



Short Report

Feasibility and acceptability of motivational interviewing to promote colorectal cancer screening among average risk Chinese older adults

Dorothy N.S. Chan^{*}, Kai-Chow Choi

Faculty of Medicine, The Nethersole School of Nursing, The Chinese University of Hong Kong, Hong Kong SAR, China

ARTICLE INFO

Keywords:

Motivational interviewing
Cancer screening
Colorectal cancer
Fecal immunochemical test
Nursing

A B S T R A C T

Objective: This study aims to evaluate the feasibility and acceptability of motivational interviewing to promote fecal immunochemical test (FIT) uptake among average-risk Chinese older adults and to preliminarily examine its effects on the knowledge level, perceived barriers to and benefits of the FIT, self-efficacy in screening, screening intention and FIT uptake.

Methods: A one-group pre-test and post-test study design was adopted. A motivational interviewing intervention using face-to-face and telephone approaches was delivered to average-risk Chinese older adults aged 50–75 years. The number of participants approached, the number eligible for participation and intervention completion, and study retention rates were recorded. The knowledge, perceived benefits of, barriers to, self-efficacy in and intention to participate in colorectal cancer (CRC) screening were assessed before and after the intervention. FIT uptake was recorded 3 months after the intervention. Interviews were conducted to record the participants' experiences of participating in the intervention.

Results: Twenty Chinese older adults completed the study. The motivational interviewing intervention improved the screening intention, knowledge of CRC and its screening, the perceived benefits of and self-efficacy in screening and perceived barriers to screening. Twelve participants (60%) had undergone FIT screening. Nineteen participants attended the interviews. They were all satisfied with the intervention. Three categories were generated regarding their experience in participating in the intervention, namely, (1) enhanced motivation and self-efficacy in screening, (2) enhanced understanding of the CRC screening program, and (3) areas for intervention improvement.

Conclusions: The implementation of a motivational interviewing intervention was feasible and was acceptable to average-risk Chinese older adults. A full-scale study should be conducted in the future.

Trial registration: ISRCTN39658070.

Introduction

Colorectal cancer (CRC) is the third most common cancer and the second leading cause of cancer-related mortality worldwide.¹ The risk of developing CRC can be lowered by regular screening. The fecal immunochemical test (FIT), sigmoidoscopy, and colonoscopy are the most common screening tests used to detect CRC.^{2–4} Population-based CRC screening programs (CRCSPs) have been implemented in different countries and regions to encourage citizens to attend cancer screening.⁵ In Hong Kong, a voluntary, subsidized population-based CRCSP was fully implemented in 2020. This program subsidized FIT screening in the private healthcare sector for asymptomatic, average-risk individuals aged 50–75.⁶ The government has made efforts to promote the CRCSP

through educational and promotional videos, printed materials, and television announcements.⁶ Despite these efforts, the FIT uptake rate remains low (43.9%) in Hong Kong.⁷ The low FIT uptake rate implies that current promotional strategies do not adequately address the factors influencing FIT uptake among Chinese older adults in Hong Kong.⁷ Low uptake also implies a smaller chance of detecting precancerous changes or early-stage CRC, meaning that prompt treatment cannot be implemented.¹

Several systematic reviews have reported that strategies such as fecal occult blood test outreach, patient education, reminders and social support can increase CRC screening uptake among average-risk individuals.^{8,9} A previous survey conducted among Chinese older adults in Hong Kong revealed that, apart from subsidized screening, certain health

^{*} Corresponding author.

E-mail address: dorothycns@cuhk.edu.hk (D.N.S. Chan).

