

RESEARCH ARTICLE

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# Knowledge and Attitudes toward Colorectal Cancer among Healthcare Workers: A Pilot Cross-Sectional Survey in Thailand

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## Abstract

**Background:** Colorectal cancer is an important public health problem in Thailand. The health workforce is one of the key strategies to reduce the burden of cancer. They are not only involved in patient care, but they can improve public knowledge of cancer within their community. This study aimed to explore the knowledge and attitudes toward colorectal cancer among Thai healthcare workers. **Methods:** A cross-sectional pilot study was conducted from October 2021 to March 2022. Convenience sampling was used to recruit study participants who worked in selected primary healthcare units or hospitals located in different regions across the country. The data on demographics and health behavior, knowledge of using the Fecal Immunochemical Test (FIT), and knowledge and attitudes toward colorectal cancer were collected using self-administered questionnaires. Descriptive statistics were used for data analysis. **Results:** A total of 300 healthcare workers were recruited in the study. The majority of participants presented a healthy lifestyle: 74% were in the healthy weight range, 68% had never consumed alcohol, and 99.3% were never smokers. More than 70% of participants provided correct answers to questions about the use of a FIT kit. The mean score for knowledge of colorectal cancer was 12.16 + 2.16 (out of 14) and 240 (80%) participants were considered to have adequate knowledge. Also, colorectal cancer knowledge was associated with age of participants ( $p < 0.05$ ). Most of the participants (76.2-92.3%) had positive attitudes toward colorectal cancer screening, however about half of them thought that a colonoscopy could be painful, uncomfortable, and embarrassing. **Conclusions:** Overall, the majority of participants had adequate knowledge of colorectal cancer and positive attitudes toward its screening. The present study provided overview information on practical guidance for undertaking a nationwide survey in the future.

**Keywords:** Knowledge- Attitudes- colorectal cancer- Healthcare workers- Thailand

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## Introduction

Colorectal cancer (CRC) is an important public health problem in Thailand, as it is not only a major cause of illness in Thai people but also causes financial and economic burdens in the country. Due to the aging population and population growth, the epidemiology trends showed that the incidence of CRC has continuously increased during the past decade. Currently, CRC is the third and the second most common cancer in men and women respectively. There were an estimated 16,000 new cases diagnosed [1] and 5,000 deaths from this disease [2].

Primary and secondary prevention of CRC is an effective way to reduce the burden of disease at a population level [3]. Many studies suggested that primary prevention by modification of lifestyle risk factors has the potential to significantly reduce CRC risk [4, 5]. In

Thailand, public health campaigns are utilized to prevent CRC such as raising awareness of anti-smoking and limiting alcohol intake, as well as maintaining a healthy body weight. Moreover, national CRC screening with Fecal Immunochemical Test (FIT) has been provided for all Thai people aged 50 to 70 years. However, participation in screening was associated with knowledge and attitudes toward cancer [6]. Therefore, knowledge of cancer is the key that can influence an individual's lifestyle and health behaviors [7- 9].

Healthcare workers play multiple roles in connecting people to public health services in their communities [10]. They can raise knowledge and awareness regarding healthy lifestyles and educate people about cancer risk factors, warning signs, and prevention [11]. They can also help to increase the participation rate by providing information about CRC screening tests, eligibility

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criteria, and recommended intervals for individuals. Thus, knowledge and attitudes toward cancer among healthcare workers are necessary for the effective implementation of strategies for cancer prevention. However, there was a limited report on knowledge and attitudes toward CRC among Thai healthcare workers.

This pilot study aimed to explore the knowledge, and attitudes toward colorectal cancer among healthcare workers. Our results were the first exploration that provides the information to strengthen the human resource capacity for CRC prevention and screening services in Thailand.

## Materials and Methods

### Study design

A descriptive cross-sectional pilot study was conducted from October 2021 to March 2022. This study includes healthcare workers who were 20-59 years old and had at least 1 year of work experience in CRC screening services. Those who did not meet the criteria were excluded. Study participants were recruited from each of the four different geographical areas of Thailand (northern, eastern, central, and southern). In each region, 75 study participants were recruited from selected primary healthcare units or hospitals through the convenience sampling method. In total, 300 individuals were included in the study, consisting of nurses, public health officers, and laboratory technicians. All research staff were trained and conducted the survey using a paper self-administered questionnaire. This study was approved by the National Cancer Institute Research Ethics Committee (reference EC COA 050/2021).

