RESEARCH COMMUNICATION

Negative Perception in Those at Highest Risk - Potential Challenges in Colorectal Cancer Screening in an Urban Asian Population

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Abstract

    <u>Introduction</u>: Colorectal carcinoma (CRC) is the second commonest malignancy in Malaysia, with the highest incidence seen in the Chinese. The aim of this study is to examine the knowledge of CRC and to identify potential barriers for screening, which has yet to be carried out on a nationwide scale. <u>Methods</u>: Subjects were recruited consecutively from friends and relatives accompanying patients to the general medical clinic in a tertiary hospital in Kuala Lumpur. Interviews were carried out using a standardized questionnaire for the Asia Pacific CRC working group based on the Health Belief Model (HBM). <u>Results</u>: 991 subjects were interviewed. From our study, 414 (41.8%), 500 (50.5%) and 646 (65.2%) could not identify any of the symptoms, risk factors and screening methods for CRC respectively. Only 384 (38.7%) were agreeable to undergo screening. Independent factors associated with willingness to undergo screening were as follows; Malay and Indian race compared to the Chinese [aOR 2.73 (1.87, 3.98) and 3.04 (2.02, 4.59) respectively], perceived susceptibility, perceived barriers to screening, doctor's recommendation and personal contact with CRC. <u>Conclusions</u>: Knowledge of CRC and CRC screening is low among the Malaysian population. The majority are not willing to undergo screening, the Chinese paradoxically being the least willing despite being at greatest risk.

Introduction

    Colorectal carcinoma (CRC) is a one of the commonest solid organ malignancies worldwide. Although previously a predominantly Western disease, the incidence of CRC is increasing in Asia (Sung et al., 2005; 2008). In Malaysia, the age-standardized incidence (ASR) from 2003-2005 is 20.9 per 100,000 population and is the second commonest malignancy overall (after breast). CRC is the commonest malignancy in men and the third commonest malignancy in women (after breast and cervical) (Lim et al., 2006). The population of Malaysia consists of three major ethnic groups; the Malays (60%), the Chinese (30%) and the Indians (10%) Among the three major groups, the Chinese has been consistently found to have the highest incidence of CRC (Lim et al., 2006).

    One of the major advances in the management of CRC is screening for the disease, both in terms of prevention of CRC by removal of polyps (due to the well accepted adenoma to carcinoma sequence (Hill et al., 1978) or detection of the cancer at an early stage. Screening for CRC has been shown to reduce mortality (Heresbach et al., 2006; Lee et al., 2007; Hakama et al., 2008; Steele et al., 2009). In the West, screening for colorectal cancer is established both in high risk groups as well as the general population at moderate risk of the disease ie those over a certain age. Malaysia has yet to carry out such a program but as our health system becomes more developed, it is reasonable that CRC should become one of the diseases targeted for screening. At present however, there is little data about the baseline knowledge of the public with regards to CRC and the population's willingness to undergo CRC screening.

    There are several models that can be used to examine health seeking behavior in the population and one of the most widely applied is the Health Belief Model (HBM) (Glanz, 2002). The function of the HBM is to assess factors that predict or explain one's preventative seeking behavior (uptake of a specific preventative measure) and can be applied to a wide range of medical settings such as condom use in HIV prevention and uptake of an available screening tool (eg mammography for breast cancer). The four factors identified are perceived individual susceptibility to the disease, perceived severity of the disease, perceived benefits of the preventative action and perceived barriers to the preventative action. However, a positive perception alone may not be sufficient for one to take up a specific preventative action and 'cues to action' are often required

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as triggers for the action to occur.

The aims and objectives of the present study were: 1) To assess public knowledge of CRC and CRC screening in an urban area in Malaysia and identify factors associated with knowledge of CRC and CRC screening; 2) To examine the general public perception of CRC screening and identify factors that associated with one's willingness to undergo CRC screening.

Materials and Methods

This was a prospective study where subjects were recruited consecutively from friends and relatives accompanying patients to the general medical clinic in the University of Malaya Medical Centre, Kuala Lumpur Dec 2006-Dec 2008. Subjects with previous CRC were excluded. Each interview was carried out by trained research assistants using a standardized questionnaire which was formulated for the Asian Pacific Colorectal Cancer Working Group by Sung et al. The original questionnaire was in English which was translated to Bahasa Malaysia (the national language of the country) and back translated to ensure that the original content of the questionnaire was preserved. Almost all Malaysians are fluent in either of these two languages. A small pilot study was initially carried out in ten Malays, Chinese and Indians respectively to identify potential problems with application of the questionnaire before the main study was carried out. Baseline demography of the subjects was recorded including ethnicity, gender and education level.