<https://doi.org/10.1016/j.apjon.2023.100315>

Received 19 August 2023; Accepted 5 October 2023

2347-5625/© 2023 The Author(s). Published by Elsevier Inc. on behalf of Asian Oncology Nursing Society. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

beliefs, including the perceived benefits of and barriers to screening, and being prompted by doctors and family members were important factors influencing FIT uptake.⁷ That survey's findings imply that the current promotional strategies do not adequately improve awareness of and/or change attitudes toward and perceptions of CRC screening and uptake. Solely providing education, reminders via television announcements and a subsidy program is insufficient to induce behavioral changes, especially when people's ambivalence toward screening is caused not by a lack of knowledge, financial support or reminders, but by their attitudes toward and perceptions of CRC screening and their motivation to undergo it. Therefore, to improve FIT uptake, it is important to develop relevant strategies that address people's attitudes, perceptions, intentions, and actions. As recommended in a previous review, motivational interviewing may help improve cancer screening uptake by exploring people's ambivalent attitudes toward perceptions of and ideas about the necessity of screening.¹⁰ Motivational interviewing is a client-centered communication technique that helps motivate people to commit to behavioral changes.¹¹ The approach involves the following four processes: engaging, focusing, evoking, and planning. During the engaging process, a therapeutic relationship is developed. In the focusing process, the goals of counselling are chosen, and conversations about behavioral change are initiated. In the evoking process, the practitioner explores the client's ambivalence and helps them construct reasons for their ambivalence and cultivate motivation for change. The communication proceeds to the planning process after the client expresses a readiness for behavioral change.¹¹

Despite the usefulness of motivational interviewing, no study has examined its effects on FIT uptake by average-risk Chinese older adults. The aims of this study were to primarily evaluate the feasibility and acceptability of motivational interviewing for promoting FIT uptake by average-risk Chinese older adults and to preliminarily examine its effects on the knowledge level, perceived barriers to and benefits of the FIT, self-efficacy in screening, screening intention, and FIT uptake. These outcome indicators were selected based on the findings of previous surveys conducted among Chinese older adults in Hong Kong.^{7,12}

Methods

Study design, participants, and setting

This feasibility study was conducted from December 2021 to March 2022 using a one-group pre-test and post-test design. Participants were recruited from two local community centers serving Chinese older adults. The inclusion criteria were set with reference to the eligibility criteria for participating in the CRCSP in Hong Kong. Thus, to be included in the study, the participants were required to (1) be average-risk Hong Kong Chinese citizens (defined as those who do not show any symptoms of CRC; do not have a significant family history of CRC, such as an immediate relative diagnosed with CRC at the age of 60 or less; do not have more than one immediate relative diagnosed with CRC, irrespective of age at diagnosis; and do not have any immediate relatives diagnosed with a hereditary bowel disease), (2) be aged 50–75, and (3) be able to read and communicate in Chinese (or speak Cantonese). Participants were excluded if (1) their medical condition excluded them from a FIT, (2) they had a personal history of CRC, or (3) they had undergone a FIT in the past 2 years, a sigmoidoscopy in the past 5 years or a colonoscopy in the past 10 years preceding the study.⁶ As this was a feasibility study, a sample size of at least 20 participants was anticipated to be sufficient.¹³

Intervention

The motivational interviewing intervention was delivered by an interventionist trained in motivational interviewing. Motivational interviewing was implemented according to the relevant theoretical principles.¹¹ Motivational interviewing involves four processes: engaging, focusing, evoking, and planning. These processes guide the flow of

conversation between the participant and the interventionist. To successfully motivate the participants to make behavioral changes, the interventionist conducted the interviews in keeping with the underlying spirit (partnership, acceptance, compassion, and evocation) of motivational interviewing throughout the process. In addition, the interventionist used the core skills of motivational interviewing (open questions, affirmation, reflection, and summary), tailored to the participants' responses, to guide the process towards eliciting discussion of and/or commitment to change. The participants received two weekly face-to-face motivational interview sessions, each of which lasted no more than 45 min.^{10,11} In the first session, we established rapport and engaged the participants in the discussion. We introduced the purpose of the discussion and explored the participants' attitudes toward and perceptions of CRC screening using appropriate motivational interviewing skills. In the second session, a recap of the previous discussion was provided and we helped the participants explore and resolve their ambivalence regarding CRC screening. Change talk was elicited as appropriate, and we assessed the participants' readiness for screening. As permitted by the participants, information about CRCSP was provided using the government's website, with the details about how to join CRCSP and look for a service provider. We also supported the participants to develop an action plan, based on their insights, to implement behavioral change.^{10,11} One week later, a phone call was made or a message was sent via mobile instant messaging (eg, WhatsApp) to review the participants' screening status and to encourage screening using appropriate motivational interviewing skills.^{10,11}

