Knowledge of Colorectal Cancer and Associated Factors
Among the General Population in Malaysian

Redhwan A. Al-Naggar, Yuri V. Bobryshev and Muhamed T. Osman

Faculty of Medicine, Universiti Teknologi MARA (UiTM), Malaysia
Faculty of Medicine, School of Medical Sciences, University of New South Wales, New South Wales, Sydney NSW, Australia
Centre of Pathology, Diagnostic and Research Laboratories, Faculty of Medicine, Universiti Teknologi MARA (UiTM), Malaysia

Abstract: Colorectal cancer is the fourth leading cause of cancer death worldwide. The objective of this study was to determine the knowledge of colorectal cancer among the general population in Malaysia. A cross-sectional study was conducted among the general population in Shah Alam, Selangor, Malaysia. A total number of 300 subjects participate in this study. The mean age of the study participants was 31.38±11.07. The majority of the participants were female, less than 50 years of age, Malay, single and with no history of colorectal cancer (56.7%, 90.3%, 71.0%, 59.0% and 83.3%; respectively). Regarding the eating habits, 60.3% eat vegetables regularly, 45.0% eat green salad regularly, 29.3% took supplements regularly, 55.7% eat fruits regularly, 64.7% eat meat regularly, 46.3% eat fast food regularly and only 29.0% drink sufficient amount of water regularly. For lifestyle, 43.3% of the participants reported that they exercise regularly. Univariate analysis showed that sex, marital status, smoking cigarettes and shisha were significantly influence the knowledge of colorectal cancer (P=0.006, P=0.022, p<0.001, P<0.001; respectively). Multiple linear regression identified smoking and family history of colorectal cancer significantly associated with knowledge about colorectal cancer prevention (p<0.001, p=0.044; respectively). Conclusions: The population survey showed low awareness of colorectal cancer. Therefore importance of continuing public education, particularly about the link between lifestyle behaviors and colorectal cancer is urgently needed.

Key words: Colorectal Cancer %General Population %Malaysia

INTRODUCTION

Cancer is a leading cause of mortality and morbidity worldwide [1]. The World Health Organization estimated 7.6 million deaths due to cancer in the year 2005, a number expected to rise to 12 million deaths by the year 2030 [1, 2]. Cancer is a disease that provokes massive public anxiety and elicits cognitions and emotions about its cause and cure [3, 4]. It is a major cause of mortality worldwide and accounts for around 25% of all deaths across Europe and the United States [5, 6]. Colorectal cancer is the fourth leading cause of cancer death worldwide (WHO, 2012) [1, 2]. In fact that 50% to 75% of colorectal cancer can be prevented through detection and removal of precancerous polyps [7, 8]. Colorectal cancer is the third-leading cause of cancer-related deaths in the United States among men and women [5].

Evidence indicates that early detection reduces the rates of morbidity and mortality of colorectal cancer [9] and a variety of screening modes are endorsed by evidence-based guidelines [7, 8, 10]. Moreover, several behavioral factors such as exercise obesity, alcohol consumption, diet and dietary fiber has long been thought to be associated with a reduced risk of colorectal cancer [11-15]. Several studies confirmed the relation between fiber intake and risk of colorectal cancer [16-23].
Family history of colorectal cancer is an independent risk factor for developing the disease. The relationship between family history of cancer and changes in health behaviors has not been studied in colorectal cancer patients; however, some studies developed in women with family history of breast cancer shown contradictory results [24, 25]. Lemon et al. [24] showed an improvement in healthy habits in women with a first-degree relative with breast cancer when comparing health habits just after the diagnosis with health habits 6 months later.

Several studies suggest that the major causes of colorectal cancer are environmental and lifestyle factors risk factors [26-29]. The fact that known high penetrance gene variants that are associated with colorectal cancer risk explain fewer than 5% of the observed cases [30], together with the wide geographical differences in colorectal cancer risk and the marked secular changes in colorectal cancer rates within certain populations and in studies of migrants [31-34], suggests that environmental and lifestyle factors including diet are important factors that influence risk. For Dietary factors, intakes of red and processed meat and alcohol consumption are considered to be risk factors for colorectal cancer [35].