Assessment of CRC and screening knowledge

For knowledge of CRC symptoms and risk factors, the answers had to be given spontaneously by the subjects without prompting or given a list of options. The symptoms accepted include PR bleeding, mucus, alteration in bowel habit/ new onset diarrhoea or constipation, abdominal pain, tenesmus, lethargy (anaemia) and weight loss. A score of one was given for correctly identifying a symptom; poor knowledge was identified as a score of 0, moderate knowledge 1-2 and good knowledge ≥3. In terms of risk factors, accepted answers include advancing age, family history, low fibre/high red meat/high fat diet, obesity, lack of exercise, smoking and miscellaneous conditions such as inflammatory bowel disease. A score of one was given for correctly identifying a risk factor; poor knowledge was identified as a score of 0, moderate knowledge 1-2 and good knowledge ≥3.

For knowledge of CRC screening, the available tests were read out and the subjects were asked whether or not they were aware of each test. The CRC screening tests were colonoscopy, faecal occult blood testing (FOBT), virtual colonoscopy, flexible sigmoidoscopy +/- barium enema and faecal DNA test. A score of one was given for each known test; poor knowledge was identified as 0, moderate knowledge 1 and good knowledge ≥2.

Assessment of attitude towards screening

Attitude towards CRC screening was examined based on the HBM. The same scoring system by Sung et al looking at the Hong Kong Chinese population was used. The variables measured were as follows: Perceived susceptibility, the subjects were asked whether or not they thought that they had any risk factors for CRC. A score of 0 was given for 'no' and 1 for 'yes'; Perceived severity, this was assessed based on several questions such as whether or not the subjects felt CRC is would result in pain, impairment in activities of daily living as well as financial and social burden for the family. The five possible answers to each question were; strongly agree (score of 4), agree (score of 3), don't know (score of 2), disagree (score of 1) and definitely disagree (score of 0). The maximum possible score was divided into three groups; low, middle and high; Perceived benefits, The subjects were asked whether they thought screening could prevent the development of CRC. The five possible answers were; strongly agree (score of 4), agree (score of 3), don't know (score of 2), disagree (score of 1) and definitely disagree (score of 0). The maximum possible score was divided into three groups; low, middle and high; Perceived barriers, The questions were aimed to look at barriers towards the screening methods in themselves as well as the subject's personal access to the screening methods. The questions included whether or not the screening tests were harmful, painful or embarrassing as well as questions such as whether or not the screening tests were expensive, time consuming and not easily available. The five possible answers to each question were; strongly agree (score of 4), agree (score of 3), don't know (score of 2), disagree (score of 1) and definitely disagree (score of 0). The maximum possible score was divided into three groups; low, middle and high.

Cues for action

The three cues looked at were physician recommendation/referral, whether or not the subject had health insurance which included CRC screening and personal experience (relatives or friends with CRC). There two outcome variables looked at were as follows:1) Whether or not the subject had undergone CRC screening in the past (positive action); 2) Willingness or intention to undergo CRC screening if it were available.

Statistical analysis

All statistical analyses were carried out using SPSS. Potential factors associated with the main outcome variable(s) were analyzed using Chi square (with Yate's continuity correction where applicable). This was followed by multiple logistic regression to identify the independent factors associated with the main outcome variable(s). A p value of <0.05 was taken as significant.

Results

Nine hundred and ninety one subjects were recruited between the months of June 2006 to Dec 2008. Baseline demography was as follows: male 459(46.3%), female 532(53.7%); Malays 403(40.7%), Chinese 315(31.8%), Indian 273(27.5%); mean age was 43.5±5.3.

Knowledge about common symptoms of CRC

The common symptoms of CRC correctly identified by

the subjects were as follows; per rectal bleed 340(34.3%), mucus 22(2.2%), alteration in bowel habit (new onset diarrhea or constipation) 372(37.5%), abdominal pain 311(31.4%), weight loss 92(9.3%) and others 49(4.9%). 417(42%) could not identify any of the symptoms of CRC (Figure 1).

Knowledge of CRC symptoms was poor in 417(42.1%) moderate in 386(39.0%) and good in 188(19.0%). Factors independently associated with moderate to good knowledge on multivariate analysis include Malay and Indian race compared to the Chinese [Malay vs Chinese OR 2.23 (1.60, 3.15) p<0.001, Indian vs Chinese aOR 4.00 (2.74, 5.85)] p<0.001, higher education level [secondary vs primary aOR 2.88 (1.76, 4.71) p<0.001, tertiary vs primary OR 5.18 (3.01, 8.75) p<0.001] and family member/close friend with CRC aOR 4.82 (3.15, 7.36) p<0.001 (Table 1).

