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RESEARCH ARTICLE

Effects of a Health Literacy Promoting Program on Health Behaviors among Fecal Immunochemical Test (FIT)-Positive Individuals in Kuddon Subdistrict, Huaimek District, Kalasin Province

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Abstract

This study is a quasi-experimental research design (Two-group pretest-posttest design), conducted using both qualitative and quantitative methods. The objective was to examine the effects of a health literacy promotion program on health behaviors among individuals with a positive colorectal cancer screening result, in Kutdon Subdistrict, Huaimek District, Kalasin Province. The study was conducted from January to September 2026 (B.E. 2569), a total of 9 months. The quantitative sample in the program evaluation phase consisted of 60 individuals aged 50–70 years with a positive colorectal cancer screening result, divided equally into an experimental group and a control group (30 per group). The research instruments included the health literacy promotion program, a general information questionnaire, a health literacy assessment form, a health behavior questionnaire, and a program appropriateness evaluation form. Quantitative data were analyzed using descriptive statistics and inferential statistics (Paired t-test, Independent sample t-test), while qualitative data were analyzed using content analysis.

The results showed that, based on the situational analysis prior to receiving the program, the sample had low levels of health literacy and health behavior. This was predicted to result from the absence of a health literacy promotion process specifically tailored to individuals with a positive colorectal cancer screening result. Following implementation of the developed health literacy promotion program, the experimental group's health knowledge score increased to 6.73±1.46, health literacy skill score increased to 32.57±2.93, overall health literacy score increased to 39.30±2.89, and health behavior score increased to 39.87±2.32. These scores were significantly higher than before receiving the program and significantly higher than the control group at the .05 level (t = 7.67, 19.37, 22.60, 20.96, and t = 5.65, 17.43, 19.02, 18.60, respectively).

Keywords: health literacy, health behavior, colorectal cancer, screening, FIT test

Introduction

The World Health Organization and the International Agency for Research on Cancer reported that in 2024 there were approximately 20.60 million new cancer cases and approximately 9.80 million cancer deaths worldwide. Colorectal cancer was the third most commonly diagnosed cancer in the world, accounting for 9.90% of all new cancer cases, and the second leading cause of cancer death, accounting for 9.40% of all cancer deaths.[1] Although screening by fecal occult blood testing is a low-cost measure that can clearly reduce mortality, surveys of colorectal cancer awareness in many countries have found that 49.30% of the population had never been screened even once, and that even among people with a family history of colorectal cancer, as many as 23.20% had never been screened.[2] This indicates that problems of health literacy and health behaviors related to colorectal cancer screening remain a global public health problem that has not yet been addressed effectively.

In Thailand, colorectal cancer is among the most common cancers in the country, with approximately 15,939 new cases per year (about 44 per day) and approximately 5,476 deaths per year among the Thai population (an average of 15 per day).[3] The Ministry of Public Health has therefore made colorectal cancer screening by fecal occult blood testing a benefit covering Thai people aged 50-70 years under all health insurance schemes. Data from the past 3 fiscal years show that the number of people screened nationwide was 1,450,656 in fiscal year 2023, fell to 1,331,915 in fiscal year 2024, and rose to 1,387,573 in fiscal year 2025, and that in fiscal year 2025 more than 100,000 abnormal results were found.[4] However, although screening coverage has increased, the indicator in the cancer service plan requiring that at least 50.00% of people with abnormal results receive a confirmatory colonoscopy has not been met in practice in many areas. A study at Udon Thani Hospital illustrates this: before the service system was improved, only 18.64% of at-risk people with abnormal results underwent colonoscopy.[5] This indicates that knowing the test result alone is not enough to lead at-risk people to adopt appropriate health behaviors.

A key factor determining whether people with positive screening results appropriately change their health behaviors

after learning the result is their level of health literacy, defined as the knowledge, motivation, and ability of individuals to access, understand, appraise, and apply health information in order to make decisions about treatment, disease prevention, and health promotion in daily life.[6] Low health literacy directly affects health behaviors, which comprise perceived benefits, perceived barriers, and motivation to act to prevent and control disease.[7] When people with positive results do not understand the meaning and seriousness of the result, do not know the correct follow-up steps, or underestimate their own risk, all of which result from a lack of health literacy, they tend to postpone or avoid confirmatory colonoscopy. If left without appropriate continuing care, precancerous lesions or early-stage cancers that could be cured may progress to advanced cancer, which substantially increases mortality and the treatment costs borne by patients and the health service system.