### Data collection

The data collection tool was developed to assess the knowledge and attitudes toward CRC prevention and screening of healthcare workers. The questionnaire's validity was ensured by a committee of experts in research methodology. A preliminary pilot test was conducted to check the participants' understanding of the questionnaire. Cronbach Alpha coefficient was used to assess the internal consistency of the questionnaire, a value of  $\geq 0.7$  indicated good reliability of a construct. The questionnaire consists of four parts. The first part collected demographic and health behavior data. The second part was a multiple-choice test question that included 7 items to determine the understanding of healthcare workers on using the Fecal Immunochemical Test (FIT) for CRC screening service. They were asked to choose one answer from a set of alternatives, the correct answer was assigned 1 point, whereas a wrong answer was given 0. The third part was a dichotomous scale that included 14 items used to assess the knowledge about risk factors, warning signs, and prevention of CRC. Each correct answer was given 1 point and the wrong answer or blank response received a 0 point. The total score ranged from 0 to 14, with a higher score indicating better knowledge. The mean scores were calculated to obtain the total knowledge score of all participants. They also were grouped into two categories, a score  $\geq 12$  points were considered as having

"adequate knowledge" and  $< 12$  points were considered as having "inadequate knowledge". The final part was focused on attitudes toward CRC screening, which was measured on a five-point Likert-type scale that ranges from 1 to 5 as follows: 1= "Strongly agree", 2= "Agree", 3= "Neither agree nor disagree", 4= "Disagree", 5= "Strongly disagree". A score point was used to classify into two groups of participants. Those who scored 4 or 5 were considered as having a positive response, whereas those who scored below were categorized as negative responses toward CRC screening. The questionnaire took approximately 10-15 minutes to complete all questions.

### Statistical analysis

The data were analyzed using the Statistical Package for Social Science program. Descriptive statistics, including mean, standard deviation, frequency, and percentage were used to summarize the demographic and health behavior, knowledge, and attitudes toward CRC. The association between participants' characteristics and knowledge level was evaluated using Pearson's chi-square ( $\chi^2$ ) or Fisher's exact test (when a cell count was smaller than five). A P-value of less than 0.05 was considered statistically significant.

## Results

### Participant's characteristics

A total of 300 healthcare workers participated in the study, the detailed characteristics of study participants were described in Table 1. There were 290 females (96.7%) and 10 males (3.3%). The mean age was 43.2 + 8.9 years, ranging from 24 to 59 years. The majority of the participants (38.7%) were in the 40–49-year age group, 87.7% were Buddhist, 69% were married and 84.3% had a bachelor's degree. The participants included nurses (76%), public health officers (18.3%), and laboratory technicians (5.7%).

Regarding health-related behavior, most of the participants (74%) were classified as having normal weight, 68% had never consumed alcohol, and 99.3% never smoked. Only 1.7% of the participants had been diagnosed with cancer, and 31% reported having relatives diagnosed with cancer.

### Knowledge and understanding of using the Fecal Immunochemical Test

Participants' knowledge and understanding of using the FIT kit were summarized in Table 2. The majority of the participants (85.3%) understood the benefits of the test kit. They responded correctly to the caution of using a kit. 74.7% and 72.3% knew that kit users should avoid any bleeding condition and contamination with urine or toilet water respectively. More than 80% of participants could describe how to collect stool samples, interpret their test, and provide suggestions to those who had positive FIT results. Additionally, 79% knew that negative test results should be repeated every two years.