Knowledge about risk factors for CRC

The correct risk factors for the development of CRC identified by the subjects were as follows: old age 105(10.6%), family history 240(24.2%), low fibre diet 159(16%), high fat diet 91(9.2%), obesity 45(4.5%), smoking 87(8.8%) and others 113(11.4%). 500(50.5%) patients were not aware of any risk factors for the development of CRC (Figure 2).

Knowledge of risk factors for CRC was poor in 562(56.7%) moderate in 358(36.1%) and good in 71(7.2%). Factors associated with moderate to good knowledge on multivariate analysis include Malay and Indian race compared to the Chinese [aOR 1.94(1.39, 2.72) p<0.001 and 3.95(2.74, 5.70) p<0.001 respectively] and higher education level [secondary vs primary aOR 2.05 (1.23, 3.41) p<0.001, tertiary vs primary OR 3.83 (2.25, 6.54) p<0.001] and close friends or family with CRC aOR 2.25(1.56, 3.23) p<0.001 (Table 1).

Knowledge about CRC screening methods

From the study, 135 (13.6%) of patients were aware of FOBT as a screening method, colonoscopy 325(32.8%), flexible sigmoidoscopy ± barium enema 35(3.5%), virtual colonoscopy 32(3.2%) and faecal DNA 21(2.1%). 646(65.2%) were not aware of any available screening tests for CRC (Figure 3).

Knowledge of CRC screening was poor in 646(65.2%), moderate in 210(21.2%) and good in 135(13.6%). Factors associated with moderate to good knowledge of CRC screening on multivariate analysis were female gender aOR1.59(1.20, 2.11) p<0.001, age more than 45 years aOR1.53(1.17, 2.00) p<0.001, Malay and Indian race compared to the Chinese [aOR 2.05(1.42, 2.94) p<0.001 and 3.37(2.29, 4.95) p<0.001 respectively] and higher education level [secondary vs primary aOR 4.78 (2.57, 8.91) p<0.001, tertiary vs primary OR 5.79 (4.78, 11.05) p<0.001] and close friends or family with CRC aOR 2.67(1.85,3.88) p<0.001 (Table 1).

Perceptions towards CRC screening

Subjects with previous screening (positive action). Out of the 991 subjects interviewed, there were only 15(1.51%) subjects who had CRC screening (mean age 49.3±5.23;
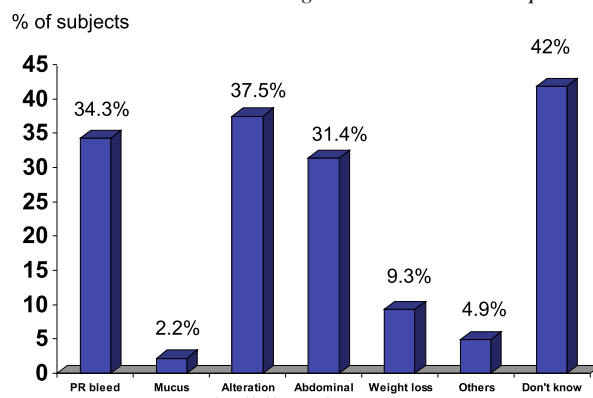

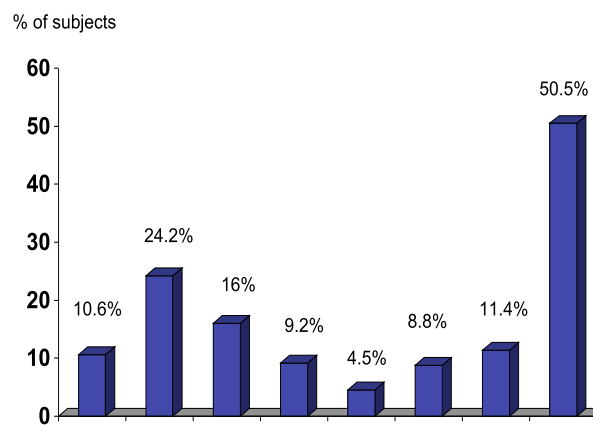**Figure 1. Symptoms Identified by Subjects as Associated with CRC.**