In Kalasin Province, where the sample of this study is located, 23,002 of the 28,096 people in the target population aged 50-70 years were screened for colorectal cancer in fiscal year 2025, or 81.87%, considerably higher than the national average of 49.70%.[8] This indicates that early screening coverage in Kalasin Province is good, but such high coverage does not guarantee that people with abnormal results will enter the process of confirmatory colonoscopy and appropriately change their health behaviors. This is evident in the service network covering Huaimek, Yang Talat, Nong Kung Si, and Tha Khantho Districts, which reported screening and colonoscopy results over a 3-year period and found 19 patients with colorectal cancer, all of whom were successfully treated by laparoscopic surgery.[9] These figures show that new colorectal cancer cases continue to occur in Huaimek District every year, and that continuous care is needed from the screening level through to health behavior change after the result is known.

At the subdistrict level, data on colorectal cancer screening in Kuddon Subdistrict, Huaimek District, Kalasin Province over the past 4 fiscal years (2023-2026) show that the number of people screened rose from 133 in 2023 to 250 in 2024, fell to 201 in 2025, and rose to 306 in 2026, while the numbers of positive results were 4, 30, 20, and 10, respectively. Calculated as proportions, the annual positivity rate ranged from 3.01% to 12.00% of all people screened. This indicates that Kuddon Subdistrict has a considerable population at risk of colorectal cancer each year, yet there is no empirical information on the level of

health literacy and health behaviors of these people after learning their results.

A review of previous models of care found that most primary care health personnel still provide colorectal cancer risk groups with general health education, without systematically applying a health literacy framework, and lack clear tools for assessing and following up behavioral outcomes after education is provided. In addition, workload constraints and the travel distance to colonoscopy services remain major obstacles that prevent practitioners from following up target groups continuously. Meanwhile, the application of health literacy promotion programs among risk groups for other chronic diseases has already shown positive results, for example among older adults in a semi-urban community[10] and among high-risk groups for diabetes and hypertension,[11] where after the program the experimental groups had higher health literacy and health behavior scores than before the experiment and than the comparison groups. However, no similar study has yet been found that applied this approach to people with positive colorectal cancer screening results in a rural northeastern Thai context, where travel limitations and the education levels of the target population differ from those in urban settings.

Given this background and significance, the researcher saw a need to develop a health literacy promotion program, applied together with the concept of health behavior, for people with positive colorectal cancer screening results in Kuddon Subdistrict, Huaimek District, Kalasin Province. The program is expected to increase the health literacy and appropriately change the health behaviors of the target group, reduce delays in undergoing confirmatory colonoscopy, and prevent the progression of colorectal cancer in the long term.

Research Objectives

1. To examine the health literacy and health behavior problem situation of people with positive colorectal cancer screening results in Kuddon Subdistrict, Huaimek District, Kalasin Province

2. To develop a health literacy promotion program for people with positive colorectal cancer screening results in Kuddon Subdistrict, Huaimek District, Kalasin Province

3. To examine and compare the effects of the health literacy promotion program on health literacy and health behaviors of people with positive colorectal cancer screening results between the experimental group and the control group in Kuddon Subdistrict, Huaimek District, Kalasin Province

Research Methods

This study was quasi-experimental research with a two-group pretest-posttest

design. It was conducted from January to September 2026, a total of 9 months, with the experimental group receiving the health literacy promotion program for 8 weeks. Details are as follows:

Population The population comprised 90 people aged 50-70 years in Kuddon Subdistrict, Huaimek District, Kalasin Province whose colorectal cancer screening by the Fecal Immunochemical Test (FIT) was positive in fiscal years 2024-2025.

Sample The sample comprised people aged 50-70 years in Kuddon Subdistrict, Huaimek District, Kalasin Province whose colorectal cancer screening results were positive in fiscal years 2024-2025. They were selected by purposive sampling according to the specified inclusion and exclusion criteria and divided into an experimental group of 30 people and a control group of 30 people, for a total sample of 60 people.

Inclusion Criteria People aged 50-70 years (completed years) with a positive colorectal cancer screening result by FIT; residing in Kuddon Subdistrict, Huaimek District, Kalasin Province during the study period; physically and mentally able to communicate and provide information; having no intellectual impairment or psychiatric disorder affecting participation in activities; able to read and write or having a caregiver who can help answer the questionnaires; able to participate in activities and follow-up throughout the 8-week program; and willing to participate voluntarily by signing a consent form.

