



Perceived Susceptibility, Severity, Benefits and Barriers in Colorectal Cancer Screening via Colonoscopy among a High Risk Population: A Comparative Study*

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Abstract

Purpose: To compare the perceived susceptibility of colorectal cancer risk and severity as well as the benefits and barriers related to screening colonoscopy in individuals with hereditary CRC or an age greater than 50 years between those who underwent and did not undergo screening colonoscopy at Songklanagarind Hospital.

Design: Cross-sectional comparative study.

Methods: Individuals with hereditary CRC or an age greater than 50 years (N = 165) recruited from Songkhla and nearby provinces were interviewed via telephone to assess their perceived susceptibility and perceived severity of CRC as well as the benefits of and barriers to screening colonoscopy using a set of questionnaires. Data were analyzed using descriptive statistics and Fisher's exact test and rank sum test.

Main findings: There were 97 individuals in the adherence to colonoscopy screening group (59%) and 68 in the non-adherence group (41%). No significant differences regarding perceived susceptibility and perceived risk were found between the study groups. However, perceptions concerning the benefits of and barriers to colonoscopy screening were significantly different between the groups. Individuals who underwent colonoscopy perceived greater benefits ($p = .002$) and less barriers ($p < .001$), compared to their counterparts who did not undergo the screening.

Conclusion and recommendations: The perceptions of the benefits of and barriers to colonoscopy screening constituted adherence factors for undergoing this procedure. Therefore, it is recommended that medical personnel provide information highlighting the benefits of colonoscopy screening and assist minimizing the existing barriers to undergoing colonoscopy among high-risk populations.

Keywords: colonoscopy, colorectal cancer, perception

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การรับรู้โอกาสเสี่ยงต่อการเกิดโรค ความรุนแรง ประโยชน์และอุปสรรคของการส่องกล้องเพื่อตรวจคัดกรองโรคมะเร็งลำไส้ และไส้ตรงในกลุ่มที่มีความเสี่ยง: การศึกษาเปรียบเทียบ*

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บทคัดย่อ

วัตถุประสงค์: เพื่อเปรียบเทียบการรับรู้โอกาสเสี่ยงต่อการเกิดโรคและความรุนแรงของโรคมะเร็งลำไส้ใหญ่และไส้ตรงทางพันธุกรรม รวมทั้งการรับรู้ประโยชน์และอุปสรรคของการเข้ารับการส่องกล้องลำไส้ใหญ่ ในผู้ที่มีความเสี่ยงต่อโรคมะเร็งลำไส้ใหญ่และไส้ตรงทางพันธุกรรม หรือในผู้ที่มีอายุตั้งแต่ 50 ปีขึ้นไป ระหว่างกลุ่มผู้ที่มารับการส่องกล้องลำไส้ใหญ่และไม่มาการส่องกล้องลำไส้ใหญ่ ณ โรงพยาบาลสงขลานครินทร์

รูปแบบการวิจัย: วิจัยเชิงเปรียบเทียบแบบตัดขวาง

วิธีดำเนินการวิจัย: กลุ่มตัวอย่างจำนวน 165 คน เป็นผู้ที่มีความเสี่ยงต่อโรคมะเร็งลำไส้ใหญ่และไส้ตรงทางพันธุกรรมหรือผู้ที่มีอายุตั้งแต่ 50 ปีขึ้นไป ซึ่งอยู่ในจังหวัดสงขลาและจังหวัดใกล้เคียง กลุ่มตัวอย่างได้รับการสัมภาษณ์ทางโทรศัพท์เพื่อประเมินการรับรู้ความเสี่ยง ความรุนแรง ประโยชน์และอุปสรรคของการเข้ารับการส่องกล้องลำไส้ใหญ่ ตามแบบสอบถามการรับรู้โอกาสเสี่ยงต่อการเกิดโรค ความรุนแรงของโรคมะเร็งลำไส้ใหญ่และไส้ตรง ประโยชน์และอุปสรรคของการเข้ารับการส่องกล้องลำไส้ใหญ่ วิเคราะห์ข้อมูลด้วยสถิติเชิงพรรณนา การทดสอบพิชเชอร์ และสถิติการไ้ผลรวมอันดับ