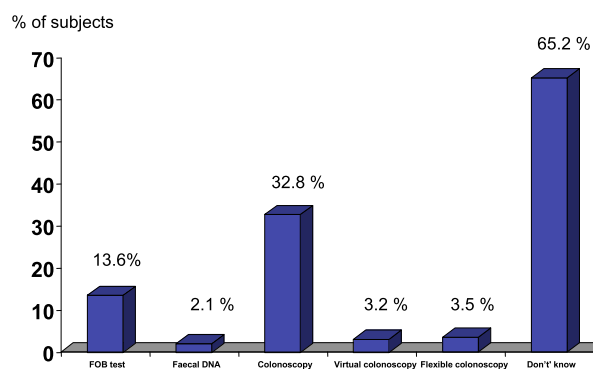**Figure 2. Risk Factors Identified by Subjects as Associated with CRC.**

Figure 3. Knowledge of the Available CRC Screening Methods.

male:female 6/9; Chinese:Indian/Malay 6/4/5). Thirteen subjects had colonoscopy and the other two underwent FOBT. The reasons for screening were as follows : first degree relative with CRC (1), relatives with other cancer (1), self referral for CRC screening (3), doctor's recommendation (6), included as part of a regular general check-up (1) and presence of bowel symptoms without alarm features (3). None of the subjects were found to have either CRC or advanced neoplasm. 14 (82.4%) of the subjects were willing to undergo screening again in future. Due to the very small numbers of patients, further analysis was not carried out.

Subjects willing to undergo screening. In terms of

Table 1. Factors Associated with Knowledge CRC and CRC Screening on Univariate and Ultivariate Analysis

		Moderate to good knowledge (%)	cOR(95% CI)	p value	aOR(95% CI)	p value
CRC symptoms						
Age	<45	352/606(58.1%)	1.00			
	>45	222/385(57.7%)	0.98(0.76-1.27)	0.895	-	NS
Gender	Male	259/459(56.4%)	1.00			
	Female	315/532(59.2%)	1.12(0.87-1.44)	0.376	-	NS
Ethnicity	Chinese	147/315(46.7%)	1.00			
	Malay	239/403(59.3%)	1.67(1.22-2.27)	<0.001	2.23(1.60-3.15)	<0.001
	Indian	188/273(68.9%)	2.53(1.78-3.60)	<0.001	4.00(2.74-5.85)	<0.001
Education level	Primary/none	33/98 (5.7%)	1.00			
	Secondary	271/489(47.2%)	2.45(1.52-3.96)	<0.001	2.88(1.76-4.71)	<0.001
	Tertiary	270/404(66.8%)	2.71(1.71-4.30)	<0.001	5.18(3.01-8.75)	<0.001
Close family or friends with CRC	No	433/812(53.3%)	1.00		1.00	
	Yes	141/179(78.8%)	3.25(2.21-4.77)	<0.001	4.82(3.15-7.36)	<0.001
CRC risk factors						
Age	<45	261/606(43.1%)	1.00			
	>45	168/385(43.6%)	1.02(0.79-1.32)	0.861		NS
Gender	Male	201/459(43.8%)	1.00			
	Female	228/532(42.9%)	0.96(0.75-1.24)	0.963		NS
Ethnicity	Chinese	97/315(30.8%)	1.00		1.00	
	Malay	175/228(43.3%)	1.72(1.25-2.38)	<0.001	1.94(1.39-2.72)	<0.001
	Indian	157/116(57.5%)	3.04(2.14-4.33)	<0.001	3.95(2.74-5.70)	<0.001
Education level	Primary/none	26/98 (26.5%)	1.00		1.00	
	Secondary	192/489(39.3%)	1.79(1.08-2.99)	0.02	2.05(1.23-3.41)	<0.001
	Tertiary	211/404(52.2%)	3.03(1.81-5.09)	<0.001	3.83(2.25-6.54)	<0.001
Close family or friends with CRC	No	334/812(41.1%)	1.00		1.00	
	Yes	95/179(53.1%)	1.62(1.17-2.24)	0.004	2.25(1.56-3.23)	<0.001
CRC screening						
Age	<45	188/606(31%)	1.00		1.00	
	>45	157/385(40.8%)	1.53(1.17-2.00)	0.002	1.96(1.46-2.65)	<0.001
Gender	Male	139/439(30.3%)	1.00		1.00	
	Female	206/532(38.7%)	1.45(1.11-1.90)	0.05	1.59(1.20-2.11)	0.001
Ethnicity	Chinese	82/315(26.0%)	1.00		1.00	
	Malay	138/403(34.2%)	1.48(1.06-2.08)	0.002	2.05(1.42-2.94)	<0.001
	Indian	125/273(45.8%)	2.40(1.67-3.45)	<0.001	3.37(2.29-4.95)	<0.001
Education level	Primary/none	14/84 (14.3%)	1.00			
	Secondary	181/489 (37%)	3.53(1.89-6.70)	<0.001	4.78(2.57-8.91)	<0.001
	Tertiary	150/404(37.1%)	3.54(1.88-6.78)	<0.001	5.79(4.78-11.05)	<0.001
Close family or friends with CRC	No	257/812(31.7%)			1.00	
	Yes	88/179(49.2%)	2.09(1.50-2.90)	<0.001	2.67(1.85-3.88)	<0.001