Exclusion Criteria People already diagnosed with colorectal cancer before joining the project; people with severe illness or disability that obstructs participation in activities; people planning to move out of the study area during the research period; people participating in other research during the same period that might affect the results; and people who are unwilling to provide information or who withdraw from the research during implementation.

Research Instruments The instruments used in this research consisted of: 1) a health literacy promotion program for the health behaviors of people with positive colorectal cancer screening results, lasting 8 weeks, adapted from the "Integrated Model of Health Literacy" of Sørensen et al. (2012); 2) an interview form on the general information of the sample, including sex, age, marital status, education level, occupation, average monthly income, other underlying diseases, family history of colorectal cancer, and previous experience of colorectal cancer screening; 3) a health literacy assessment form, adapted from the concept of Sørensen et al. (2012), covering the ability to access, understand, appraise, and apply health information; and 4) a health behavior questionnaire for people with positive colorectal cancer screening results.

Data Analysis General characteristics of the sample were analyzed using descriptive statistics, namely frequency, percentage, mean, and standard deviation. The distribution of the data was tested with the Shapiro-Wilk test. Mean health literacy and health behavior scores were compared within the experimental group before and after the program, and within the control group before and after the experiment, using the paired t-test, and were compared between the experimental and control groups after the program using the independent sample t-test. The confidence level was set at 95%.

Research Ethics

This study strictly followed the principles of research ethics involving human participants. Before data collection, the researcher explained the objectives, procedures, duration, and the benefits and risks of participation to the sample and the focus group participants, emphasizing that participation was voluntary and that they could decline or withdraw from the research at any time without affecting the health services they would normally receive. Participants signed an informed consent form before every round of data collection. All data were kept confidential and presented in aggregate using codes, with no disclosure of information that could identify individuals, and the data were used for academic purposes only. For the control group, the researcher provided usual care during the study and offered the health literacy promotion program after data collection ended so that both groups would benefit equally.

Results

1. Health literacy and health behavior situation among people with positive FIT test results in Kuddon Subdistrict, Huaimek District, Kalasin Province

1.1 General characteristics of the sample Of the 60 quantitative sample members in total, most were female (63.33%), with a mean age of 59.68±5.96 years (minimum 50, maximum 70 years); 55.00% were aged 60-70 years; 65.00% were married; 45.00% had primary education; 48.33% were farmers; mean monthly income was 9,466.67±4,300.05 baht, with 45.00% earning more than 10,000 baht per month; 55.00% had no underlying disease; 81.67% had no family history of colorectal cancer; 71.67% had never received information about colorectal cancer; and 91.67% had been advised to undergo colonoscopy, but a combined 40.00% had not yet done so or were awaiting an appointment.

1.2 Health literacy and health behavior situation before the program The whole sample had a mean pre-program health knowledge score of 4.52±1.42 out of 10 (45.17% of the full score), which is a low level; a mean health literacy skills score of

20.40±2.12 out of 40 (51.00%), a low level; an overall health literacy score (knowledge + skills) with a mean of 24.92±2.55 out of 50 (49.83%), a low level; and a mean health behavior score of 26.18±2.98 out of 50 (52.37%).

1.3 General characteristics of focus group participants in the situation analysis phase There were 20 focus group participants, most of whom were female (75.00%), with a mean age of 45.05±8.66 years. They were public health technical officers (40.00%), professional nurses (30.00%), and village health volunteers (25.00%), with a mean length of work or involvement in screening activities of 8.65±5.43 years. Of them, 75.00% had previously cared for people with positive FIT results, but as many as 65.00% had never received any training on health literacy.

2. Results of developing the health literacy promotion program for people with positive FIT test results in Kuddon Subdistrict, Huaimek District, Kalasin Province

2.1 The developed health literacy promotion program The program lasts 8 weeks in total, once a week, 60-90 minutes per session. It was designed around a three-phase structure following the research and development process: 1) the situation analysis and preparation phase (week 1); 2) the development and implementation phase, with activities based on the four dimensions of the health literacy framework, namely accessing, understanding, appraising, and applying health information, together with health behavior modification and strengthening of social support according to Pender's concept (weeks 2-7); and 3) the evaluation and follow-up phase (week 8). The activities of each week are sequentially linked, starting from building basic knowledge and understanding, moving to practicing analytical thinking and decision-making skills, and finally to real-life implementation with continuous support from family and community. This is expected to enable people with positive colorectal cancer screening results to improve their health literacy and health behaviors and to undergo confirmatory colonoscopy more promptly, as shown in Table 1.