ผลการวิจัย: มีผู้มาส่องกล้องตามนัดจำนวน 97 ราย (ร้อยละ 59) และผู้ที่ไม่มาส่องกล้องจำนวน 68 ราย (ร้อยละ 41) ทั้งสองกลุ่มไม่มีความแตกต่างในเรื่องการรับรู้โอกาสเสี่ยงต่อการเกิดโรคและความรุนแรงของโรคมะเร็งลำไส้ใหญ่และไส้ตรง แต่มีความแตกต่างอย่างมีนัยสำคัญทางสถิติในการรับรู้ประโยชน์และอุปสรรคต่อการเข้ารับการส่องกล้องลำไส้ใหญ่ โดยกลุ่มผู้ที่มารับการส่องกล้องลำไส้ใหญ่มีการรับรู้ประโยชน์ของการส่องกล้องลำไส้ใหญ่มากกว่าผู้ไม่มาส่องกล้อง ($p = .002$) และมีการรับรู้อุปสรรคน้อยกว่าผู้ไม่มาส่องกล้องลำไส้ใหญ่ ($p < .001$)

สรุปและข้อเสนอแนะ: การรับรู้ประโยชน์และมีการรับรู้อุปสรรคเป็นปัจจัยสำคัญต่อการตัดสินใจเข้ารับการส่องกล้องลำไส้ใหญ่ ดังนั้นบุคลากรทางการแพทย์ควรให้ความสำคัญอย่างมากในการให้ข้อมูลเกี่ยวกับประโยชน์ของการเข้ารับการส่องกล้องลำไส้ใหญ่ และช่วยเหลือเพื่อลดอุปสรรคต่อการเข้ารับการส่องกล้องของผู้ที่มีความเสี่ยงสูง

คำสำคัญ: การส่องกล้องลำไส้ใหญ่ โรคมะเร็งลำไส้ใหญ่และไส้ตรง การรับรู้

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Background and Significance

Colorectal cancer (CRC) is the third most common cancer and cause of death in Thailand. The main risk factors for CRC are family history, age, and dietary habit¹⁻². It was shown that 70-80% of CRC affects individuals aged over 50 years¹. Between 20% and 25% of CRC cases are found among individuals with a family history of CRC¹, and 5-10% of them have hereditary CRC syndrome¹. Importantly, the hereditary condition can be associated with an increase in risk of up to 100%³. However, CRC mortality can be reduced by early detection⁴.

Screening colonoscopy in high-risk individuals has been shown to reduce mortality due to CRC⁴. Numerous observational studies have found that colonoscopy also reduces CRC incidence⁵. Even though colonoscopy is recommended for relatives of individuals who are diagnosed with CRC, adherence to it is low⁶. Theoretically, perceived susceptibility should help motivate individuals to have colorectal cancer screening⁷. A previous study found a small, positive relationship between perceived susceptibility to CRC and reported screening behavior⁸. It has been shown that the higher the perceived severity, the lower the defensive avoidance and consequently, the greater the effort

and willingness to participate in cancer screening⁹. An earlier study found that individuals with fewer barriers reported a greater level of participation in undergoing screening colonoscopy at 12 months compared to those with more barriers ($p = .035$)¹⁰. Fear of cancer is one of the barriers that affects participation in screening colonoscopy. Some studies have reported that fear of cancer and perception of cancer risk are the main predictors for plans and action related to cancer screening tests¹¹⁻¹². However, avoiding cancer screening is also associated with an extreme fear of cancer¹³. It has been reported that the low rate of adherence to colonoscopy is related to difficulties associated with visiting the hospital due to financial concerns, time constraints, and limited caregiver availability¹⁴. However, the main reasons for preferring colonoscopy are its high level of accuracy and effectiveness in reducing the incidence rate of CRC¹⁵. Therefore, healthcare providers in Songklanagarind Hospital developed a remote project to help in the education and early detection of individuals with a history of hereditary CRC and older than 50 years of age. All of them were recruited from Songkhla and nearby provinces. Of the 357 individuals attending the educational activities of the remote project, 150 (42%) did not come for screening colonoscopy at Songklanagarind Hospital. It was not clear what the reasons these

CRC high-risk individuals had to opt out of colonoscopy at no service charge. Therefore, it was deemed necessary to understand why they did not adhere to undergoing this procedure as recommended.

Based on the Health Belief Model, the perceptions of susceptibility, severity, treatment benefit, and barriers of specific diseases or symptoms could relate to or predict the behaviors of individuals⁷. In this study, it was hypothesized that the perceptions of susceptibility, severity, that the perceptions of susceptibility, severity, benefit, and barriers related to CRC among individuals who are at risk for developing this malignancy would be different among those who underwent colonoscopy and those who decided to opt out.

