

## RESEARCH ARTICLE

# Knowledge of Colorectal Cancer Screening among Young Malaysians

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### Abstract

The objective of this study was to determine the knowledge and associated factors regarding colorectal cancer screening among university students in Malaysia. The questionnaire consisted of three parts: socio-demographic characteristics, lifestyle practice and knowledge of colorectal screening. A cross-sectional study was conducted among 300 students (21.3±1.4 years old). The majority of the participants were Malay with a monthly family income of less than 5,000 Ringgit Malaysia (equal to 1,700 USD) (67.0% and 76.0%, respectively). Regarding their lifestyle practices, the majority were non-smokers and had never consumed alcohol (83.7%, and 88.0%, respectively). The majority of the participants had no knowledge of digital rectal examination, colonoscopy, barium enema and fecal occult blood screening (63.3%, 60.7%, 74.0% and 62.3%, respectively). Univariate and multivariate analysis revealed that their age and the discipline which the students were studying significantly influenced their level of knowledge about colorectal screening. The present study results indicate that education campaigns about colorectal cancer should be promoted.

**Keywords:** Screening - colorectal cancer - questionnaire - students - Malaysia

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### Introduction

The global burden of cancer has increased rapidly over recent decades (Jemal et al., 2011). It is the main cause of death in the developed world and the second highest cause in developing countries (Jemal et al., 2011). Worldwide, colorectal cancer is the third most commonly diagnosed cancer among males and the second among females, with over 1.2 million new cases and an estimated 608,700 deaths occurring in 2008 (Jemal et al., 2011).

As in other parts of the world, the incidence of colorectal cancer in Asia is increasing rapidly and it is expected that it will become the primary cause of death among the Asian population (Pignone et al., 2002). In Malaysia, colorectal cancer is the leading cause of death among males and the second highest among females. Accordingly to a report by the Ministry of Health of Malaysia, the incidence of colorectal cancer in 2006 was highest among Chinese (with age-standardized rate of 21.4/100,000 population) and was lower in Indians and Malays, where the age-standardized rates equal 11.3/100,000 and 9.5/100,000, respectively (National Cancer Registry, Malaysia Cancer Statistic, 2006).

In the United States of America, colorectal cancer is the second leading cause of cancer death (United States Preventive Services Task Force, 2002). Screening for colorectal cancer has resulted in early detection of the

disease and an improvement in the survival rate (United States Preventive Services Task Force, 2002; Sung et al., 2008; Park et al., 2011; 2012). The US Preventive Services Task Force recommends screening for CRC for all persons over 50 years (United States Preventive Services Task Force, 2002; Jemal et al., 2011).

The primary goal of screening for colorectal cancer is to detect adenomatous polyps. Interruption of the malignant progression of adenomatous polyps leads to the prevention of the disease (United States Preventive Services Task Force, 2002). The secondary goal is to diagnose colorectal cancer at an early stage when treatment is more likely to be successful: it is known that with early diagnosis and treatment of colorectal cancer, the 5-year survival rates increase dramatically (United States Preventive Services Task Force, 2002; Jemal et al., 2011). Colorectal cancer screening has been shown to decrease the incidence of colorectal cancers and decrease mortality (United States Preventive Services Task Force, 2002; Sung et al., 2008; Park et al., 2011; 2012). The slow decline in the incidence and mortality from colorectal cancer, which began in the mid-1980s, has been recently accelerating, due likely, at least in part, to the increasingly widespread utilization of modern screening methods. For instance, in 2008, only 54% of adults aged 50 years or older were screened for colorectal cancer. In contrast, 75% of women were screened that year for breast cancer and 72% were

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screened for cervical cancer (Oxentenko et al., 2007; Nelson and Thorson, 2009; Smith et al., 2010). Recent decades have witnessed the mortality reduction in breast and cervical cancers, largely attributed to the screening programs (Blanks et al., 2000; Raffle et al, 2003), and screening for colorectal cancer is emerging (Benson et al., 2008).