Early observation Burkitt [11] that rural Africans have low rates of colorectal cancer who ate a diet with high fiber content. Whole grains are a major source of dietary fiber and contain germ, endosperm and bran, in contrast with refined grains that contain only the endosperm. The germ and bran contain numerous nutrients, which are removed during the refining process. In addition, whole grains are a major source of several vitamins, minerals and phytochemicals, which have anticancer properties and could plausibly; influence the risk of colorectal cancer by several potential mechanisms [36]. An earlier review and meta-analysis of case-control studies of whole grain intake and colorectal cancer and polyps reported a summary odds ratio of 0.79 for the highest versus the lowest intake [37]. However, the interpretation of case-control studies is hampered by possible recall and selection biases, which make it difficult to draw firm conclusions.

In Malaysia, colorectal cancer is the most common cancer in males and the third most common in females [38]. A previous Malaysian study showed that knowledge on colorectal cancer and its screening is extremely low among Malaysian patients [39]. However, no previous study reported the Knowledge of colorectal cancer and associated factors among the General Population in Malaysian. In order to fill the gap of knowledge, Therefore, the objective of this study is to determine the knowledge and practices of fiber intake and colon cancer among the general population.

**MATERIALS AND METHODS**

A cross-sectional study was conducted among the general population in Shah Alam, Selangor, Malaysia. The data collected from 1st of April until 1st May 2012. The areas selected were Alam Budiman, Section U10 Shah Alam, Taman Tadisma, Section 13 Shah Alam, Seri Alam Condo Section 13 Shah Alam, Section 7 Shah Alam, Section 9 Shah Alam, Section 10 Shah Alam, Section 11 Shah Alam, Section 2 Shah Alam, Section 8 Shah Alam, TTDI jaya U2 Shah Alam. About 300 questionnaires were distributed; random sampling method was used in this study. For the area at Alam Budiman, Section U10 Shah Alam, the questionnaires were distributed by door to door. In Sri Alam Condo, the questionnaires were distributed at the mamak stall or at the café provided. In the Taman Tadisma, section 13 and section 7, the questionnaires were distributed at the ‘surau’ where basically it is the place people gather and it is also the area where mostly elderly and adult who have been married with successful career stay. For section 9, the questionnaire were distributed at Plaza Masalam and for the rest, it had been distributed at the events done at the housing area nearby. This survey includes several socio-demographic questions, of which the following were used in these analyses: gender; age ( dichotomized into <50 and >=50 year), ethnicity (Malay, Chinese, Indian and others), marital status (single; ever married); and income (<1000, 1000-5000, >5000). Respondents below 18 years old and above 70 years old were excluded from this study. The protocol of this study approved by the research committee, International Medical School, Management and Science University and Consent form were obtained from the participants. The research conforms to the NHMRC standards and the Helsinki Declaration. Data were analyzed using SPSS 13.0; t-test was used for univariate analysis and multiple linear regression was used in multivariate analysis.

**RESULTS**

The mean age of the study participants was 31.38±11.07, maximum age was 72 years old and minimum was 16 years old. The majority of the participants were female (56.7%), less than 50 years old of age (90.3%);
Table 1: Socio-demographic characteristics and factors associated with knowledge about colon cancer among the general population (n=300)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Categories</th>
<th>Number</th>
<th>Percentage</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Male</td>
<td>121</td>
<td>40.3%</td>
<td>0.006</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>179</td>
<td>59.7%</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>&lt; 50</td>
<td>271</td>
<td>90.3%</td>
<td>0.155</td>
</tr>
<tr>
<td></td>
<td>&gt;= 50</td>
<td>29</td>
<td>9.7%</td>
<td></td>
</tr>
<tr>
<td>Race</td>
<td>Malay</td>
<td>213</td>
<td>71.0%</td>
<td>0.625</td>
</tr>
<tr>
<td></td>
<td>Chinese</td>
<td>35</td>
<td>11.7%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Indian</td>
<td>33</td>
<td>11.0%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>19</td>
<td>6.3%</td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td>Single</td>
<td>177</td>
<td>59.0%</td>
<td>0.022</td>
</tr>
<tr>
<td></td>
<td>Ever Married</td>
<td>123</td>
<td>41.0%</td>
<td></td>
</tr>
<tr>
<td>Income (RM)*</td>
<td>&lt;1000</td>
<td>116</td>
<td>38.7%</td>
<td>0.568</td>
</tr>
<tr>
<td></td>
<td>1000-5000</td>
<td>137</td>
<td>45.7%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt;5000</td>
<td>47</td>
<td>15.7%</td>
<td></td>
</tr>
<tr>
<td>Smoking cigarettes</td>
<td>Yes</td>
<td>77</td>
<td>25.7%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>223</td>
<td>74.3%</td>
<td></td>
</tr>
<tr>
<td>Smoking Shisha</td>
<td>Yes</td>
<td>70</td>
<td>23.3%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>230</td>
<td>76.7%</td>
<td></td>
</tr>
<tr>
<td>Family history of colon cancer</td>
<td>Yes</td>
<td>50</td>
<td>16.7%</td>
<td>0.098</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>250</td>
<td>83.3%</td>
<td></td>
</tr>
</tbody>
</table>