Objectives

To compare the perceptions of colorectal cancer susceptibility, severity, the benefits of and barriers to colonoscopy screening in individuals with hereditary CRC or an age greater than 50 years between those who underwent and did not undergo colonoscopy screening.

Methodology

Population and Sample

The population in this study consisted of

individuals with a high risk of CRC, with a history of hereditary CRC, and those older than 50 years of age, who resided in Songkhla and nearby provinces of Southern Thailand and participated in the remote project launched from 2015 to 2016 by Songklanagarind Hospital. This remote project was set to help in the education, screening, and genetic testing of individuals with a history of hereditary CRC as well as those with familial adenomatous polyposis and Lynch syndrome detected by a physician. They were invited to undergo colonoscopy at Songklanagarind Hospital at no service charge since this project was funded by the National Health Security Office of Thailand (NHSO). A total of 357 participants consisted of both those who underwent screening colonoscopy at Songklanagarind Hospital and those who did not were enrolled in this study.

The sample size was calculated using the percentage value (55.4%) of the susceptibility perception of individuals who underwent screening colonoscopy found in a previous study⁶. On the other hand, the percentage of perceived susceptibility to CRC among individuals who did not undergo colonoscopy was estimated at 20%⁶. Therefore, 192 individuals were deemed necessary to constitute the minimum sample size of this study. However, only 165 invitees participated

In this study, yielding a power of analysis of .84. The participants were divided into the adherence to colonoscopy screening group (97 cases) and the non-adherence to colonoscopy screening group (68 cases).

Research Instruments

A set of five questionnaires was developed by the researchers based on the Health Belief Model⁷ including the followings:

The Demographic and General Information Questionnaire covered the questions asking about age, education level, household income, ethnicity, place of residence, personal and family history of cancer, type of cancer, and physician recommendation of colonoscopy.

The Perceived Susceptibility Questionnaire comprised 9 items covering the perception of susceptibility related to a high risk of developing CRC due to a history of CRC in the family, and other CRC risk factors concerned age, eating grilled food, eating red meat, smoking, alcohol consumption, lack of exercise, suffering from inflammatory bowel disease, and having abnormal bowel habits. The response format was a 3-point Likert scale of 'agree', 'neutral' and 'disagree'. The frequency and percentage of individuals according to the response choice were used for data interpretation.

The Perceived Severity Questionnaire consisted of 9 items asking about the perception of CRC severity and severity of other symptoms related to chronic illness, surgical pain, possible colostomy, undergoing chemotherapy, undergoing radiotherapy, changes in daily life, impact on income, shorter life span or death, and possibility of becoming dependent on others. The response choices and interpretations were the same as those for perceived susceptibility.

The Perceived Benefit of Undergoing Screening Colonoscopy Questionnaire was composed of 4 items covering the benefit of screening colonoscopy (that is, colonoscopy being the gold standard for CRC screening, CRC being curable as a result of early detection, colonoscopy being a precise diagnostic tool, and CRC being preventable with early removal of identified polyps). The response choices were "beneficial," "somewhat beneficial," and "not beneficial". The interpretations were the same as those for perceived susceptibility.

The Perceived Barrier Questionnaire consisted of 15 items covering the barriers to undergoing colonoscopy and other barriers such as travel inconvenience, depending on others for transportation, inability to take time off from work, loss of income, afraid of additional costs

related to undergoing the procedure, transportation costs, time constraints, fear of developing CRC, personal belief concerning colonoscopy and CRC, colonoscopy being painful, colonoscopy being harmful, afraid of bowel preparation, fear of abnormal colonoscopy results, and forgetting the colonoscopy appointment. The response choices and interpretations were the same as those for perceived susceptibility.

In regards to validity and reliability, the last four-domain questionnaires were tested for content validity by three experts consisting of a doctor in this field, a nurse instructor, and a registered nurse. The scale content validity index was 1.0. As for reliability testing, these four questionnaires, which were based on the health belief model, were tested on 20 individuals with similar characteristics to those of the samples. The Cronbach's alpha coefficients of the Perceived Susceptibility Questionnaire, Perceived Severity Questionnaire, Perceived Benefit Questionnaire, and Perceived Barrier Questionnaire were .83, .82, .73, and .94, respectively. In addition, the Cronbach's alpha coefficients of these questionnaires with the entire study subjects ($n = 165$) were .63, .79, .52, and .83, respectively.