willingness to undergo CRC screening were 384(38.7%) answered 'definitely yes' or 'yes and 607(61.3%) answered 'no' and 'definitely no'. Looking specifically at the HBM variables, 33(3.3%) believed that they were or might be at risk for CRC (perceived susceptibility). Perceived severity was low in 8(0.8%), moderate in 832(84%) and high in 151(15.2%). Perceived benefit was low in 852(86%), moderate in 129(13%) and high in 10(1%) and perceived negative consequences is low in 48(4.8%), moderate in 785(79.2%) and high in 158(16%). In terms of identifying cues for action, 14(1.4%) had been recommended by a doctor to undergo screening and 179(18.1%) had personal experience with CRC. 582(58.7%) had insurance cover for CRC screening.

Malay and Indian race compared to the Chinese [aOR 2.73(1.87, 3.98) p<0.001 and 3.04(2.02, 4.59) p<0.001

Table 2. Factors Associated with Willingness to Undergo CRC Screening on Univariate and Multivariate Analysis

VARIABLE		Keen for screening	cOR (95% CI)	p value	aOR(95% CI)	p value
Age	<45	217/606 (35.8%)	1.00			
	>45	167/385 (43.4%)	1.37 (1.05-1.80)	0.017		NS
Gender	Male	172/459 (37.5%)				
	Female	212/532 (39.8%)	1.11(0.85-1.44)	0.444		NS
Ethnicity	Chinese	67/315 (21.3%)	1.00		1.00	
	Malay	171/403 (42.4%)	2.73 (1.93-3.87)	<0.001	2.73(1.87-3.98)	<0.001
	Indian	146/273 (53.5%)	4.26 (2.92-6.20)	<0.001	3.04(2.02-4.59)	<0.001
Education	None/primary	41/98 (41.8%)	1.00			
	Secondary	196/489 (40.1%)	1.17 (0.88-1.55)	0.288		NS
	Tertiary	147/404 (36.4%)	1.26 (0.78-2.02)	0.376		NS
CRC Symptom knowledge	Low	122/417 (29.3%)	1.00			
	Moderate	160/386 (41.5%)	1.71 (1.26-2.32)	<0.001		NS
	High	102/188 (54.3%)	2.87 (1.98-4.16)	<0.001		NS
CRC Risk Knowledge	Low	181/562 (32.2%)	1.00			
	Moderate	162/358 (45.3%)	1.74 (1.31-2.31)	<0.001		NS
	High	41/71 (57.7%)	2.88 (1.69-4.90)	<0.001		NS
CRC screen knowledge	Low	204/646 (31.6%)				
	Moderate	106/210 (50.5%)	2.21 (1.59-3.07)	<0.001		NS
	High	74/135 (54.8%)	2.63 (1.77-3.90)	<0.001		NS
Perceived Susceptibility	No	358/958 (37.4%)	1.00			
	Yes	26/33 (78.8%)	6.23 (2.54-15.91)	<0.001	2.14(1.34-3.41)	0.001
Perceived severity	Low	4/8 (50.0%)	1.00			
	Moderate	210/832 (25.2%)	0.34 (0.07-1.62)	0.119		NS
	High	89/151 (58.9%)	1.44 (0.29-7.16)	0.719		NS
Perceived negative consequences to screening	Low	35/48 (72.9%)	1.00			
	Moderate	273/785 (34.8%)	0.20 (0.10-0.40)	<0.001	0.33(0.16-0.72)	<0.001
	High	76/158 (48.1%)	0.34 (0.16-0.74)	0.002	0.34(0.16-0.72)	0.005
Perceived lack of access to CRC screening	Low	49/79 (62.0%)	1.00		1.00	
	Moderate	220/409 (53.8%)	0.71 (0.42-1.20)	0.178	0.77(0.44-1.33)	0.343
	High	115/503 (22.9%)	0.18 (0.11-0.31)	<0.001	0.28(0.15-0.62)	<0.001
Perceived benefit	Low	309/852 (36.3%)	1.00			
	Moderate	69/129 (53.5%)	2.02 (1.37-2.98)	<0.001		NS
	High	6/10 (60.0%)	3.12 (0.78-13.24)	0.88		NS
Insurance Cover	No	174/409 (42.5%)	1.00			
	Yes	**210/582 (36.1%)**	**0.76 (0.59-0.99)**	**0.047**		NS
Doctor Recommendation	No	371/977 (38.0%)	1.00			
	Yes	13/14 (92.9%)	21.23 (2.76-162.99)	<0.001	11.97(1.45-98.93)	0.021
CRC in family or friends	No	308/812 (37.9%)	1.00			
	Yes	76/179 (42.5%)	1.21 (0.87-1.68)	0.298	1.54(1.02-2.32)	0.042