Outcome measures

The feasibility of the intervention was assessed by comparing the number of participants approached, screened, and deemed eligible for participation to the number of participants who joined the study and completed the intervention and data collection. The duration of the intervention sessions and the time required to complete the questionnaire were also recorded. The acceptability of the intervention was assessed through asking the participants about their general impressions and experience of participating in the intervention through a semi-structured telephone interview.

The other outcomes included FIT uptake; intention to undergo a FIT; knowledge of CRC and its screening; the perceived benefits of, barriers to and self-efficacy in CRC screening. Demographic information was collected at baseline. FIT uptake was assessed 3 months after the intervention (Yes/No) using an attendance receipt. The intention to undergo screening was assessed using a single-item question assessing the likelihood of the participant to undergo a FIT in the next 3 months, with scoring on a 7-point Likert scale (1 = definitely not to 7 = certainly). Knowledge about CRC and its screening was assessed using the Chinese version of the 16-item CRC knowledge test. The answers were either 'True' or 'False', with a correct answer scored as 1 and an incorrect answer scored as 0. The total score ranged from 0 to 16.¹⁴ The perceived benefits of and barriers to CRC screening were assessed using the validated Chinese versions of the 5-item CRC Perception Scale-Benefits of CRC Testing and 13-item Psychological and Knowledge Barriers tools, respectively. The items were scored on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree).¹⁵ Perceived self-efficacy in screening was assessed using the Chinese version of the 4-item Self-Efficacy Questionnaire. The items were scored on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree).¹⁶

Data collection procedure

The research assistant approached potential participants at the participating centers. Consenting participants were asked to complete a baseline questionnaire (T0). Their knowledge of, perceived benefits of and barriers to, self-efficacy in and intention to participate in CRC screening were recorded at baseline (T0) and after the intervention (T1). FIT uptake was recorded 3 months after the intervention (T2) (Fig. 1).