Ethical Consideration

This study was approved by the Ethics

Committee, Faculty of Medicine, Prince of Songkla University (REC 60-080-15-7, date 9-11-2017). The researchers informed the individuals regarding the objective of the study, the data collection methods, the benefits and potential risks, the prevention of possible risks, and their rights to either participate or not participate in this study. The data were kept secure and only accessed by the researchers. If the individuals agreed to participate in this study, a verbal consent was provided before the commencement of data collection.

Data Collection

Data collection was done during the 2017-2018 period, after the completion of the remote project (2015-2016). The data were collected over the telephone by one trained interviewer, who was a research assistant of the remote project and was trained by the principle investigator of this study in order to ensure the reliability of administering the questionnaires. In case that the potential participants could not be reached, the interviewer would make the contact not more than twice.

Data Analysis

Statistical analyses were performed using the R program version 3.6.1. The demographic and other relevant data, such as history of annual health checkup and underlying disease, were

analyzed using descriptive statistics. The data obtained via the four-domain questionnaires were compared between the two groups. The Shapiro-Wilk test was used to assess the normality of the findings. Patient characteristics were analyzed using the Student t-test, the Wilcoxon rank-sum test was employed for continuous variables, and Pearson's Chi-squared test or Fisher's exact test were used for categorical variables where appropriate depending on the number of samples. P-values less than .05 were considered statistically significant¹⁶.

Findings

Demographic and Relevant Characteristics

Of the 357 individuals attending the educational activities of the remote project, 192 cases could not be contacted. Twenty-eight percent of them gave only one telephone number to contact more than one person and said that they

would contact the others for the research team, but this turned out to not be the case. Furthermore, 39% of the given telephone numbers could not be reached, and 33% of those who were contacted refused to be interviewed over the telephone.

In the end, 165 individuals were recruited; 97 were made a part of the adherence to colonoscopy screening group, and 68 were placed in the non-adherence group. The mean age of the adherence group was 48.2 years (SD±10.6), and that of the non-adherence group was 51 years (SD±13.3), as shown in Table 1.

When comparing the demographic characteristics of both groups, it was found that there was no difference in age, sex, marital status, occupation, religion, place of residence, and income level. However, the level of education in the adherence group was higher than that of the non-adherence group ($p = .003$), as seen in Table 1.

Table 1 Comparison of demographic and general information between the adherence and non-adherence to colonoscopy screening groups (N = 165)

Characteristics	Adherence group (n = 97)	Non-adherence group (n = 68)	p-value
Age	$\bar{X} \pm SD$	$\bar{X} \pm SD$.140 ^a
	48.2 (10.60)	51 (13.30)	
Sex	n (%)	n (%)	.490 ^b
Male	24 (24.7)	21 (30.9)	
Female	73 (75.3)	47 (69.1)	
Marital status	n (%)	n (%)	.700 ^c
Single	11 (11.3)	6 (8.8)	
Married	84 (86.6)	59 (86.8)	
Divorced/Widowed	2 (2.1)	3 (4.4)	
Education	n (%)	n (%)	.003 ^b
Primary school	26 (26.8)	32 (47.0)	
High school	33 (34.0)	17 (25.0)	
Certificate of vocational education	4 (4.1)	8 (11.8)	
Bachelor's degree	34 (35.1)	11 (16.2)	
Occupation	n (%)	n (%)	.350 ^b
Bureaucrat/state-enterprise officer	21 (21.6)	12 (17.7)	
Private-sector employee	13 (13.4)	9 (13.2)	
Agriculture/fishery	36 (37.1)	27 (39.7)	
Personal business owner/merchant	16 (16.5)	6 (8.8)	
Unemployed/housewife	11 (11.4)	14 (20.6)	
Place of residence	n (%)	n (%)	1.000 ^b
Songkhla Province	8 (8.2)	5 (7.4)	
Nearby Songkhla	89 (91.8)	63 (92.6)	
Religion	n (%)	n (%)	.480 ^b
Buddhism	69 (71.1)	44 (64.7)	
Islam	28 (28.9)	24 (35.3)	
Physician's recommendation of colonoscopy	n (%)	n (%)	.404 ^c
Agree	95 (97.9)	65 (95.6)	
Disagree	2 (2.1)	3 (4.4)	
Income	Mdn (IQR)	Mdn (IQR)	.060 ^d
	14,500 (5,750-30,000)	12,000 (6,000-20,000)	

Mdn = Median, IQR = Interquartile range, ^at-test, ^bChi-square test, ^cFisher's exact test, ^dRank sum test

When considering the perception of CRC susceptibility and severity, and the benefit and barriers related to screening colonoscopy between the two groups, it was found that the members of the adherence group perceived the susceptibility of developing CRC at a slightly higher level than those of the non-adherence group. In addition, the adherence group perceived a slightly lower level of severity than those who did not undergo colonoscopy. Moreover, those who underwent colonoscopy perceived it to be beneficial more than their counterparts. In addition, they perceived

fewer barriers than those in the non-adherence group.