respectively], perceived susceptibility aOR 2.14(1.34, 3.41) p=0.001, perceived negative consequences to screening [high vs low aOR 0.34(0.16, 0.72) p=0.005, moderate vs low aOR 0.33(0.16,0.72) p<0.001] perceived lack of access to screening aOR 0.28(1.15, 0.62) p<0.001, doctor's recommendation aOR 11.97(1.45, 98.93) p=0.021 and personal contact with CRC aOR 1.54(1.02, 2.32) p=0.042 were independent factors associated with willingness to undergo screening on multivariate analysis.

Knowledge of CRC symptoms, risk factors and screening were found to be significant factors associated with willingness to undergo screening on univariate but not on multivariate analysis (Table 2).

Discussion

The emergence of CRC in the Asia Pacific region is a cause for concern. Due to this, an Asia Pacific consensus group was formed in 2004 and among the objectives was to look specifically at the epidemiology of CRC in this region as well as identify potential barriers for screening (Sung et al., 2005; Sung, 2007). As mentioned previously,

the aim of our study was to look at the baseline knowledge of the Malaysian population regarding CRC and CRC screening as well as have an idea about the likely uptake of a CRC screening program if it were made available. From the study, it appears that the majority of Malaysians do no not have a good knowledge of CRC, either in terms of symptoms as well as risk factors. This is in keeping with many other studies including findings from more developed countries such as Hong Kong (Wong et al., 2002; 2006; Sung et al., 2008) and in Europe, where the incidence of CRC is high(Aubry et al., 1989; McCaffery et al., 2003; Keighley et al., 2004). For example, a study from Hong Kong also showed that half of the one thousand correspondents interviewed were unable to identify any available screening venue. As our hospital serves an urban population which is largely made up of the middle social class, it is likely that the general level of knowledge of the population in Malaysia is much lower. Not surprisingly, subjects with a higher education level and previous exposure to CRC were more aware of the condition. However, an unexpected finding was the marked difference in knowledge among the three major ethnic groups. From our study, the Chinese had a lower level of knowledge about CRC compared to the Malays and the Indians, which was independent of educational level. There does not appear to be a clear explanation to account for this finding which is even more surprising if you consider that the incidence of CRC is highest among the Chinese.

In terms of CRC screening methods, it is not surprising that colonoscopy was by far the commonest method identified by the subjects as it is the probably the commonest form of screening carried out in this country. FOBT is available in Malaysia (guaiac based and immunochemical) but is not widely carried out and faecal DNA testing is not available at present. Virtual colonoscopy is offered mainly in large hospitals but is more expensive than colonoscopy and its efficacy as a screening tool remains controversial. Again, the Chinese appeared to have a lower level of knowledge compared to the Malays and the Indians.

In terms of looking the attitudes of the Malaysian population, our initial aim was to identify factors based on the HBM that were positively associated with uptake of CRC screening. However, from our study, only a few of the subjects had undergone CRC screening in the past. Most of the subjects who had undergone CRC screening were willing to undergo further screening. Looking at willingness rather than actual positive uptake, factors that were found to be positively associated were ethnicity, perceived susceptibility, perceived barriers to screening (both reservation towards the procedure itself as well as perceived difficulties in access), doctor's recommendation and close relatives/friends with CRC. Although found to be strongly significant factors on univariate analysis, knowledge about CRC symptoms, risk factors and screening were not found to be independently associated with willingness to undergo screening. This suggests that although strongly associated with a positive perception towards CRC screening, knowledge of the disease alone may not be adequate in determining one's health seeking