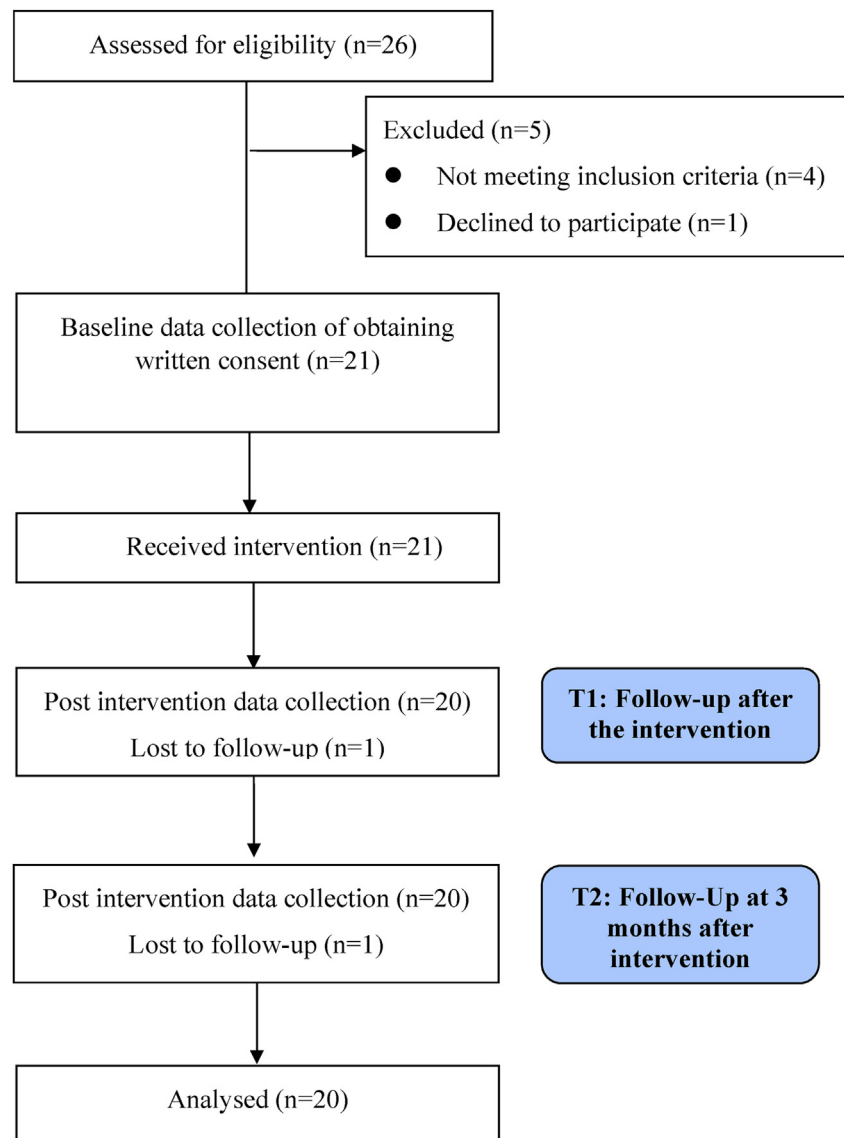


Fig. 1. Flow diagram of intervention and data collection points.

The individual semi-structured interviews were conducted in Cantonese at 1 month after the intervention, following the interview guide (Table 1), to record the participants’ experiences of participating in the intervention. Each interview lasted approximately 15–30 min and was audio-recorded.

Data analysis

Participant characteristics and outcomes are presented using appropriate descriptive statistics, such as the mean (standard deviation) for continuous variables and frequency (%) for categorical variables. A paired Student’s *t*-test was used to compare the changes in each outcome

Table 1

Interview guide.

1. Could you please share your general impression and experience of this intervention?
2. How does intervention affect your understanding and/or ambivalence about colorectal cancer screening?
3. How does intervention affect your motivation, attitude and perception, intention to or actual FIT uptake?
4. Concerning the intervention, please provide your suggestions for any areas for improvement.

from baseline to after the intervention. All statistical analyses were conducted using SPSS version 26 (IBM, Armonk, NY, USA), with the level of significance set at 0.05 (two-sided). The interview recordings were transcribed verbatim, and data were analysed using content analysis.¹⁷

Ethical considerations

Ethical approval was obtained from the Survey and Behavioural Research Ethics of the Chinese University of Hong Kong (IRB No. SBRE-21-0205). All of the participants provided written informed consent.

Results

Recruitment and feasibility of the intervention

Twenty-six Hong Kong Chinese older adults were approached. Four of them were deemed to be ineligible, resulting in an eligibility rate of 84.6%. One man refused to participate. The remaining 21 men and women consented to participate, giving a consent rate of 95.5%. All participants received two face-to-face motivational interview sessions. The mean duration of each session was approximately 30 min. The follow-up phone calls lasted approximately 5 min. One participant did

not respond to the follow-up phone call and dropped out at T1 and T2. The remaining participants required 10–15 min to complete the T1 questionnaire. Finally, 20 participants completed the study and were included in the analysis. The intervention completion and study retention rates were both 95.2% (Fig. 1).

Participant characteristics

The mean age of the participants was 69.6 (standard deviation = 4.4). Most of the participants were female, and all were retired (Table 2).

Preliminary effects of the intervention on the outcomes

Changes in the scores for screening intention; knowledge of CRC and its screening and perceived benefits of, barriers to and self-efficacy in screening from T0 to T1 were determined (Table 3). Significant improvements were shown in screening intention; knowledge of CRC and its screening and the perceived benefits of, self-efficacy in (all $P < 0.0001$) and perceived barriers to screening ($P < 0.0001$) after the intervention. Twelve participants (60%) had undergone FIT screening by 3 months after the intervention. The other eight participants had not undergone FIT screening due to restrictions related to the COVID-19 pandemic and family issues.

