even in developed countries (American Cancer Society 2011).

A recent multi-center, international study involving 14 countries or regions in the Asia Pacific region reported considerable deficiencies in knowledge of CRC symptoms and risk factors, and suggested that this could lead to poor uptake of CRC screening tests (Koo et al. 2012). This is compatible with another interview based survey conducted in an ethnically diverse population aged 30-70 years, which found that the overall knowledge of CRC was a significant predictor of intent to participate in CRC screening (Kim et al., 1998). Knowledge of CRC symptoms has been identified as a powerful predictive factor of having received a CRC screening test (Gimeno-Garcia et al., 2009).Therefore, the objective of this study was to determine the knowledge level and attitude towards CRC among Malaysians.

Materials and Methods

The questionnaires were distributed in the Umra Private Hospital, Selangor. Ethical approval was obtained from the Management and Science University (MSU) committee. Permission to distribute the questionnaires to the out patients was obtained from the management of the hospital. The questionnaires were distributed amongst about 200 patients. The questionnaire was divided into four parts in which the first part was about social-demographic status which included information about age, race, highest education, occupation, monthly family income, health status, history of CRC and other cancer, smoking habit, physical activity, consumption of vegetables and fruits, alcohol intake and screening of CRC. The second part was to assess the respondents' knowledge about CRC and colorectal tests. The third part was to assess the respondents' attitude towards CRC; example of questions was:"If you think have chances of colorectal cancer, why you do not wish to do some of the screenings". In the fourth part, the questions were based on the respondents' action regarding CRC. The scoring for knowledge was '1' for 'Yes' and 'zero' for 'No'. In Section 3 of the questionnaires, respondents have had to answer nine questions pertaining to their Attitude towards CRC. Their responseswere measured on a Likert scale of '0' ('Strongly Disagree') to '4' ('Very Much'). In Section 4, respondents have had to answer five questions pertaining to Action (or Practice) towards CRC. Their responseswere measured on a Likert scale of '1'('Not at All') to '5' ('Very Much').

Results

Out of the 200 completed questionnaires, 187 study participants (93.5%) were Malay, 4 study participants (2%) were Chinese, while 4.5% of the study participantswere Indian respondents. Since the Chinese and Indian were underrepresented, the analysis focused on Malay patients only. All the 187 patients resided in urban areas, 107 study participants (57.2%) were females and 180study participants (96.3%) were married. Only 10 study participants had primary or secondary education while the rest had higher education. About 38% of the study participants were unemployed while 36.9% of the study participants were professionals and the rest were non-professionals. Majority of the study participants (61%) earned between RM2001-RM3000. Table 1 summarizes the socio-demographic characteristics, health information and lifestyle practices of the Malay patients of this study.

In terms of health status of the study participants, a total of 138 the study participants(73.8%) rated their health status as 'Good' and 44 (23.5%) rated as 'Fair'. Only two patients rated their health-status 'Excellent' while 3 patients rated their health status as 'Very Good'. A high majority of the study participants (n=158; 84.5%) had no family history of CRC. However 74 of the study participants (39.6%) have family history of cancer. Only 11 study participants (5.9%) were smokers while two were ex-smokers. A total of 22.5%of the study participants did not do physical activity while 69 (36.9%) did physical

Table 1. Socio-demographics, Health Information and Lifestyle Practices

Variable	Categories	Frequency (%)
Gender	Male	80 (42.8%)
	Female	107 (57.2%)
Occupation	Professional	69 (36.9%)
	Non-Professional	47 (25.1%)
	Not Employed	71 (38.0%)
Income	<RM2000	5 (2.71%)
	RM2001-RM3000	114 (61.0%)
	RM3001-RM4000	56 (29.9%)
	RM4001-RM5000	8 (4.3%)
	>RM5001	4 (2.1%)
Health status	Excellent	2 (1.1%)
	Very Good	3 (1.6%)
	Good	138 (73.8%)
	Fair	44 (23.5%)
CRC family history	Yes	29 (15.5%)
	No	158 (84.5%)
Cancer family history	Yes	74 (39.6%)
	No	113 (60.4%)
Smoker	Yes	11 (5.9%)
	No	174 (93.0%)
	Ex-smoker	2 (1.1%)
Physical activity	Regularly	69 (36.9%)
	Irregularly	76 (40.6%)
	No	42 (22.5%)
Vegetables and fruits intake	Every day	133 (71.1%)
	At least 3 times	39 (20.9%)
	Once or Twice	15 (8.0%)

activity regularly, and 76 (40.6%) exercised irregularly. A high percentage of the participants (n=133; 71.1%) indicated that they intake vegetables and fruits every day.