Table 1 Health literacy promotion program for the health behaviors of people with positive colorectal cancer screening results, Kuddon Subdistrict, Huaimek District, Kalasin Province (8 weeks)

Week	Activities/Content	Tools Used	Duration	Academic Rationale
1	Orientation to explain the program objectives, build rapport with the target group, and assess health literacy	Health literacy assessment form, health behavior questionnaire,	60 minutes	Building rapport and trust is the foundation of participatory learning. The pre-program assessment

Week	Activities/Content	Tools Used	Duration	Academic Rationale
	and health behaviors before joining the program (Pre-test)	program introduction handout		provides baseline information for designing activities suited to each individual.
2	Education on colorectal cancer, the meaning of a positive FIT result, and introduction to reliable sources of health information	Video media, leaflets, LINE group for consultation	60 minutes	Corresponds to the Access dimension of health information in the health literacy framework (Sørensen et al., 2012), which is the first step in building health literacy.
3	Small-group discussion to build understanding of the meaning of the test result, the confirmatory colonoscopy procedure, and the consequences of not continuing follow-up, using case examples and visual aids	Illustrations/case examples, group discussion record form	90 minutes	Corresponds to the Understand dimension of health information (Sørensen et al., 2012) and helps adjust the perceived likelihood of risk and severity of disease according to Pender's health behavior concept (Danyutthasilp, 2018).
4	Practice in appraising the credibility of health information received from various media and distinguishing accurate information from mistaken beliefs through case study activities	True/false health information case study set, group exercises	60 minutes	Corresponds to the Appraise dimension of health information (Sørensen et al., 2012) and strengthens the ability to make critical health decisions.
5	Practice applying information in real life by jointly preparing an Individual Action Plan and setting a colonoscopy appointment date	Individual action plan form, appointment calendar	90 minutes	Corresponds to the Apply dimension of health information (Sørensen et al., 2012) and the Commitment to a Plan of Action stage in Pender's

Week	Activities/Content	Tools Used	Duration	Academic Rationale
				concept (Danyutthasilp, 2018).
6	Demonstration and practice of behavior modification regarding a risk-reducing diet (reducing red meat and processed foods, increasing vegetables and fruit) and exercise suitable for older adults	Food demonstration kit, exercise manual, behavior record form	90 minutes	Strengthens the Perceived Benefits of Action, a key determinant of health behavior in Pender's concept (Danyutthasilp, 2018).
7	Empowerment and building a social support network, in which family members, village health volunteers, and peers in the same group jointly follow up through home visits/encouraging telephone calls	Follow-up visit record form, telephone counseling guide	60 minutes	Corresponds to Interpersonal Influences and social support, which strengthen the continuity of health behaviors in Pender's concept (Danyutthasilp, 2018).
8	Summary of lessons learned, review of the knowledge and skills gained throughout the program, post-program assessment of health literacy and health behaviors (Post-test), and planning of continued follow-up	Health literacy assessment form, health behavior questionnaire, continued follow-up planning form	60 minutes	The post-program assessment measures outcomes according to the research objectives, and planning continued follow-up helps sustain health behaviors in the long term.

2.2 Expert validation of the program's appropriateness The developed program was reviewed for appropriateness by 12 experts: 4 experts from Subdistrict Health Promoting Hospitals, 4 experts from District Public Health Offices, and experts from Huaimek Community Hospital in program development. Overall, the program was appropriate at a high level, with an overall mean of 4.28±0.71 out of 5.

3. Comparison of health literacy and health behaviors among people with positive FIT test results in Kuddon Subdistrict, Huaimek District, Kalasin Province, before and after the program and between the experimental and control groups

3.1 Within-group comparison (before-after the experiment) The experimental group's health knowledge score increased from 4.43±1.48 to 6.73±1.46 (t=7.67, p<0.001); health literacy skills score increased from 20.77±1.96 to 32.57±2.93 (t=19.37, p<0.001); overall health literacy score increased from 25.20±2.52 to 39.30±2.89 (t=22.60, p<0.001); and health behavior score increased from 25.97±2.71 to 39.87±2.32 (t=20.96, p<0.001), all statistically significant differences. In contrast, the control group's scores on all variables increased only slightly and not significantly (p>0.05), as shown in Table 3.