behavior. Those who perceive themselves to be at risk are correspondingly more willing to undergo screening but a major barrier to screening appears to be the towards the screening procedure itself as well as practical difficulties in obtaining access to the screening tests . Of all the positive risk factors identified, the strongest predictive factor is by far is recommendation by a doctor but out of the 991 subjects interviewed, only 1.4% were recommended by their doctors to undergo screening despite the fact that approximately 40% of the subjects were over 50 years of age. This could be due to the fact that Malaysia does not have a good primary care system and that many Malaysians do not consult doctors unless they're ill but it is equally possible that the primary care physicians are not recommending screening as a routine. It is also clear that in our society, the doctor's opinion is still highly regarded and from this study, one could argue that educating the medical profession at large may have the greatest impact on the success of CRC screening in the population.

Looking specifically at differences in the three ethnic groups, the Chinese were again found to be less willing to undergo CRC screening compared to the other two races independent of education level or knowledge of CRC and CRC screening. There is paucity of data in this country comparing differences in ethnicity and health seeking behavior but a study published recently looking at health utilization in Malaysia revealed that the Chinese had the lowest uptake of medical services compared to the Malays and the Indians.(Krishnaswamy et al., 2009) It must be noted however that the data was derived from government hospitals only and private health care in Malaysia makes up a significant part of the health service in this country, particularly in the urban population. Therefore the data has to be interpreted with caution and the same limitation applies to our study. Nevertheless, this apparent negative perception towards CRC screening is particularly noteworthy as the Chinese have the highest incidence of CRC among the three races. The ASR of CRC for the Chinese is 31.5 per 100,000 population compared to 12.3 for the Malays and 15.7 for the Indians respectively (Lim et al., 2006). Chinese race was found to be a predictive factor for advanced neoplasm in a published study by the Asia Pacific Working Group (Leung et al., 2006). Further exploratory studies such as looking specifically at Chinese cultural views (Hou 2005; Wenchi et al., 2008) followed by targeted education for the Chinese may be required if and when colorectal screening were to become available to the general population.

There are several limitations to this study. Due to constraints in available resources, door to door interviews or phone interviews were not carried which are generally considered to be more representative of the population. However, our hospital which is partly funded by the government is one of the largest tertiary hospitals in Kuala Lumpur and the patients seen in our institution are fairly representative of an urban population, with the possible exception of the lowest and highest spectrums of social class who are either seen in pure government hospitals or private hospitals respectively. The other valid consideration is the fact that as Malaysia does not have a national screening program, it is not altogether surprising

that the majority of the population are not aware of either the disease or the screening methods.

Malaysia is a developing country and at present, the current consensus is that it is not ready for a nationwide screening program due to limited resources (Qureshi et al. ; Lambert et al., 2009). However, as mentioned previously, the incidence of CRC is expected to rise and it may be that screening has advantages both from a public health point of view but also overall health costs if you consider the cost of CRC management, including surgery, radiotherapy and chemotherapy. It is particularly concerning that most patients in our own hospital present only in the late stages of the disease (Goh et al., 2005). Another issue still to be addressed is the best method for screening, taking into account cost effectiveness, availability and patient acceptance. Although we still have a long way to go before a nationwide program is made available, the study highlights the fact that it is important to at least to educate about the modifiable risk factors as well as recognizing early symptoms of the disease. Patients who are keen on CRC screening should be educated on the available screening methods, including their risks and advantages. A common method that has been employed in other countries that do not have a formal screening program is carrying out mass screening events.(Qureshi et al. ; Fujita et al., 1986; Chew et al., 2009) Our study also highlights the important role of educating and assessing the attitudes of health care professionals themselves regarding CRC screening. As mentioned previously, it appears that advice from the medical professional will play a pivotal role in the success of any screening program and this has been confirmed in many studies (Janda et al., 2003; Janz et al., 2003; Sung et al., 2008; Nichols et al., 2009; Wong et al., 2009).

In conclusion, knowledge of CRC and CRC screening is limited in our population. There appears to be ethnic differences in the perception towards CRC screening, the Chinese paradoxically the least willing to screen despite being at highest risk. Willingness to undergo CRC screening is determined by several factors but one of the most important factors identified was recommendation by the health care providers, signifying the importance of educating the health care professionals as well as the public at large. We still have a long way to go in improving the outcome of this common and serious disease.

References

Aubry C, Spyckerelle Y, et al (1989). Public knowledge and attitude towards colorectal cancer. Gastroenterol Clin Biol, 13, 596-601.