Regarding the practice of colorectal screening among the study participants,93.6%of the study participants never had CRC screening test and only 6.4%the study participants underwent colorectal screening. Regarding the knowledge towards CRC among the study participants, only 44.9% of the study participants have heard about CRC. Additionally, 72.7% of the study participants have not heard about test for CRC. Only 5.9%of the study participantsknewabout flexible sigmoidoscopy. A low percentage of the participants have knowledge about FOBT (3.2%) and about that screening for CRCshould be started at age 50 years (4.3%) (Table 2).

Table 2. Knowledge of Colorectal Cancer and Colorectal Cancer Screening Test

Questions	Response	Frequency	Percentage
Have you ever heard of colorectal cancer?			
	Yes	84	44.90%
	No	103	55.10%
Have you ever heard a test to find colorectal cancer?			
	Yes	51	27.30%
	No	136	72.70%
Did you know what flexible sigmoidoscopy is?			
	Yes	11	5.90%
	No	176	94.10%
Did you know what Fecal Occult Blood Test is?			
	Yes	6	3.20%
	No	181	96.80%
Did you know screening for colon cancer start at age 50 years?			
	Yes	8	4.30%
	No	179	95.70%

As for attitudetowards CRC, this study showed that only 15of the study participants (10.2%) did not think that their chances of getting CRC werehigh. A high percentage of the study participants (n=81; 43.3%) believed that a chance of survival if the cancer is found early would be good and that this may be a serious problem if found late. A large majority of the study participants indicated that they would have FOBTand sigmoidoscopy test if these procedureswould be recommended by their doctors. Basically, majority of patients indicated that they would like to know if they have CRC (Table 3).

Concerning the barriers towards CRC screening, 32.1% of the study participants did not want to do screening because of fear of cancer. The reasons why they did not do fecal blood test and flexible sigmoidoscopy were: *i)* these procedures have not been recommended by doctor (35.3%, 28.3%; respectively), and *ii)* 40.6% of the study participants mentioned that they did not have any health problem and did not have symptoms of CRC

Table 3. Attitude Towards Colorectal Cancer among the Study Participants

	Response				
Items	Not at all	A little bit	Somewhat	Quite a bit	Very much
My chances of getting colorectal cancer are high					
	15(10.2%)	45 (24.1%)	73 (39.0%)	45 (24.1%)	5(2.7%)
Colorectal cancer is serious if it found early					
	5 (2.7%)	55(29.4%)	68(36.2%)	41(21.9%)	18(9.6%)
Colorectal cancer may be serious when it is found late					
	1(0.5%)	9(4.8%)	51(27.3%)	71(38.0%)	55(29.4%)
If I have colorectal cancer, I will have a good chance of survival if the cancer found early					
	0(0%)	12(6.4%)	57(30.5%)	81(43.3%)	37(19.8%)
I intended to have a fecal occult test if it is recommended by a doctor					
	0(0%)	8(4.3%)	45(24.1%)	94(50.3%)	40(21.4%)
I intended to have a fecal occult test if it is recommended by my friends or relatives test					
	1(0.5%)	30(16.0%)	100(53.5%)	48(25.7%)	8(4.3%)
I want to have a flexible colonoscopy if it is recommended by a doctor					
	0(0%)	7(3.7%)	44(23.5%)	89(47.6%)	47(25.1%)
I intended to have a flexible colonoscopy if it is recommended by my friends or relatives					
	3(1.1 %)	20(10.7%)	87(46.5%	60(32.1%)	18(9.6%)
I want to know if I have colorectal cancer or not					
	0(0%)	13 (7.0%)	53 (28.3%)	72 (38.5%)	49 (26.2%)

Table 4. Barriers Towards Colorectal Cancer Screening among the Study Participants Barriers of Fecal Occult Blood Test

Items	Number (%)
I do not know if should have fecal occult blood test	95 (50.8%)
I think fecal occult blood test not necessary	87(46.5%)
Fecal occult blood test (FOBT) was not recommended by doctor	66 (35.3%)
I did not do FOBT because I do not have health problem	76 (40.6%)
I do not think that flexible sigmoidoscopy is necessary	77 (41.2%)
I have no symptoms of colorectal cancer	73 (39.0%)
FOBT is a painful test	100 (53.5%)
Flexible sigmoidoscopy test will be embarrassing	103 (55.1%)
I do not want to do screening because fear of being discovered of having cancer	60 (32.1%)

(39%). A high percentage of patients did not know if they should have a FOBT (50.8%) and thought that CRC screening was somewhat not necessary (46.5%). More than half of the study participants did not do flexible sigmoidoscopy because they considered that the procedure might be embarrassing (55.1%) or painful (53.5%) (Table 4).The study showed that males had significantly higher attitude to CRC scores compared to female ($p<0.05$). As for attitude towards CRC screening, on the average female patients score was significantly higher than that of male patients ($p<0.01$). However, attitude to CRC scores were not significantly different for income group (Table 5).