### Knowledge of colorectal cancer

The participants who correctly responded to risk

Table 1. Demographic Characteristics and Health-Related Behavior of Participants (n=300)

Demographic Characteristics	n (%)*
Age (years)	
20-29	23 (7.7)
30-39	77 (25.7)
40-49	116 (38.7)
50-59	84 (28.0)
Mean age (Standard deviation)	43.2 + 8.9
Min-Max	24-59
Gender	
Male	10 (3.3)
Female	290 (96.7)
Religion	
Buddhist	263 (87.7)
Islamic	34 (11.3)
Christian	3 (1.0)
Marital status	
Single	62 (20.7)
Married/partner	207 (69.0)
Separated/Divorced/ Widowed	31 (10.3)
Education	
Diploma	4 (1.3)
Bachelor's degree	253 (84.3)
Master's degree	43 (14.3)
Current profession	
Nurses	228 (76.0)
Public health officers	55 (18.3)
Laboratory technicians	17 (5.7)
Health-related Characteristics	
Body Mass Index (BMI)	
Underweight (<18.5)	11 (3.7)
Normal weight (18.5-24.9)	222 (74.0)
Overweight (>25)	67 (22.3)
Drinking status	
Never	204 (68.0)
Current	96 (32)
Smoking status	
Never	298 (99.3)
Current	2 (0.7)
Have you ever been diagnosed with any cancer?	
No	295 (98.3)
Yes	5 (1.7)
Has anyone in your family had cancer?	
No	207 (69.0)
Yes	93 (31.0)

\* Frequency (n) and percentage (%)

factors, warning signs, and prevention of CRC were shown in Table 3. The majority of participants knew that older age (92.7%), personal or family history of CRC (91.7%), alcohol consumption (83.7%), tobacco smoking (80%), being overweight (79.7%), and eating lots of processed

Table 2. Knowledge and Understanding of Participants on Using the Fecal Immunochemical Test (n=300)

Questions	n (%)*
Q1: What are the benefits of the FIT?	256 (85.3)
Q2: What people should do if they have diarrhoea or any bleeding conditions such as haemorrhoids or are currently menstruating?	224 (74.7)
Q3: What people should do if urine or toilet water contaminates the collected stool sample?	217 (72.3)
Q4: How is the stool sample collected?	264 (88.0)
Q5: What does an abnormal or positive FIT result mean?	241 (80.3)
Q6: What is your suggestion if people have a positive FIT result?	253 (84.3)
Q7: What are the recommendations on the timing of repeat FIT?	237 (79.0)

\* Frequency (n) and percentage (%) of the correct answers

and red meat (90.3%) were the risk factors for CRC. Most of them recognized that warning signs of CRC were rectal bleeding (91%), a feeling of bowel doesn't empty (86%), chronic abdominal pain (88%), and unexplained weight loss, (87.3%). However, change in bowel habits as a warning sign was the least known among them (69.7%). For preventive factors, 92.7% of the participants agreed that cancers can be prevented through a healthy lifestyle, 89.3% thought that early detection can improve the success rates of treatment, and 94% said that everyone aged 50 years old or older should be screened for CRC.

The analysis of the total knowledge score showed that

Table 3. Participants' Knowledge of Colorectal Cancer Risk Factors, Warning Signs, and Prevention (n=300)

Question items	n (%)*
Risk factors	
Aging (>50 years)	278 (92.7)
Personal or family history of colorectal cancer	275 (91.7)
Alcohol consumption	251 (83.7)
Tobacco smoking	240 (80.0)
Being overweight	239 (79.7)
Eating lots of processed and red meat	271 (90.3)
Warning signs and symptoms	
Unexplained rectal bleeding	273 (91.0)
Change in bowel habits	209 (69.7)
Tenesmus, feeling that your bowel doesn't empty completely	258 (86.0)
Chronic abdominal pain or discomfort	264 (88.0)
Unexplained weight loss, weakness, and fatigue	262 (87.3)
Prevention	
Dietary fiber intake and physical activity can reduce the risk of developing colorectal cancer	278 (92.7)
Early detection of colorectal cancer can improve the success rates of cancer treatment	268 (89.3)
Everyone over the age of 50 should be screened for colorectal cancer	282 (94.0)

\* Frequency (n) and percentage (%) of the correct answers

Table 4. Factors associated with CRC Knowledge of Participants (n = 300)