However, a number of previous studies have revealed that cancer education is insufficient, fragmented and unorganized, and that students' knowledge of cancer need to be improved (Barton et al., 2003; Hansen et al., 2004; Jeeva et al., 2007; Villarreal-Garza et al., 2010). Many factors influence whether or not an individual receives colorectal cancer screening. Lack of knowledge and fatalistic attitudes about screening and cancer have also been identified, in particular, among Latinos (Walsh et al., 2005).

Medical educators have shown that an emphasis on cancer prevention in medical schools' curricula can result in knowledge being retained long-term as well as positive self-reported attitudes and beliefs practice in clinical rotations, and intent to apply prevention in future practices (Zack et al., 2001; Geller et al., 2002; Lee et al, 2006).

Despite the importance given to the information relevant to the evaluation of the level of knowledge towards colorectal cancer screening in different parts of the world, the information about the Asia-Pacific region is remarkably scant. There is practically no current information about the knowledge towards colorectal cancer screening in Malaysia. Therefore, the objective of this study was to investigate the knowledge and associated factors towards colorectal cancer screening among young Malaysians.

## Materials and Methods

A cross-sectional study was conducted involving 300 students. In order to assess their knowledge of colorectal cancer screening, students were randomly selected from five of the faculties at the Management and Science University, Malaysia, including the International Medical School (IMS), the Faculty of Health and Life Sciences (FHLS), the Faculty of Business Management and Professional Studies (FBMP), the Faculty of Information Sciences and Engineering (FISE) and the School of Pharmacy (SOP). The study was approved by the ethics committee of the Management and Science University, Malaysia, and the questionnaire presented to the students consisted of three parts. The first part concerned the individual's socio-demographic characteristics such as sex, age, marital status, race, faculty, semester, education level and family income. The second part focused on lifestyle practices among the students such as smoking, exercise, and the consumption alcohol. The third part related to the students' knowledge about colorectal screening including the knowledge about digital rectal examination, colonoscopy, barium and fecal occult blood testing. The questionnaire was distributed to students and completed during class time. Before presenting the questionnaires to the respondents, informed consent was obtained from each student. Only once a respondent confirmed that

they understood the purpose of survey were they handed the questionnaire form. The respondents were required to answer all the questions and hand the questionnaire back to the researcher. The data obtained was analyzed by Statistical Package for the Social Sciences (SPSS). T-test was used in univariate analysis and multiple linear regression was used in multivariate analysis.

## Results

A total of 300 students participated in this study. The average age of the participants was  $21.26 \pm 1.41$ , with a minimum age of 17 years and a maximum age of 27 years. The majority of the participants were female (65%) and younger than 22 years of age (55.3%). The majority of the participants were Malays (67%) and with a family monthly income of less than 5,000 Ringgit Malaysia (RM) (76%) (Table 1). Factors that influenced the knowledge among the students were age and types of faculty and showed statistically significant results ( $p=0.006$  and  $p<0.001$ ) (Table 2). Regarding age, there was a difference between the mean of different age groups; senior students ( $\geq 22$  years) had higher scores ( $0.42 \pm 0.652$ ) for their knowledge of colorectal cancer screening compared with junior students ( $0.23 \pm 0.488$ ). The difference in the knowledge of colorectal cancer screening between the age groups was statistically significant ( $p=0.006$ ). Regarding the type of faculty, there were differences between the mean scores of students' knowledge: those from medical and health faculties ( $0.44 \pm 0.66$ ) had high scores for screening knowledge compared to those from non-medical and "non-health" faculties ( $p<0.001$ ). A comparison of other variables, such as race and family monthly income, did not show any significant difference (Table 2). Regarding the lifestyle practices among the students, the majority were non-smokers (83.7%) and had never consumed alcohol (88.0%) (Table 3). Few of them exercised regularly (15.7%). However, these factors did not affect significantly their knowledge about colorectal cancer screening (Table