Two-independent samples t-tests were carried out in order to compare the mean of 'Knowledge' and 'Practice' between two groups. Obtained results showed that there was significant difference in "Knowledge" and 'Practice' between male and female patients. Males had significantly higher 'Knowledge about CRC"than females. However, males have lower "Practice towards CRC' than females as indicted by the means and negative point bi-serial correlation. 'Knowledge' category was also significantly higher for those with family history of CRC. "Practice' category was significantly higher for those who have family history of cancer. Point bi-serial correlation is well known to be a measure of correlation between a dichotomous and continuous variable. AVOVA was carried out to compare the mean of 'Knowledge' and 'Practice' among physical activity groups (Table 5). The Tukey HSD pairwise comparison tests showed that the mean knowledge score of those who did physical activity regularly (24.69) was significantly higher than those who did physical activity irregularly (14.49) and who did not

Table 5. Independent t-tests Results for Knowledge and Practice

Dependent Variable	Independent Variable	n	Mean±SD	t or F statistic (p-value)	Point bi-serial correlation (p-value)
Attitude	Male	77	2.48±0.40	2.03*	0.148
	Female	97	2.31±0.67		-0.054
	Rm3001-Rm4000	114	2.43±0.53	1.48	0.114
	Rm4001-Rm5000	56	2.29±0.63		-0.14
Attitude Towards	Male	77	1.98±0.38	-4.14**	-0.304
Screening Test	Female	97	2.24±0.43		0
	Rm3001-Rm4000	114	2.11±0.43	-0.35	-0.028
	Rm4001-Rm5000	56	2.14±0.43		-0.721
Knowledge	Male	77	26.49±18.19	5.55**	0.394**
	Female	93	9.68±20.77	0	0
	Rm2001-Rm3000	114	15.44±19.01	-1.482	0.125
	Rm3001-Rm4000	56	21.07±25.13	-0.142	-0.105
	Family History of Crc				
	Yes (1)	29	23.44±28.82	1.33	0.131
	No (0)	141	16.03±19.30	-0.94	-0.08
	Family History of Cancer				
	Yes (1)	68	15.88±24.08	0.674	-0.054
	No (0)	102	18.23±19.32	-0.502	-0.482
	Heath Status				
	Good	133	17.29±20.56	0.001	0
	Fair	37	17.30±24.11	-0.999	-0.999
	Physical Activity				
	Regularly	64	24.69±20.67	7.28**	
	Irregularly	69	14.49±23.73	-0.001	
	No	37	9.73±12.13		
Practice	Male	77	2.49±0.37	-5.52**	-0.392**
	Female	93	2.78±0.31	0	0
	Rm2001-Rm3000	114	2.65±0.36	-0.135	0.1
	Rm3001-Rm4000	56	2.66±0.38	-0.893	-0.893
	Family History of Crc				
	Yes (1)	29	2.69±0.39	0.62	0.048
	No (0)	141	2.64±0.36	-0.538	-0.538
	Family History of Cancer				
	Yes (1)	68	2.74±0.37	2.49*	0.189*
	No (0)	102	2.59±0.35	-0.014	-0.014
	Heath Status				
	Good	133	2.64±0.37	1.07	-0.082
	Fair	37	2.71±0.35	-0.286	-0.286
	Physical Activity			3.08**	
	Regularly	64	2.58±0.37	-0.049	
	Irregularly	69	2.73±0.34		
	No	37	2.63±0.37		

**p<0.01,*p<0.05; +Mann-Whitney test as data for 'Yes' was highly skewed and m=1

Table 6. Multiple Regression Results for KNOWLEDGE

Variable	Standardized beta	t	p-value
AGE	0.157	2.228	0.027**
GENDER	0.602	5.017	0.000***
INCOME	0.197	2.818	0.005***
OCC_1	-0.276	-2.557	0.011**
OCC_2	-0.251	-2.594	0.010**
CRC_history	0.128	1.898	0.060*
CANCER_history	0.026	0.348	0.728
HEALTH_STATUS	-0.04	-0.566	0.572
VEGE_FRUITS	0.217	2.881	0.005***
PA_REG	0.233	2.087	0.039**
PA_IRREG	0.204	2.155	0.033**