Acceptability of the intervention

Nineteen participants agreed to attend the interviews. All of the participants stated that they were satisfied with the intervention and agreed that it was a positive experience as it gave them a chance to express their concerns and receive information about screening. The following three categories were generated regarding their experiences: (1) enhanced motivation and self-efficacy in screening, (2) enhanced

Table 3
Outcome measures of the participants ($N = 20$).

Outcomes		Mean (SD)	P-value
<i>Screening intention</i>			
Likelihood of taking a Fecal Immunochemical Test in the next 3 months	T0	3.00 (1.81)	
	T1	1.55 (0.76)	
[Possible score range: 1–7]	Ch	–1.45 (1.57)	< 0.0001
<i>Knowledge of CRC and screening</i>			
Knowledge score	T0	8.45 (2.35)	
	T1	10.75 (2.47)	
[Possible score range: 0–16]	Ch	2.30 (1.84)	< 0.0001
<i>Health-related beliefs</i>			
<i>Perceived benefits of screening</i>			
	T0	23.55 (1.73)	
	T1	22.15 (2.21)	
[Possible score range: 5–25]	Ch	–1.40 (2.30)	< 0.0001
<i>Perceived barriers to screening</i>			
	T0	35.50 (7.07)	
	T1	30.10 (7.36)	
[Possible score range: 13–65]	Ch	–5.40 (6.67)	< 0.0001
<i>Perceived self-efficacy in screening</i>			
	T0	16.30 (2.87)	
	T1	16.90 (2.05)	
[Possible score range: 4–20]	Ch	0.60 (2.66)	< 0.0001
<i>Screening uptake</i>			
<i>Undergone a Fecal Immunochemical Test</i>			
No	T2	8 (40.0%)	
Yes		12 (60.0%)	

SD, standard deviation; CRC, colorectal cancer.

understanding about the CRCSP, and (3) areas for intervention improvement.

1. Enhanced motivation and self-efficacy in screening

They revealed that they were able to think about the benefits and necessity of cancer screening. They felt that they were heard and supported by the interventionist. Most of the participants expressed that they felt motivated and were more confident in completing the FIT screening.

What affects me is that you listen to me and explain it to me clearly. You are so detailed and so I know I can do it (obtain FIT) by myself. Without joining this (motivational interview sessions), you can't find it out by yourself. I didn't know where to go to find a doctor and I didn't have much motivation before. Now I have it (motivation). (P10)

My motivation to have it (FIT) is greater. I understand the benefits of it, and it is good for my health. I must grasp this opportunity to do it. (P12)

2. Enhanced understanding about the CRCSP

All of the participants agreed that, after the intervention, they had a clearer understanding of the CRCSP. They were clear about the steps required to join the CRCSP and where to approach a primary care doctor to obtain the FIT kit.

I think these motivational interview sessions are good. They provide me with more information about the screening programme and where to obtain screening. (P01)

The best thing is that the explanations are clear; I know what the FIT procedure is, and it makes me feel that I should do it. (P07)

3. Areas for intervention improvement

Some of the participants suggested that the intervention should be implemented regularly to benefit more eligible people. Furthermore, they thought that one session and a follow-up phone call would be sufficient.

There should be more of this kind of intervention. This should be done regularly and promoted to more people. (P17)

Keep doing it. This should be provided to other people like me who don't know about these (CRCSP and FIT). The overall experience (joining the

Table 2
Baseline characteristics of the participants ($N = 20$).

Characteristics	Intervention ($n = 20$)
Age (years) [†]	69.6 (4.4)
Gender	
Male	5 (25.0)
Female	15 (75.0)
Marital status	
Single/divorced/widowed	4 (20.0)
Married/cohabited	16 (80.0)
Educational level	
Primary or below	8 (40.0)
Secondary	9 (45.0)
Post-secondary or above	3 (15.0)
Employment status	
Retired	20 (100.0)
Monthly household income (HK\$)	
< 6000	15 (75.0)
6000–19,999	3 (15.0)
≥ 20,000	2 (10.0)
Family members had colorectal cancer	
No	17 (85.0)
Yes ^a	3 (15.0)
Presence of chronic illness	
No	4 (20.0)
Yes	16 (80.0)
Smoking status	
Never smoke	19 (95.0)
Quitted	1 (5.0)
Alcohol drinking	
Never	15 (75.0)
Quitted	1 (5.0)
Occasionally	4 (20.0)

Data marked with [†] are presented as mean (standard deviation), all others are presented as frequency (%).