Characteristics	CRC knowledge score, n (%)*		P-value**
	0-11 (Inadequate)	12-14 (Adequate)	
Age (years)			
20-29	7 (30.4)	16 (69.6)	0.034 <sup>a</sup>
30-39	18 (23.4)	59 (76.6)	
40-49	27 (23.3)	89 (76.7)	
50-59	8 (9.5)	76 (90.5)	
Gender			
Male	3 (30.0)	7 (70.0)	0.424 <sup>b</sup>
Female	57 (19.7)	233 (80.3)	
Religion			
Buddhist	50 (19.0)	213 (81.0)	0.100 <sup>b</sup>
Islamic	8 (23.5)	26 (76.5)	
Christian	2 (66.7)	1 (33.3)	
Marital status			
Single	19 (30.6)	43 (69.4)	0.060 <sup>a</sup>
Married/partner	35 (16.9)	172 (83.1)	
Separated/Divorced/ Widowed	6 (19.4)	25 (80.6)	
Education			
Diploma	1 (25.0)	3 (75.0)	0.552 <sup>b</sup>
Bachelor's degree	53 (20.9)	200 (79.1)	
Master's degree	6 (14.0)	37 (86.0)	
Current profession			
Nurses	48 (21.1)	180 (78.9)	0.233 <sup>a</sup>
Public health officers	7 (12.7)	48 (87.3)	
Laboratory technicians	5 (29.4)	12 (70.6)	
Body Mass Index (BMI)			
Underweight (<18.5)	1 (9.1)	10 (90.9)	0.650 <sup>a</sup>
Normal weight (18.5-24.9)	45 (20.3)	177 (79.7)	
Overweight (>25)	14 (20.9)	53 (79.1)	
Drinking status			
Never	40 (19.6)	164 (80.4)	0.804 <sup>a</sup>
Current	20 (20.8)	76 (79.2)	
Smoking status			
Never	59 (19.8)	239 (80.2)	0.361 <sup>b</sup>
Current	1 (50.0)	1 (50.0)	
Have you ever been diagnosed with any cancer?			
No	58 (19.7)	237 (80.3)	0.262 <sup>b</sup>
Yes	2 (40.0)	3 (60.0)	
Has anyone in your family had cancer?			
No	39 (18.8)	168 (81.2)	0.454 <sup>a</sup>
Yes	21 (22.6)	72 (77.4)	

\*, Frequency (n) and percentage (%); \*\*, Significant at 0.05; <sup>a</sup>, Pearson's Chi-square ( $\chi^2$ ); <sup>b</sup>, Fisher's exact test

the mean score of study participants was 12.16 (SD=2.16; in the range of 0-14). Most of the participants (n=240, 80%) were considered to have adequate knowledge of CRC. Moreover, factors associated with knowledge scores were analyzed, as shown in Table 4. The results demonstrated that only the age of participants was

significantly associated with CRC knowledge (p = 0.034).

#### *Attitude toward colorectal cancer screening*

The attitudes toward CRC screening among participants were presented in Table 5. Almost all participants (92.3%) reported that it's still important to get CRC screened even



Table 5. Attitudes towards Colorectal Cancer Screening (n=300)

Attitude indices	n (%)*
Not necessarily to get colorectal cancer screening, if you feel healthy or have no symptoms	
Yes	23 (7.7)
No	277 (92.3)
Colorectal cancer cannot be cured or treated even if detected early	
Yes	59 (19.7)
No	241 (80.3)
Do not get screened for colorectal cancer because worry about having cancer	
Yes	42 (14.0)
No	258 (86.0)
Colorectal cancer screening is complicated and time-consuming	
Yes	70 (23.3)
No	230 (76.7)
Colonoscopy can be painful, uncomfortable, and embarrassing	
Yes	146 (48.7)
No	154 (51.3)

\*Frequency (n) and percentage (%) on an attitude-based questionnaire; Responding "No" to each index implied a positive response.

if feeling healthy, 80.3% believed that CRC could be cured or treated. A small minority of them (14%) stated that they did not screen because they were afraid of the test results, and 23.3% expressed that CRC screening was complicated and needed to spend time in the hospital. However, about half of the participants (48.7%) believed that colonoscopy could be painful, uncomfortable, and embarrassing.