As seen in Table 2, the comparison of the perception scores between the groups in terms of perceived CRC susceptibility and severity, and perceived benefit and barriers related to undergoing screening colonoscopy showed that those who underwent the procedure perceived it to be beneficial at a significantly higher rate than those who did not ($p = .002$). In addition, they perceived barriers to undergoing colonoscopy significantly less frequent than their counterparts ($p < .001$).

Table 2 Comparison of median scores and interquartile ranges of perceptions of CRC susceptibility, severity, benefit, and barriers between the adherence and non-adherence to colonoscopy screening groups

Perceptions	Adherence group (n = 97)	Non-adherence group (n = 68)	p-value ^a
	Mdn (IQR)	Mdn (IQR)	
Susceptibility	35 (33, 36)	34 (32, 36)	.620
Severity	36 (32, 36)	36 (34, 36)	.140
Benefit	16 (16, 17)	16 (16, 16)	.002
Barrier	38 (32, 42)	41.5 (36, 49)	< .001

Mdn = Median, IQR = Interquartile range, ^a Rank sum test

Table 3 displayed only items asked in each questionnaire that found significant differences between the study groups. The individuals in the colonoscopy adherence group perceived that screening colonoscopy could help cure CRC by detecting its early signs at a significantly greater percentage than those who did not undergo the exam (100%) ($p < .001$). Regarding

the barriers to undergoing colonoscopy such as travel inconvenience, dependence on others for transportation, fear of pain, fear of bowel preparation procedures, and forgetting the appointment date, they were found at a significantly lower rate in the adherence group than in the non-adherence group ($p < .001$, $.002$, $< .001$, $.006$, and $< .001$, respectively). However, in terms

of the belief that colonoscopy is not needed for persons with good bowel habit, a significantly higher percentage in the non-adherence group (77.9%) than in the adherence group (43.3%) shared this belief ($p < .001$). It was also found that

30.9% of those who did not undergo colonoscopy perceived CT or MRI studies to be better diagnostic tools for CRC than colonoscopy, compared to 7.2% of those who underwent the exam ($p < .001$).

Table 3 Comparison of selected items of susceptibility to CRC, benefit and barriers between the adherence and non-adherence to colonoscopy screening groups

Variables	Level of agreement	Adherence group n (%)	Non-adherence group n (%)	p-value
Susceptibility perception				
- related to smoking	Agree	69 (71.1)	48 (70.6)	.020 ^a
	Neutral	7 (7.2)	13 (19.1)	
	Disagree	21 (21.7)	7 (10.3)	
Benefit perception				
- Early detection can help cure CRC	Agree	97 (100.0)	60 (88.2)	< .001 ^b
	Neutral	0 (0.0)	8 (11.8)	
Barrier perception				
- Travel inconvenience	Agree	24 (24.8)	42 (61.8)	< .001 ^b
	Neutral	1 (1.0)	0 (0.0)	
	Disagree	72 (74.2)	26 (38.2)	
- Dependence on others for transportation	Agree	44 (45.4)	48 (70.6)	.002 ^b
	Neutral	1 (1.0)	1 (1.5)	
	Disagree	52 (53.6)	19 (27.9)	
- Fear of pain	Agree	30 (30.9)	39 (57.4)	< .001 ^b
	Neutral	1 (1.0)	2 (2.9)	
	Disagree	66 (68.0)	27 (39.7)	
- Fear of bowel preparation procedures	Agree	30 (30.9)	36 (52.9)	.006 ^b
	Neutral	3 (3.1)	4 (5.9)	
	Disagree	64 (66)	28 (41.2)	
- Forgetting appointment date	Agree	2 (2.1)	15 (22.0)	< .001 ^b
	Neutral	1 (1.0)	5 (7.4)	
	Disagree	94 (96.9)	48 (70.6)	
- Colonoscopy is not needed if having good bowel habit	Agree	42 (43.3)	53 (77.9)	< .001 ^a
	Neutral	0 (0.0)	0 (0.0)	
	Disagree	55 (56.7)	15 (22.1)	
- CT or MRI is better than colonoscopy	Agree	7 (7.2)	21 (30.9)	< .001 ^b
	Neutral	0 (0.0)	4 (5.9)	
	Disagree	90 (92.8)	43 (63.2)	