^a The family members of these 3 participants were aged over 60 years when they were diagnosed with CRC. CRC, colorectal cancer.

intervention) is good. It is good to have a session of one-to-one conversation and a follow-up call. It is sufficient for you to talk and ask questions. (P14)

Discussion

Feasibility and acceptability of the intervention

This study evaluated the feasibility and acceptability of a motivational interviewing intervention among average-risk Chinese older adults. Our findings suggested that recruiting participants and implementing a motivational interviewing intervention in a community setting were likely to be feasible and acceptable to the target population. Our recent large-scale survey found that people's attitudes toward and perceptions of screening and their motivation to undergo the FIT were important determinants of screening uptake.⁷ Motivational interviewing can help by exploring people's ambivalence about attitudes toward and perceptions of CRC screening. After participating in motivational interviews, their ambivalence regarding CRC screening tends to resolve, they become motivated to change and they are more amenable to CRC screening.¹⁰

A previous review revealed that face-to-face and telephone approaches enhance breast and cervical cancer screening uptake, while telephone-based motivational interviewing shows mixed results for CRC screening.⁸ In this study, face-to-face (two sessions) and telephone/mobile instant messaging (one session) approaches were used. Face-to-face motivational interviewing offered a chance for the interventionist and the participants to remain engaged. The participants were able to express their attitudes toward and perceptions of CRC screening directly to the interventionist. Moreover, as information about the CRCSP was offered, older adults needed to learn how to browse the website and search for a service provider. Thus, a face-to-face approach may be more acceptable than alternative approaches, as it allows the interventionist to explain and guide the older adults in using the CRCSP website.⁸ Although the emergence of mobile instant messaging tools, such as WhatsApp, have provided useful platforms to facilitate the delivery of motivational interviewing, not all older adults are proficient at using or are willing to use such platforms to send and receive information.¹⁸ Thus, the telephone approach remains a viable option and the willingness and ability of older adults to use mobile instant messaging platforms should be assessed.

Positive user experiences are important for the successful implementation of an intervention. Inconclusive results were reported regarding the optimal duration and format of motivational interviewing in a previous review.¹⁰ Participants in the present study provided valuable comments about the format they preferred and the optimal number and duration of sessions they felt comfortable attending and that fitted their schedule. This provided important information to guide the modification of the intervention and for the future implementation of a full-scale study.

Limitations

There are limitations to this study that should be acknowledged. The study was conducted over a short period during the COVID-19 pandemic. Therefore, only a limited number of eligible participants could be approached. A larger sample of participants should be recruited in a future full-scale study, which should also include a control group and a longer follow-up period to reveal the effects of the intervention on selected outcomes. Most of the recruited participants were aged 60 years or above and all were retired. Additional efforts should be made in future studies to recruit more participants aged 50–59 years and, preferably, more who are employed.

Conclusions

The implementation of a motivational interviewing intervention was found to be feasible and acceptable to average-risk Chinese older adults.

A full-scale study should be conducted in the future to formally examine its effectiveness.

CRedit author statement

Dorothy N. S. Chan: Conceptualization; Methodology; Project administration; Supervision; Roles/Writing – original draft; **Kai-Chow Choi:** Formal analysis; Writing – review & editing. All authors were granted complete access to all the data in the study, with the corresponding author bearing the final responsibility for the decision to submit for publication. The corresponding author affirms that all listed authors fulfill the authorship criteria and that no others meeting the criteria have been omitted.

Declaration of competing interest

The authors declare no conflict of interest. Dr. Chan and Dr. Choi, are the editorial board member of the *Asia-Pacific Journal of Oncology Nursing*. The article underwent the standard review procedures of the journal, with the peer review process managed independently from their research groups.