Table 3 Comparison of mean health literacy and health behavior scores before and after the program by group (Paired t-test)

Variable	Group	Before		After		t	p-value
		$\bar{x}$	S.D.	$\bar{x}$	S.D.		
Health knowledge (max 10)	Experimental	4.43	1.48	6.73	1.46	7.67	<0.001*
Health knowledge (max 10)	Control	4.60	1.38	4.67	1.37	0.16	0.872
Health literacy skills (max 40)	Experimental	20.77	1.96	32.57	2.93	19.37	<0.001*
Health literacy skills (max 40)	Control	20.03	2.24	21.00	2.15	1.64	0.112
Overall health literacy (max 50)	Experimental	25.20	2.52	39.30	2.89	22.60	<0.001*
Overall health literacy (max 50)	Control	24.63	2.58	25.67	2.66	1.58	0.125
Health behavior (max 50)	Experimental	25.97	2.71	39.87	2.32	20.96	<0.001*
Health behavior (max 50)	Control	26.40	3.27	27.67	2.75	1.63	0.115

*Statistically significant, p-value <.05

3.2 Comparison between the experimental and control groups Before the program, the experimental and control groups did not differ in health knowledge, health literacy skills, overall health literacy, or health behavior (p>0.05 for all variables), indicating that the two groups were equivalent before the experiment began. After the program, the experimental group scored significantly higher than the control group on all variables: health knowledge (6.73±1.46 vs 4.67±1.37, t=5.65, p<0.001), health literacy skills (32.57±2.93 vs 21.00±2.15, t=17.43, p<0.001), overall health literacy (39.30±2.89 vs 25.67±2.66, t=19.02, p<0.001), and health behavior (39.87±2.32 vs 27.67±2.75, t=18.60, p<0.001), as shown in Table 4.

Table 4 Comparison of mean health literacy and health behavior scores between the experimental and control groups (Independent Sample t-test)

Variable	Experimental group		Control group		t	p-value
	$\bar{x}$	S.D.	$\bar{x}$	S.D.		
Health knowledge, before (max 10)	4.43	1.48	4.60	1.38	-0.45	0.653
Health knowledge, after (max 10)	6.73	1.46	4.67	1.37	5.65	<0.001*
Literacy skills, before (max 40)	20.77	1.96	20.03	2.24	1.35	0.182
Literacy skills, after (max 40)	32.57	2.93	21.00	2.15	17.43	<0.001*
Overall health literacy, before (max 50)	25.20	2.52	24.63	2.58	0.86	0.393
Overall health literacy, after (max 50)	39.30	2.89	25.67	2.66	19.02	<0.001*
Health behavior, before (max 50)	25.97	2.71	26.40	3.27	-0.56	0.578
Health behavior, after (max 50)	39.87	2.32	27.67	2.75	18.60	<0.001*

*Statistically significant, p-value <.05

3.3 Comparison of confirmatory colonoscopy rates between groups When categorical variables were analyzed, the proportion who had undergone colonoscopy was 63.33% in the experimental group versus 56.67% in the control group, which was not statistically significantly different (χ^2=0.07, p=0.792), as shown in Table 5.

Table 5 Comparison of confirmatory colonoscopy rates between the experimental and control groups

Status	Experimental group (%)	Control group (%)	χ^2	p-value
Underwent colonoscopy	63.33	56.67	0.07	0.792
Not yet undergone/awaiting appointment	36.67	43.33		

Discussion

The study of the health literacy and health behavior problem situation of people with positive colorectal cancer screening results found that the sample had low health literacy and health behaviors before the program. This is consistent with Sørensen's[6] health literacy framework, which holds that individuals need knowledge, motivation, and the abilities to access, understand, appraise, and apply health information together in order to develop appropriate health behaviors. When the target group in a rural area, most of whom were farmers with low education levels, still lacked these