a = Chi-square test, b = Fisher's exact test

Discussion

This study used the Health Belief Model⁷ as a guide to explore the factors related to CRC screening participation. It was found that the perceived benefit of and barriers to the procedure were significant factors for individuals to decide whether to undergo screening colonoscopy. The Health Belief Model proposes that perceived susceptibility to and severity of a disease, and the benefit of and barriers related to a medical procedure are factors that induce behavioral change. However, previous literature has pointed out that perceived barriers are the most powerful single predictor of preventive health behavior¹⁷. A meta-analysis study also found that perceived benefit and barriers were the strongest predictors of behavior change¹⁸ while one study reported that perceived susceptibility, severity, barriers, and benefits could predict mammography adherence¹⁹. This difference in findings might be due to differences in demographic characteristics, questionnaires, or data collection techniques. This study found that individuals in the non-adherence to colonoscopy screening group had a higher level of perceived barriers than those in the adherence group. Such perceived barriers were travel inconvenience, dependence on others for transportation, fear of pain, and fear of bowel preparation. Likewise, the non-adherence group

had a lower level of perceived benefit related to this diagnostic test than those in the adherence group. This could have played a significant role such individuals' decision to not participate in the screening colonoscopy. In addition, educational background could explain the significant difference in perceived benefit and barriers between the groups. It was found that individuals who underwent screening colonoscopy had a higher level of education than those who opted to not have the exam. It could be possible that the individuals with a higher educational level were more likely to have better access to health information than those of a lower level of education²⁰; this could explain why those in the adherence group perceived screening colonoscopy to be beneficial at a higher rate and fewer barriers to undergoing this exam than their counterparts.

The reasons that could explain the non-significant difference in perceived susceptibility to and severity of CRC between the groups might be forgetting the information related to CRC that they were presented during the remote project they attended, which would have led them to being less aware of their susceptibility to developing CRC as well as the potential severity of this disease. Since this study collected data from healthy individuals who lacked any symptoms or signs related to CRC,

the participants in both groups might have had a lower level of awareness concerning perceived CRC susceptibility and severity. These findings were similar to those of a previous study, which found that healthy women who had never had a mammogram felt that they were less susceptible to developing breast cancer and perceived the severity of this malignancy at a low level²¹. Another study also found that the relationship between perceived susceptibility and behavior was near zero²².

Limitations of the study

A limitation of this study is that it was a one-visit program. Typically, the physician's recommendation is an essential factor for CRC screening participation⁹, yet this was not the case in this study. One of the reasons could be the efficacy of the education program undertaken to raise awareness related to CRC and screening colonoscopy; the participants were educated in groups that were too large to make all of them realize the importance of screening colonoscopy.

Moreover, pure telephone surveys have some limitations; for example, respondents may not provide accurate reasons related to a given answer due to forgetfulness and/or even boredom. In addition, the time elapsed from the remote project (2015-2016) to the telephone interview (2017-2018) would be a meaningful factor in memory attrition. Future studies

should explore other ways for a more accurate and complete data collection. Lastly, the generalization of these findings might be limited due to the study's small sample size.

Conclusion and Recommendations

The perception of the benefits of and barriers to screening colonoscopy constitute adherence factors for undergoing this procedure in this high-risk group. Therefore, it is recommended that medical personnel provide information highlighting the benefits of colonoscopy and assist in minimizing the existing barriers to undergoing this diagnostic test among individuals with hereditary CRC or an age greater than 50 years. Furthermore, CRC screening colonoscopy should be performed in hospitals with an appropriate proximity to the target population in order to enhance the adherence rate. Since, it is worthwhile to perform screening colonoscopy in high-risk populations, the authors are strong proponents for this diagnostic tool to be covered by the universal health insurance system of Thailand. Future study is recommended to investigate the predictive factors for undergoing colonoscopy. Finally, the assessment of patient perception related to undergoing or not undergoing colonoscopy among those attending the out-patient department would add valuable knowledge to this topic.

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Conflict of interest

The authors declare no conflict of interest.

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