*RM = Ringgit Malaysia

Table 2: Lifestyle practice among the study participants (n=300)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Categorize</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercise</td>
<td>Regular</td>
<td>130</td>
<td>43.3%</td>
</tr>
<tr>
<td></td>
<td>Irregular</td>
<td>170</td>
<td>56.7%</td>
</tr>
<tr>
<td>Supplements intake</td>
<td>Regular</td>
<td>88</td>
<td>29.3%</td>
</tr>
<tr>
<td></td>
<td>Irregular</td>
<td>212</td>
<td>70.7%</td>
</tr>
<tr>
<td>Fruits intake</td>
<td>Regular</td>
<td>167</td>
<td>55.7%</td>
</tr>
<tr>
<td></td>
<td>Irregular</td>
<td>133</td>
<td>44.3%</td>
</tr>
<tr>
<td>Vegetable</td>
<td>Regular</td>
<td>181</td>
<td>60.3%</td>
</tr>
<tr>
<td></td>
<td>Irregular</td>
<td>119</td>
<td>39.7%</td>
</tr>
<tr>
<td>Green salad intake</td>
<td>Regular</td>
<td>135</td>
<td>45.0%</td>
</tr>
<tr>
<td></td>
<td>Irregular</td>
<td>165</td>
<td>55.0%</td>
</tr>
<tr>
<td>Meat</td>
<td>Regular</td>
<td>194</td>
<td>64.7%</td>
</tr>
<tr>
<td></td>
<td>Irregular</td>
<td>106</td>
<td>35.3%</td>
</tr>
<tr>
<td>Daily Water intake</td>
<td>&lt;4 glasses</td>
<td>47</td>
<td>15.7%</td>
</tr>
<tr>
<td></td>
<td>4-8 glasses</td>
<td>166</td>
<td>55.3%</td>
</tr>
<tr>
<td></td>
<td>&gt;8 glasses</td>
<td>87</td>
<td>29.0%</td>
</tr>
<tr>
<td>Fast food intake</td>
<td>Regular</td>
<td>139</td>
<td>46.3%</td>
</tr>
<tr>
<td></td>
<td>Irregular</td>
<td>161</td>
<td>53.7%</td>
</tr>
<tr>
<td>Bakery food intake</td>
<td>Regular</td>
<td>126</td>
<td>42.0%</td>
</tr>
<tr>
<td></td>
<td>Irregular</td>
<td>174</td>
<td>58.0%</td>
</tr>
<tr>
<td>Soft drink</td>
<td>Regular</td>
<td>124</td>
<td>41.3%</td>
</tr>
<tr>
<td></td>
<td>Irregular</td>
<td>176</td>
<td>58.7%</td>
</tr>
<tr>
<td>Proceed food intake</td>
<td>Regular</td>
<td>143</td>
<td>47.7%</td>
</tr>
<tr>
<td></td>
<td>Irregular</td>
<td>157</td>
<td>52.3%</td>
</tr>
</tbody>
</table>

Table 3: Predictors of knowledge for colon cancer using Multivariate Stepwise Logistic Regression Analysis