components, their result follow-up behaviors and lifestyle changes were inappropriate. These findings are consistent with Pakdeepaiboonsakul[11] and Chaimongkol,[10] who found that chronic disease risk groups in community settings likewise had low to moderate levels of health literacy and health behaviors before joining the program, showing that this problem is not limited to any single disease but is a shared characteristic of risk groups for chronic noncommunicable diseases at the primary care level in general. In addition, the fact that colonoscopy uptake did not yet cover the entire target group reflects the gap between awareness of test results and actual practice. This accords with the finding of Chandam et al.[5] that even when at-risk people completed FIT screening, the rate of colonoscopy after an abnormal result remained below target, and with international empirical evidence from Lim[12] and Zarrinkamar,[13] who found that even though people with positive FIT results had a high level of knowledge about disease symptoms, the proportion undergoing colonoscopy still fell short of international standards. This confirms that knowledge alone is not sufficient to change behavior; perceived severity, perceived benefits, and social support are also needed, according to Pender's health behavior concept.[7] This underscores the need for health literacy approaches tailored to people with positive screening results rather than general health education.

Regarding the development of the health literacy promotion program for people with positive colorectal cancer screening results, the developed program received a high appropriateness rating from experts, which suggests that designing activities around the four dimensions of health literacy, together with strengthening health behaviors according to Pender's concept, is a suitable approach for the local context. This result is consistent with Pakdeepaiboonsakul[11] and Phuseenam et al.,[14] who developed health literacy programs based on the same framework and likewise found a high level of acceptance from both experts and target groups. The choice of visual media and demonstration activities as key components of the program is also consistent with the findings of Pansuwan and Naosuwan,[15] who found that video media helped colorectal cancer risk groups clearly understand the procedures to follow and reduced anxiety well, and with the qualitative findings of Boirot[16] in France, who found that both patients and general practitioners preferred video media to leaflets because it can convey complex procedures in an easily understood way and reduce discomfort with sensitive topics such as stool testing. This matches the nature of the target group in this study, most of whom had low education levels and may be unfamiliar with academic language. Furthermore, the inclusion of social support and home-visit follow-up in the program is consistent with the concept of Sripattha et

al.,[17] who found that integrating social support into a pre-colonoscopy preparation program effectively strengthened preparation behaviors and reduced anxiety among patients at risk of colorectal cancer. This confirms that programs that are holistic, addressing knowledge, skills, and social support, are more likely to be accepted and put into practice than education alone.

Regarding the comparison of the effects of the program on health literacy and health behaviors between the experimental and control groups, the finding that the experimental group's health literacy and health behavior scores were clearly higher than before the program and higher than the control group confirms the effectiveness of the developed program. It is consistent with several earlier studies using the same framework, namely Chaimongkol,[10] Pakdeepaiboonsakul,[11] and Phuseenam et al.,[14] which found results in the same direction: groups receiving health literacy promotion programs improved markedly compared with control groups or with pre-experiment scores. This shows that systematic education through a process covering accessing, understanding, appraising, and applying health information is a robust approach to changing the behavior of chronic disease risk groups in the Thai context, not limited to any single disease. Meanwhile, the control group, which received usual care, changed only slightly, consistent with the observations of Chandam et al.[5] and Sripattha et al.[17] that usual care without activities specifically strengthening health literacy is insufficient to significantly stimulate behavior change among patients at risk of colorectal cancer. However, when considering the link between increased health literacy and actual colonoscopy uptake, evidence from Lim,[12] who found that direct advice from a physician was an important predictor of compliance, and from O'Leary,[18] who found that having a dedicated care navigator clearly increased colonoscopy rates, indicates that increased health literacy alone may not be sufficient to fully drive actual practice if it is not accompanied by appointment or follow-up support systems. This is consistent with the long-term follow-up results of Azizi Sani Dopolani,[19] who found that even when health literacy remained high over time, sustaining health behaviors still required continuous reinforcement from the health service system. The findings of this study therefore suggest that future program development should integrate follow-up and coordination mechanisms with health literacy components, in order to achieve end-to-end outcomes from knowledge through to genuine access to confirmatory colonoscopy.

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References

1. Sung H, Filho AM, Laversanne M, Ferlay J, Siegel RL, Soerjomataram I, et al. Global cancer statistics 2024: GLOBOCAN estimates of incidence and mortality worldwide for 34 cancers in 186 countries. CA Cancer J Clin. 2026;76(4):e70090.