*significant at 10%; ** significant at 5%, ***significant at 1%; GENDER (0=Female, 1=Male); INCOME (0=RM2001-RM3000; 1=RM3001-RM4000); OCC1 (1=Professional, 0=Otherwise), OCC_2 (1=Non-Professional, 0=Otherwise), CRC_history (0=No, 1=Yes); CANCER history (0=No, 1=Yes); Health_Status (0=Fair, 1=Good); VEGE_FRUITS (1='Once/Twice/At least three times, 0=Everyday), PA_REG (1=Regular Physical Activity, 0=Otherwise); PA_IRREG (1=Irregular Physical Activity, 0=Otherwise)

do physical activity at all (9.73). Surprisingly, the practice score was significantly lower for those who did physical activity regularly.

Multiple Regression Analysis was carried out to determine the factors contributing to "Knowledge about CRC'. The predictor variables included in the model are age, gender (male, female), income (RM2001-RM3000, RM3001-RM4000), occupation (professional, non-professional, not-employed), family history of colorectal cancer, family history of cancer, health status (fair, good), vegetables and fruits (everyday, once/twice/at least three times) and physical activity (regular, irregular, no physical activity). the variable on smoking status could not be included as a predictor as there were only 13 (7.6%) who were smokers (Table 6). the r-square of the regression model was 0.315, indicating that the predictors could explain 31.5% of the total variation of knowledge scores. All predictors were found to be significant predictors except for 'Family History of Cancer' and 'Health Status'. The results of our study showed that males and those who have had higher income (RM3001-RM4000) had higher knowledge about CRC. Professionals were found to have higher knowledge score compared to those unemployed. However, those who were unemployed had higher knowledge than those who were non-professionals. As expected, those who have had family history of CRC had higher knowledge about CRC but family history of cancer did not contribute to knowledge on CRC. Those who indicated intake fruits once, twice or at least three times had higher knowledge scores (Table 6). Physical activity was a significant predictor whereby those who exercised regularly or irregularly had higher scores than those who did not do any physical activity (Table 6).

Discussion

CRC is a disease that can be prevented and successfully treated through early detection using screening tests, education, and changes in lifestyle behaviors (Coups et al., 2007; Huxley et al., 2009). In this study, we identified the barriers and practice toward CRC. To our best of knowledge, very little is known about CRC and screening behaviors and barriers in Malaysia. Data on knowledge of CRC prevention and screening among Malay patients are rare. To fill this gap, we collected data on knowledge of CRC among Malay patients 50 years and older.

Concerning the barriers towards CRC screening, 32.1% of the participants indicated that they do not want to do screening because of fear of cancer. The reasons why the participants avoided doing FOBT and flexible sigmoidoscopy were found to relate to the circumstance that these procedures were not recommended by the physician (35.3%, 28.3%; respectively) and to that the study participants (40.6%) felt that they did not have any health problem. Specifically, the study participants indicated that they had no symptoms of CRC (39%). A high percentage of patients stated that they did not know if they should have a FOBT (50.8%) and thought that CRC screening might be somewhat not necessary (46.5%). More than half of the study participants did not do flexible sigmoidoscopy because they considered that this procedure might be embarrassing (55.1%) and painful (53.5%). In relation to the above mentioned findings in our study, it is worth to refer to earlier study by Beekeret al. (2000) that found that individuals who lacked knowledge about CRC and screening were less likely to seek screening. Even though fear of the detection of cancer were cited as a frequent reason by our respondents, this finding is not novel and rather confirmatory as the literature suggested similar (Ward et al., 2008; Suha et al., 2010). This fear may stem from the belief that people usually prefer not to look for difficulties that are not currently annoying them, especially if they think of cancer as a serious disease (Wong-Kim et al., 2003). Indeed, fear is frequently cited as a barrier to screening uptake (McCaffery et al., 2001; Miles et al.,2008). Several studies reported that participants fear about the procedure of colonoscopy procedure as well (Denberg et al., 2005; Ogedegbe et al., 2005; Palmer et al., 2008).

More than half of our study participants mentioned that the barriers towards flexible sigmoidoscopy were those thatflexible sigmoidoscopy procedure is embarrassing (55.1%) and painful (53.5%). Similar findings were reported earlier indicating that embarrassment is one of the barriers to colorectal screening (Robb et al., 2008). Other studies have also reported that embarrassment associated with CRC screening has been found as a particularly important obstacle to undergoing a screening test (Rawl et al., 2000). Embarrassment has been reported to be a major barrier to CRC screening especially in women (Farraye et al., 2004; Consedine et al., 2011).