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>B</th>
<th>SE</th>
<th>Beta</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital Status</td>
<td>0.135</td>
<td>0.070</td>
<td>0.104</td>
<td>0.056</td>
</tr>
<tr>
<td>Smoking Cigarettes</td>
<td>0.548</td>
<td>0.082</td>
<td>0.378</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Smoking Shisha</td>
<td>0.140</td>
<td>0.087</td>
<td>0.093</td>
<td>0.109</td>
</tr>
<tr>
<td>Family History of Colon Cancer</td>
<td>-0.182</td>
<td>0.090</td>
<td>0.107</td>
<td>0.044</td>
</tr>
</tbody>
</table>

R²=0.199, p-value <0.001
Malay (71.0%), single (59.0%), with no history of colorectal cancer (83.3%) (Table 1). This study shows that sex, marital status, smoking cigarettes and shisha were significantly influence the knowledge of colorectal cancer (P=0.006, P=0.022, p<0.001, P<0.001; respectively).

For lifestyle, 43.3% of the participants reported that they exercise regularly. About 29.3% took supplements regularly. About 55.7% eat fruits regularly. About 60.3% eat vegetables regularly. About 45.0% eat green salad regularly. About 64.7% of them eat meat regularly. Only 29.0% drink sufficient amount of water regularly. 46.3% eat fast food regularly (Table 2).

Multiple linear regressions identified smoking and family history of colorectal cancer significantly associated with knowledge about colorectal cancer prevention (Table 3).

**DISCUSSION**

This study conducted to determine the knowledge of the general population in Malaysia towards colorectal cancer prevention. Empowering the general population with correct knowledge of cancer prevention and related to lifestyle is crucial. In general; in this study, the knowledge of the participants about colorectal cancer is poor. Similarly, British studies reported that knowledge was poor among all respondents [40]. Similarly several studies reported that people have only a hazy understanding of the causes or prevention of cancer including colorectal cancer [40-44].

This study shows that sex, marital status and smoking are significantly influence the knowledge of the participant about colorectal cancer. Furthermore, this study shows that smoking cigarettes is significantly influence the knowledge of the participant about colorectal cancer. In a meta-analysis, Botteri et al. [45] estimated that ever-smokers were 18% more likely to develop colorectal cancer than never-smokers. Similar findings were reported that an increased risk of colorectal cancer with cigarette smoking [46-50].

About 45.0% eat green salad regularly. Only 29% drink sufficient amount of water regularly. 46.3% eat fast food regularly. Dietary factors have been reported to account for about 30% of cancers in Western countries [28], making diet second only to tobacco as a preventable cause of cancer. The contribution of diet to cancer risk in developing countries has been considered to be lower, perhaps around 20% [51].

Our study shows that family history of colon cancer significantly influence the knowledge of the general population about the disease. Family history is a risk factor for Colon cancer. It is estimated that 20% of all colorectal cancer cases are attributable to familial aggregation [52]. Combinations of genetic and environmental factors are thought to play a role in the clustering of familial colorectal cancer [53]. Evidence indicates that early detection reduces the rates of morbidity and mortality of colorectal cancer [9] and a variety of screening modes are endorsed by evidence-based guidelines [7, 8, 10]. Moreover, several behavioral factors such as exercise [14], obesity [15], alcohol consumption [12] and diet [13] have been suggested to modify the risk for this cancer. Research has shown that interventions have been beneficial in improving risk perceptions for BRCA, colorectal cancer and PRCA [54-56]. Moreover, perceived risk is often a motivator for positive health-related behaviors, particularly with respect to cancer screenings. For example, women are becoming more knowledgeable about breast cancer risk and as a result are more closely adhering to screening guidelines [56-59]. Blumenthal et al. [58] evaluated culturally appropriate media messages related to screening and found that among African American participants these interventions were associated with an increase in BRCA, colorectal cancer and PRCA screenings. Approximately 20% of CRC cases are associated with a family history, including 5% of colorectal cancer cases associated with single-gene cancer syndromes [60, 61]. People with a family history of colorectal cancer are 2.3 to 4.3 times more likely to develop colorectal cancer than those without it, depending on the number, relation and age of onset of the relative(s) with cancer [62-64]. People whose relatives have early-onset colorectal cancer are at higher risk than those with relatives diagnosed later in life [65] (Church 2005). Consequently, several organizations recommend early screening for people with a positive family history, depending on the age at which the relative was diagnosed [7, 8, 66, 67]. Given the potential to reduce illness and death, early detection and prevention of colorectal cancer among people at high familial risk have important public health implications. These goals are achievable through clinician-mediated strategies and patient-mediated strategies (risk-reducing lifestyle changes or use of screening). Other research has demonstrated that having a close family member with a chronic disease is associated not only with increased perception of risk but also with preventive and health-promoting behaviors [68-70].