Chew, M. H., N. Suzanah, et al (2009). Colorectal cancer mass screening event utilising quantitative faecal occult blood test. *Singapore Med J*, **50**, 348-53.

Fujita M. Nakano Y, et al (1986). Mass screening for colorectal cancer by testing fecal occult blood. Cancer, 57, 2241-5.

Glanz K, L. F., Rimer BK (2002). Health Behavior and Health Education.

Goh KL, Quek KF, et al (2005). Colorectal cancer in Asians: a demographic and anatomic survey in Malaysian patients undergoing colonoscopy. *Aliment Pharmacol Ther*, **22**, 859-64.

Hakama M, Coleman MP, et al (2008). Cancer screening: evidence and practice in Europe 2008. *Eur J Cancer*, **44**, 1404-3.

Heresbach D, Manfredi S, et al (2006). Review in depth and meta-analysis of controlled trials on colorectal cancer screening by faecal occult blood test. *Eur J Gastroenterol Hepatol*, **18**, 427-33.

Hill MJ, Morson BC, et al (1978). Aetiology of adenoma-carcinoma sequence in large bowel. *Lancet*, **1**, 245-47.

Hou SI (2005). Factors associated with intentions for colorectal cancer screenings in a Chinese sample. *Psychol Rep*, **96**, 159-62.

Janda M, Stanton WR, et al (2003). Knowledge, attitude and intentions related to colorectal cancer screening using faecal occult blood tests in a rural Australian population. *Asia Pac J Public Health*, **15**, 50-6.

Janz NK, Wren PA, et al (2003). Colorectal cancer screening attitudes and behavior: a population-based study. *Prev Med*, **37**, 627-34.

Keighley MR, O'Morain C, et al (2004). Public awareness of risk factors and screening for colorectal cancer in Europe. *Eur J Cancer Prev*, **13**, 257-62.

Krishnaswamy S, K. Subramaniam, et al (2009). Factors contributing to utilization of health care services in Malaysia: a population-based study. *Asia Pac J Public Health*, **21**, 442-50.

Lambert, R., C. Sauvaget, et al. (2009). Mass screening for colorectal cancer is not justified in most developing countries. *Int J Cancer*, **125**, 253-6.

Lee KJ, Inoue M, et al (2007). Colorectal cancer screening using fecal occult blood test and subsequent risk of colorectal cancer: a prospective cohort study in Japan. *Cancer Detect Prev*, **31**, 3-11.

Leung, W. K., K. Y. Ho, et al. (2006). Colorectal neoplasia in Asia: a multicenter colonoscopy survey in symptomatic patients.*Gastrointest Endosc*, **64**, 751-9.

Lim C, S. Rampal, et al Cancer Incidence in Peninsular Malaysia 2003-2005.

McCaffery K, Wardle J, et al (2003). Knowledge, attitudes, and behavioral intentions in relation to the early detection of colorectal cancer in the United Kingdom. *Prev Med*, **36**, 525-35.

Nichols C. Holt CL, et al (2009). Physician knowledge, perceptions of barriers, and patient colorectal cancer screening practices. *Am J Med Qual*, **24**, 116-22.

Qureshi, A., M. Raj, et al. Screening for Colorectal Cancer in Malaysia Consensus/Clinical Practice Guidelines.

Steele, R. J., P. L. McClements, et al. (2009). Results from the first three rounds of the Scottish demonstration pilot of FOBT screening for colorectal cancer. *Gut*, **58**, 530-5.

Sung J (2007). Colorectal cancer screening: its time for action in Asia.*Cancer Detect Prev*, **31**, 1-2.

Sung JJ, Choi SY, et al (2008). Obstacles to colorectal cancer screening in Chinese: a study based on the health belief model. *Am J Gastroenterol*, **103**, 974-81.

Sung JJ, Lau JY, et al (2005). Increasing incidence of colorectal cancer in Asia: implications for screening. *Lancet Oncol*, 6, 871-6.

guidelines to evaluate the response to treatment in solid tumors. *J Natl Cancer Inst*, **92**, 205-16.

Vogel CL, Wojtukiewicz MZ, Carroll RR, et al (2005). First and subsequent cycle use of pegfilgrastim prevents febrile neutropenia in patients with breast cancer: A multicenter, double-blind, placebo-controlled phase III study. *J Clin Oncol*, **23**, 1178-84.

Weinshilboum R (2003). Inheritance and drug response. *N Engl J Med*, **348**, 529-37.