2. BGI Genomics. 2024 global state of colorectal cancer awareness report [Internet]. Shenzhen: BGI Genomics; 2024 [cited 2026 Sep 13]. Available from: https://www.bgi.com/global/news/bgi-genomics-2024-global-state-of-colorectal-cancer-awareness-report

3. Local Health Security Fund. Colorectal cancer screening project using FIT test, fiscal year 2024 [Internet]. 2024 [cited 2026 Sep 13]. Available from: https://localfund.happynetwork.org/project/176761

4. National Health Security Office. NHSO supports FIT test for colorectal cancer screening among people aged 50–70 years, all healthcare schemes, free every 2 years [Internet]. 2026 [cited 2026 Sep 13]. Available from: https://www.hfocus.org/content/2026/07/38619

5. Chandam P, Boonyanam S, Songsri C, Lohawet N. Effects of implementing access guidelines for colorectal cancer screening among at-risk populations through network participation, primary care unit, Udon Thani Hospital. Udon Thani Hosp Med J. 2025;33(1):125-36.

6. Sørensen K, Van den Broucke S, Fullam J, Doyle G, Pelikan J, Slonska Z, et al. Health literacy and public health: a systematic review and integration of definitions and models. BMC Public Health. 2012;12:80.

7. Danyutthasilp C. Pender's health promotion model. Songklanagarind J Nurs. 2018;38(2):132-41.

8. Ministry of Public Health. Health data center (Health KPI): indicator 021.3, percentage of people receiving colorectal cancer screening, Health Region 7 [Internet]. 2025 [cited 2026 Sep 13].

9. Khaosod. Kalasin: Yang Talat Hospital achieves 100% success in laparoscopic surgery for colorectal cancer [Internet]. 2026 [cited 2026 Sep 13]. Available from: https://www.khaosod.co.th/around-thailand/news_10139534

10. Chaimongkol P. Effectiveness of a health literacy promotion program on desirable health behaviors among elderly people in a semi-urban community in Khon Kaen province. J Reg Health Promot Cent 7 Khon Kaen. 2023;15(3):124-37.

11. Pakdeepaiboonsakul R. Effectiveness of a health literacy promotion program on health behaviors among high-risk groups for diabetes and hypertension. Thai J Public Health Health Educ. 2025;5(2):e275531.

12. Lim TZ, Lau J, Wong GJ, Tan LYT, Chang YJ, Natarajan K, et al. Factors predicting improved compliance towards colonoscopy in individuals with positive faecal immunochemical test (FIT). Cancer Med. 2021;10(21):7735-46.

13. Zarrinkamar M, Ebrahimi M, Zahedi M, Amini F, Geran M, Ghadirzadeh E. Prevalence, determinants, and barriers to follow-up colonoscopy after a positive fecal immunochemical test in Qaemshahr, Iran: a population-based cross-sectional study from 2022 to 2023. Prev Med Rep. 2025.

14. Phuseenam S, Isarangkul Na Ayutthaya W, Sinsuphan N. Development of health literacy and colorectal cancer prevention among village health volunteers, Phra Lap subdistrict, Mueang district, Khon Kaen province. J Educ Health Environ Manag. 2024;9(2):872-81.

15. Pansuwan C, Naosuwan K. Effects of using video media on pre-colonoscopy preparation behavior, bowel cleanliness, and anxiety among colorectal cancer risk groups at Na Mom Hospital. Rachawadee J Boromarajonani Coll Nurs Surin. 2022;12(1):136-48.

16. Boirot A, Addamiano MC, Casanova C, Redmond NM, Cazorla G, Rotily M, et al. Acceptability and implementation potential of a health literacy intervention to increase colorectal cancer screening in deprived areas: a qualitative study of patients and general practitioners participating in a cluster randomized controlled trial. PLoS One. 2025;20(8):e0329639.

17. Sripattha L, Boonthom U, Suriya N. Effects of a colonoscopy preparation program with social support on anxiety, bowel cleanliness quality, and satisfaction among patients at risk of colorectal and anal cancer. Mahasarakham Hosp J. 2025;22(1):133-51.

18. O'Leary MC, Reuland DS, Randolph C, Ferrari RM, Brenner AT, Wheeler SB, et al. Reach and effectiveness of a centralized navigation program for patients with positive fecal immunochemical tests requiring follow-up colonoscopy. Prev Med Rep. 2023;34:102211.

19. Azizi Sani Dopolani SF, Shahbazi H, Lotfizadeh M, Naderimagham S. The impact of educational intervention on enhancing health literacy among middle-aged individuals at risk for cardiovascular diseases: a randomized controlled trial. BMC Public Health. 2025;25:2291.