In our study, about 64.7% of them eat meat regularly. International correlation studies show a strong association between consumption of meat and colorectal cancer mortality and several mechanisms have been...
proposed through which meat may increase cancer risk. Mutagenic heterocyclic amines and polycyclic aromatic hydrocarbons can be formed during the cooking of meat at high temperatures [71, 72] and nitrites and their related compounds found in smoked, salted and some processed meat products may be converted to carcinogenic N-nitrous compounds in the colon [73] Bingham et al. 1996. In addition, high iron levels in the colon may increase the formation of mutagenic free radicals [74]. The results of observational studies of meat and colorectal cancer have varied; a recent systematic review concluded that preserved meat is associated with an increased risk for colorectal cancer but that fresh meat is not and most studies have not observed positive associations with poultry or fish. However, mortality rates for colorectal cancer are similar in Western vegetarians and comparable non-vegetarians [75]. Overall, the evidence is not conclusive but suggests that high consumption of preserved and red meat probably increases the risk for colorectal cancer.

In this study, about 55.7% eat fruits regularly and about 60.3% eat vegetables regularly. Many case-control studies of colorectal cancer have observed moderately lower risk in association with high consumption of dietary fiber, fruits and vegetables [37, 76], but the results of recent large prospective studies have been inconsistent [61, 77]. Furthermore, results from randomized controlled trials have not shown that intervention over a 3-4 year period with supplemental fibre or a diet low in fat and high in fibre and fruits and vegetables can reduce the recurrence of colorectal adenomas [78-80]. It is possible that some of the inconsistencies are due to differences between studies in the types of fibre eaten and in the methods for classifying fibre in food tables. Other possibilities are that the association with fruits and vegetables is principally due to an increase in risk at very low levels of consumption [47], or that high intakes of refined flour or sugar (rather than low intakes of fibre) increase risk through chronic hyperinsulinaemia or other mechanisms [81, 82]. At present, the hypothesis that fruits, vegetables and fibre may reduce the risk for colorectal cancer has not been firmly established.

In the present study only 43.3% of the participants reported that they exercise regularly. People with family history of colorectal cancer do not adopt protective behavioral patterns, such as weight control, more physical exercise, or a decrease in alcohol consumption. Public health initiatives to increase awareness of these risk factors are essential in ensuring better understanding of the links between lifestyle and cancer. Greater awareness could also lead to increased healthy behaviours [83] and thus could go some way towards reducing the overall burden of ill-health on the population.

Some recent prospective studies have suggested that a methyl-deplete diet (i.e. a diet low in folate and methionine and high in alcohol) is associated with an increased risk of colon cancer [84, 85]. Also, use of folic acid- containing multiple vitamin supplements has been associated with lower risk of colon cancer [86]. A diminished folate status may contribute to carcinogenesis by alteration of gene expression and increased DNA damage [87, 88] and chromosome breakage [89]. The finding that a common polymorphism in the methylenetetrahydrofolate reductase gene involved in folic acid metabolism may also be associated with colorectal cancer [90] strengthens the hypothesis that dietary folate may be an important factor in colorectal carcinogenesis. Another promising hypothesis is that relatively high intakes of calcium may reduce the risk for colorectal cancer, perhaps by forming complexes with secondary bile acids in the intestinal lumen [35]. Several observational studies have supported this hypothesis [35, 90] and two trials [80, 92] have suggested that supplemental calcium may have a modest protective effect on the recurrence of colorectal adenomas.

CONCLUSIONS

The population survey showed low awareness of colorectal cancer. Therefore importance of continuing public education, particularly about the link between lifestyle behaviors and colorectal cancer is urgently needed. A national colorectal cancer screening programme will increase public awareness of colorectal cancer and earlier diagnosis in symptomatic patients may be one of the benefits from this. Education about colorectal cancer should include targeting of higher-risk population groups in whom knowledge is particularly lacking and should emphasize discrimination about the significance of different bowel symptoms.

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