**Table 1. Socio-demographic Characteristics among the Study Participants (n=300)**

Variable	Categories	No.	%
Sex	Male	105	35.0
	female	195	65.0
Age	<22	166	55.3
	$\geq 22$	134	44.7
Faculty *	FHLS	97	32.3
	IMS	40	13.3
	FBMP	121	40.3
	FISE	36	12.0
	SOP	6	2.0
Race	Malay	201	67.0
	Indian	53	17.7
	Chinese	24	8.0
	others	22	7.3
Family monthly income (RM**)	<5000	228	76.0
	$\geq 5000$	72	24.0

\*IMS - International Medical School; FHLS - Faculty of Health and Life Sciences; FBMP - Faculty of Business Management and Professional Studies; FISE - Faculty of Information Sciences and Engineering; SOP - School of Pharmacy. \*\*1USD= approximately 2.8RM

**Table 2. Knowledge towards Colorectal Cancer Screening among University Students and Associated Factors (n=300)**

Variable	Categories	Mean±SD	t	p-value
Sex	Female	0.29±0.55		
	Male	0.35±0.60	0.86	0.388
Age	<22	0.23±0.488		
	≥22	0.42±0.652	2.86	0.006
Faculty	Medical and Health	0.44±0.66		
	Non-medical and health	0.20±0.44	3.74	<0.001
Race	Malay	0.35±0.615		
	Non-Malay	0.24±0.476	1.5	0.102
Income	< 5000	0.32±0.576		
	≥ 5000	0.31±0.573	0.13	0.895
Smoking	Never smoke	0.31±0.565		
	Ever smoke	0.33±0.625	0.17	0.861
Alcohol	Never drink alcohol	0.33±0.593		
	Ever drink alcohol	0.19±0.401	1.32	0.081

**Table 3. Lifestyle among University Students (n=300)**

Variable	Categories	No.	%
Smoking	Never	251	83.7
	Sometimes	35	11.7
	Always	14	4.7
Drinking alcohol	Never	264	88
	Sometimes	33	11
	Always	3	1
Exercise	Never	54	18
	Sometimes	199	66.3
	Always	47	15.7

**Table 4. Knowledge towards Colorectal Cancer Screening Methods among University Students (n=300)**

Variable	Categories	No.	%
Digital rectal examination	Do not know it at all	190	63.3
	Know a little bit	88	29.3
	Know it very well	22	7.3
Colonoscopy	Do not know it at all	182	60.7
	Know a little bit	95	31.7
	Know it very well	23	7.7
Barium enema	Do not know it at all	222	74
	Know a little bit	66	22
	Know it very well	12	4
Fecal occult blood	Do not know it at all	187	62.3
	Know a little bit	88	29.3
	Know it very well	25	8.3

2). Regarding their knowledge towards colorectal cancer screening, the majority of students did not know about specific methods for colorectal cancer screening, such as the digital rectal examination (63.3%), colonoscopy (60.7%), Barium enema (74.0%) and fecal occult blood screening (62.3%) (Table 4). Multivariate analysis showed that the age and type of studies the students were undertaking significantly influenced their knowledge of colorectal screening (Table 5).

## Discussion

The empowering of young adults with correct information about cancer prevention and related issues of lifestyle is important. This study was conducted to evaluate

**Table 5. Predictive Model for Total Knowledge and Socio-demographic Characteristics using Multiple Linear Regression (n=300)**

Predictive factors	b	SE	Beta	p-value	
Constant	0.362				
Sex	Ref.	Ref.	Ref.		
	Female	0.083	0.068	0.069	
Age	<22	Ref.	Ref.	Ref.	0.228
	≥22	0.212	0.065	0.184	0.001
Faculty	Medical and Health	Ref.	Ref.	Ref.	
	Non-Medical and Health	-0.269	0.065	-0.234	0
Race	Ref.	Ref.	Ref.		
	Malay	-0.096	0.068	-0.079	
	Non-Malay				0.161

\*F=7.30, R<sup>2</sup>=0.090, p<0.001; Family income, alcohol, smoking were excluded from the model

the current information about the level of knowledge among young Malaysian towards colorectal cancer screening. The study investigated the peculiarities of this knowledge in different age groups of young Malaysians who practiced different lifestyles and who were engaged in different types of university study.