## Discussion

Our study was the first pilot scale to examine the feasibility of an approach that would be applied to a large-scale nationwide survey. We aimed to access knowledge and attitudes toward CRC prevention and screening among Thai healthcare workers. The overall results demonstrated that the majority of participants had adequate knowledge of CRC and positive attitudes regarding CRC screening.

In this study, more than two-thirds of participants presented a healthy lifestyle by maintaining a normal weight and never smoking or drinking alcohol. This may be partly because they were aware of the health issues and avoiding illness. There is also the possibility that they had knowledge of cancer risk factors. Similarly, a previous study in China reported that smokers had poorer knowledge scores on CRC risk factors [12]. Moreover, the study conducted in the United Kingdom showed that respondents with normal weight were the most likely to be aware of being overweight as a cancer risk factor [13].

In terms of participants' knowledge, our findings indicated that almost all participants correctly answered questions assessing their understanding of how to use the FIT kit and its benefits. Healthcare workers are crucial in connecting communities to screening services. In Thailand, the national CRC screening program was

introduced in 2018 to provide free CRC screening with FIT kits for people aged 50 to 70 years. Those who had a positive FIT result were advised to get a diagnostic colonoscopy as a follow-up. Therefore, it was important to provide detailed instructions on how to use the FIT kit. This finding may reflect that participants were able to educate others on how to use the test device correctly. In addition, a study by Chapple (2008) [14] also suggested that people might feel more inclined to accept screening if they had information about patients' experiences of colonoscopy and treatment for early bowel cancer.

The results of the CRC knowledge analysis demonstrated that 80% of participants had adequate knowledge of the risk factors, warning signs, and prevention of CRC. However, some knowledge about changes in bowel habits as an early sign was relatively low. This finding was consistent with studies undertaken in China indicating that 44-66% of the respondents realized that a change in bowel habits might be an early warning sign of CRC [15, 16]. Furthermore, our results revealed that the only significant demographic variable associated with CRC knowledge was the age of participants. While a prior study suggested that knowledge can be gained by experience and is not necessarily determined by education, income, or age [17].

As for the attitude of participants, although overall results illustrated a positive attitude toward CRC screening, around half of them believed that having a colonoscopy could be painful, uncomfortable, and embarrassing. This is in line with recent studies which reported that the barriers to colonoscopy were fear of the painful procedure [18], and feelings of embarrassment [19]. Moreover, a study by Ratnapradipa (2022) [20] reported that colonoscopy was associated with negative perceptions regarding the time, cost, and discomfort of the preparation and procedure. Our findings emphasize a strong need to raise awareness about CRC screening and provide them the information about colonoscopy under sedation which is a common practice to minimize pain and discomfort during the procedure.

This pilot study had some limitations. Firstly, a cross-sectional study was useful to identify potential correlations between variables, however, it was unable to determine the cause-and-effect between study variables. Secondly, due to time and resource constraints, the study population was recruited by convenience sampling from the selected primary healthcare units and hospitals located in different areas. This could create a selection bias and might not reflect the knowledge and attitudes of Thai healthcare workers across the country. Also, the small sample sizes might not be generalizable to the large population. Therefore, future research should assess the knowledge and attitudes among healthcare workers on a larger scale to be able to design appropriate interventions at the national level.

In summary, the present study indicated that the majority of study participants had adequate knowledge and positive attitudes regarding CRC. Our findings provided crucial baseline information to examine the feasibility of an approach to be used in a nationwide survey. It can lead to improved human resource management and workforce

planning for CRC prevention and screening.

## Author Contribution Statement

SS and P Ploysawang conceived the study and initiated the study design. P Ploysawang, PJ, CT, KS, and PP carried out the data collection. P Ploysawang designed the analytical approach, performed the statistical analysis, interpreted the data, and drafted the manuscript under the supervision of SS. All authors contributed to the article and approved the submitted version.

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### Conflict of interest

All the authors declare that no conflict of interest.

### Ethics approval

This study was approved by the Ethics Committee of the National Cancer Institute (reference EC COA 050/2021). Informed consent was obtained from all participants prior to participation.

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