Our study found that 96.8% of the study participants had no idea what is FOBT and colonoscopy (94.1%) and that only 11 (5.9%) knew what is flexible sigmoidoscopy. Definitely, this indicated poor knowledge about CRC screening among Malaysian. This finding is in line with another study that showed poor knowledge about CRC among at risk population aged 50 years and older. Guessouset al. (2010) and Suhaet al. (2010) suggested that lack of knowledge might lead to low rate of CRC screening tests. Earlier survey from Malaysia reported that

only 4.1% had good knowledge of CRC and its screening (Harmy et al., 2011). Other studies from Hong Kong (Tam et al. 2011), however, data from Australia (Christou and Thompson, 2012, Javanparast et al., 2012) and from USA (Sanderson et al., 2011) also reported low levels of knowledge of CRC.

According to the findings of our study, a large majority of the study participants would have FOBT and sigmoidoscopy test if these would be recommended by their doctors. Thus, lack of physician recommendation was another most important barrier in obtaining CRC screening tests. In other studies when adherent people were asked why they had not been screened, lack of doctor recommendation was the second most important reason after "lack of awareness"(Klabunde et al., 2007). Physician recommendation is a strong predictor of the acceptance of mammography, the Papanicolaou test and prostate-specific-antigen testing (McCaul and Tulloch, 1999; Slevin et al., 1999) and is the strongest predictor of patient acceptance of CRC screening, regardless of patient preference for a particular screening modality (Leard et al., 1997). Specialists play an important role as opinion leaders and as providers of most flexible sigmoidoscopy and colonoscopy services for either primary screening or diagnostic follow-up (Leard et al., 1997).

In the present study; only 6.4% of the study participants underwent colorectal screening. Although screening for CRC reduces mortality (Mandel et al., 1993), it is still underutilized. Compliance rates in eligible populations have been reported to be approximately 20% for FOBT in the past year and 30% for flexible sigmoidoscopy in the past 5 years (Cooper et al., 1997). However, according to the findings of our study the only 44.9% of the study participants have heard about CRC, and this is accordance with another study that showed that the 'knowledge of CRC'is positively associated with CRC testing(Sung et al., 2008). Our study showed that males had significantly higher attitude scores compared to female ($p<0.05$). As for attitude towards CRC screening, on the average female patients score was significantly higher than that of male patients ($p<0.01$).

Our study reports poor awareness about the role of physical activity in preventing CRC, the finding with is agreement with earlier findings of a study conducted in the US (Coups et al., 2008). It is important to noting here that the healthcare professionals should take this opportunity to play an active role communicating the messages for cancer prevention through lifestyle modification at the health care facilities (Stead et al., 2012) and through the mass media. Physical inactivity has been linked to colon cancer (Colditz et al., 1997). The relation between physical inactivity and the development of colon cancer is that the colon is susceptible to the effects of insulin. With increased physical activity, insulin sensitivity improves (Giovannucci et al., 1994). The benefits of regular physical activity for physiological and psychological health are well documented (Biddle et al., 2004). However, despite the well-known benefits of physical activity, many individuals even from developed countries are not engaged in physical activity sufficiently to obtain health benefits (Biddle et al., 2004). Our present study revealed that relatively few of the participants exercised regularly (15.7%). A similar study reported that only 40% of men and 28% of women met the American College of Sports Medicine (ASCM) guidelines for physical activity (which is 30 minutes of at least moderate-intensity activity on most days of the week) (American College of Sports Medicine, 2000).

The present study showed, however, that educational levels have a differential effect on screening among participants. An earlier study conducted in Malaysia has shown that one of the best methods in educating the rural population was via mass media, for example-television,where 97% of the population received information regarding severe acute respiratory syndrome during the outbreak via television (Power et al., 2011). Respondents with higher education level and high income in our study were found to have a higher level of awareness about CRC. This is consistent with findings of previous study conducted in the United Kingdom which revealed that respondents from affluent groups had shown higher level of cancer awareness (Power et al., 2011). It is worth to mention here also, that according to the result of our study, patients who had experienced cancer themselves and those with friends, who have had cancer, showed a higher level of knowledge of CRC. These individuals were more familiar with the disease because they may have heard about it from their family or friends, hence raising their awareness.

Obviously, each study has some limitations. The limitation of the current study was that the study was undertaken only in one private hospital and only in one state in Malaysia. Therefore, one cannot exclude that the present study may not reflect the views of people with different cultural traditions and beliefs throughout Malaysia. However, the findings of this study do provide the information about knowledge and barriers to CRC screening and thus would assist further studies. The findings of the present study might have implications for understanding of similarities and differences in attitude to CRC amongst elderly patients in other cultural/geographic regions.

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