It was found that with the lifestyle practices among the students, the majority were non-smokers (83.7%) and had never consumed alcohol (88.0%) and few of them exercised regularly (15.7%). Compared to previous European studies, our study showed a lower percentage of Malaysian students consumed alcohol. German (Bloomfield et al., 2008) and European (European Commission, 2007) studies presented findings of harmful levels of alcohol consumption in approximately 25% of the younger population. Consequently, harmful or hazardous consumption of alcohol has been indentified as being a problem in the general German and European populations, and in particular amongst medical students (European Commission, 2007; Bloomfield et al., 2008). Another factor, namely physical inactivity, has been associated with colon cancer (Colditz et al., 1997). One possible mechanism to explain this difference is that the colon is more 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 published benefits of physical activity, many individuals from developed countries are not engaged in it sufficiently to obtain health benefits (Biddle et al., 2004; Craig, 2008). 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 (ACSM) 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). A study from Lebanon reported that 26.4% of university students were engaged in physical exercise (Musharrafieh et al., 2008). About one-third of Chinese and Brazilian university students were physically inactive (Abdullah et al., 2005; Fontes and Vianna, 2009).

Makrides et al. (1998) reported that fewer than half of university students in Canada participated in exercise three or more times per week. National statistics also show that, in many countries, at least one-quarter of all young people are deemed physically inactive (National Youth Risk Behavior Survey, 2006). Among university students of 23 countries, the prevalence of inactivity in leisure time varied with cultural and economic development factors, averaging 23% (northwestern Europe and USA), 30% (central and eastern Europe), 39% (Mediterranean), 42% (Pacific Asia), and 44% (developing countries) (Haase et al., 2004). This variation in the level of physical inactivity between different countries is a reflection of socioeconomic development, technology and urbanization (Haase et al., 2004). A previous study showed the association of smoking with an increased risk for colorectal cancer (Giovannucci et al., 1994). The prevalence of smoking among university students in the study of Giovannucci et al. (Giovannucci et al., 1994) was 16.3%. A higher percentage of smoking (29%) was reported in our previous study in which a Malaysian population was investigated (Al-Naggar et al., 2011). A study from Finland showed a lower prevalence of smoking (15%) among university students (Adetunji et al., 2008). This variation may be due to the use of different criteria for defining smoking, and different methodologies adopted. Medical education about the risks associated with smoking should be established in universities world-wide to help reduce the level of smoking among students (Adetunji et al., 2008; Al-Naggar et al., 2011). University students should be encouraged and assisted to stop smoking by, for example, increasing the number of smoke-free institutes (Adetunji et al., 2008; Al-Naggar et al., 2011).

The age of university students in this study significantly influenced their knowledge of colorectal cancer screening. A similar study performed in 1992 reported on the influence of age on colorectal cancer screening (Hobbs et al., 1992). Notably, in our study, students from medical and health-related faculties had higher scores for screening knowledge compared to those from other faculties. Medical students have exposure to such knowledge during their study and this might explain the differences in their knowledge of colorectal cancer screening between younger and older students.

In the present study, the majority of the respondents were unaware of colorectal cancer screening modalities: they did not know about the rectal examination at all (63.3%) and knew nothing about colonoscopy (60.7%); they did not know anything about Barium technique (74.0%) and knew nothing at all about the fecal occult blood screening (62.3%). A possible explanation that might account for such a poor knowledge towards colorectal cancer screening among university students is inadequate health education and the absence of any effective screening promotional activities. Furthermore, the lack of information and promotion from the public media campaigns also lead to poor knowledge about colorectal screening. A very recent study reported that a majority of respondents were unaware of screening modalities for early detection of colorectal cancer [36]. In that study of Harny et al. (2011), 62.3% of the study

participants did not know about Faecal Occult Blood Tests (FOBT) and 63.3% knew nothing about colonoscopy. Another study from Singapore showed a higher percentage of a lack of knowledge about colorectal cancer screening in which about 70% of the Chinese respondents had not heard of or knew anything about colonoscopy (Wong et al., 2002). A study from Hong Kong showed that colonoscopy was the most mentioned colorectal screening test (33%), followed by sigmoidoscopy (6.3%) and FOBT (5.9%) (Wong et al., 2008). A similar study reported that among the screening modalities available for colorectal cancer, most participants were aware that colonoscopy and FOBT were recommended tests but fewer were aware of flexible sigmoidoscopy and double-contrast barium enema being screening options (Boehler et al., 2011). Several studies showed poor knowledge of basic cancer facts and knowledge about cancer screening recommendations (Borum, 1997; Madan et al., 2006; Stephen et al., 2007). A study performed in the USA reported that cancer prevention knowledge was low among students at the School of Medicine, University of California, Los Angeles (UCLA) and two other medical schools in California (Lee et al., 2006). Studies show that many physicians lack proper training and confidence in basic cancer prevention and detection techniques and most medical students graduate without the skills necessary to assist patients in cancer prevention and detection (Garr et al., 2000; Zapka et al., 2000).

Recognition of the importance of teaching prevention is not new. In 1945, the Association of American Medical Colleges (AAMC) recommended that each medical school establish a department of preventative medicine (Chamberlain et al., 1992). A 1992 survey of 126 of the 128 US medical schools found that cancer prevention and detection were important topics in the medical school curriculum but more emphasis, time and resources were needed (Chamberlain et al., 1992). More recently, an expert panel convened by the Association of Teachers of Preventative Medicine proposed curricular requirements in prevention using the Guide to Clinical Preventive Service to achieve the goal of making preventative medicine an integral part of the education, training and practice of physicians (Berg, 2008). The present study revealed insufficient knowledge towards colorectal screening among university students, including even medical students. This provides an indication that preventative medicine modules should be integrated in all Malaysian medical schools. The preventative medicine modules were implemented in several universities in the United States, including the University of Wisconsin, Madison, where lectures and panel discussions that cover colorectal cancer screening are provided during their second year as part of the gastrointestinal and hepatic course (Boehler et al., 2011). The University of Wisconsin also provides problem-based cases and required readings that cover all cancer screening methods during their third year primary care clerkship. In addition, specific instruction regarding colorectal cancer screening is offered again during their third year surgery clerkship (Boehler et al., 2011). There is a similar curriculum at the Southern Illinois University School of Medicine with the

introduction to basic cancer screening needs and methods as problem-based cases during the first and second years during their endocrine, reproductive, and gastrointestinal units (Boehler et al., 2011). Students are also provided "life course prevention cards" during year 1 that include guidelines for all kinds of health prevention including cancer. During the third year students are also exposed to specific colorectal cancer screening via an on-line tutorial and case-based discussions during the surgery clerkship as well as general case-based group (Boehler et al., 2011). A cancer education curriculum for medical students increased students' knowledge of and improved their attitudes toward cancer prevention (Wilkerson et al., 2002). After a longitudinal cancer prevention curriculum, students were more likely to say that they had developed their own style for cancer prevention and to report that they were already practicing cancer prevention (Geller et al., 2002).

In conclusion, the present study revealed a poor level of knowledge towards colorectal screening among university students in Malaysia as well as their poor performance when it comes to regular exercise. This urges an education campaign for university students which would focus on their need to make healthy lifestyle choices and to promote a much better awareness regarding colorectal cancer screening.

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