Funding

This study received no external funding.

Ethics statement

The study was approved by Survey and Behavioral Research Ethics Committee of the Chinese University of Hong Kong (IRB No. SBRE-21-0205). All of the participants provided written informed consent.

Data availability statement

The data that support the findings of this study are available from the corresponding author, upon reasonable request.

Declaration of Generative AI and AI-assisted technologies in the writing process

No AI tools/services were used during the preparation of this work.

References

1. International Agency for Research on Cancer. *Estimated Number of New Cases in 2020, World, Both Sexes, all Ages (excl. NMSC)*; 2022. https://gco.iarc.fr/today/online-analysis-table?v=2020&mode=cancer&mode_population=continents&population=900&populations=900&key=asr&sex=0&cancer=39&type=0&statistic=5&prevalence=0&population_group=0&ages_group%5B%5D=0&ages_group%5B%5D=17&group_cancer=1&include_nmsc=0&include_nmsc_other=1. Accessed August 18, 2023.
2. Hewitson P, Glasziou P, Irwig L, Towler B, Watson E. Screening for colorectal cancer using the faecal occult blood test, Hemoccult. *Cochrane Database Syst Rev*. 2007; 2007(1):Cd001216. <https://doi.org/10.1002/14651858.CD001216.pub2>.
3. Pan J, Xin L, Ma YF, Hu LH, Li ZS. Colonoscopy reduces colorectal cancer incidence and mortality in patients with non-malignant findings: a meta-analysis. *Am J Gastroenterol*. 2016;111(3):355–365. <https://doi.org/10.1038/ajg.2015.418>.
4. Shroff J, Thosani N, Batra S, Singh H, Guha S. Reduced incidence and mortality from colorectal cancer with flexible-sigmoidoscopy screening: a meta-analysis. *World J Gastroenterol*. 2014;20(48):18466–18476. <https://doi.org/10.3748/wjg.v20.i48.18466>.
5. Chiu HM, Su CW, Hsu WF, et al. Mitigating the impact of COVID-19 on colorectal cancer screening: organized service screening perspectives from the Asia-Pacific region. *Prev Med*. 2021;151:106622. <https://doi.org/10.1016/j.ypmed.2021.106622>.
6. Department of Health. Colorectal cancer screening programme. <https://www.colonscreen.gov.hk/en/public/index.html>; 2023. Accessed August 18, 2023.
7. Chan DNS, Choi KC, Au DWH, So KWK. Identifying the factors promoting colorectal cancer screening uptake in Hong Kong using Andersen's Behavioural Model of Health Services Use. *BMC Publ Health*. 2022;22(1):1228. <https://doi.org/10.1186/s12889-022-13634-7>.

8. Dougherty MK, Brenner AT, Crockett SD, et al. Evaluation of interventions intended to increase colorectal cancer screening rates in the United States: a systematic review and meta-analysis. *JAMA Intern Med.* 2018;178(12):1645–1658. <https://doi.org/10.1001/jamainternmed.2018.4637>.
9. Tsipa A, O'Connor DB, Branley-Bell D, et al. Promoting colorectal cancer screening: a systematic review and meta-analysis of randomised controlled trials of interventions to increase uptake. *Health Psychol Rev.* 2020;1–24. <https://doi.org/10.1080/17437199.2020.1760726>.
10. Chan DNS, So WKW. Effectiveness of motivational interviewing in enhancing cancer screening uptake amongst average-risk individuals: a systematic review. *Int J Nurs Stud.* 2021;113:103786. <https://doi.org/10.1016/j.ijnurstu.2020.103786>.
11. Miller WR, Rollnick S. *Motivational Interviewing: Helping People Change.* 3rd ed. New York: Guilford press; 2013.
12. So WK, Choi KC, Chan DN, et al. Colorectal cancer screening behaviour and associated factors among Chinese aged 50 and above in Hong Kong - a population-based survey. *Eur J Oncol Nurs.* 2012;16:413–418. <https://doi.org/10.1016/j.ejon.2011.09.006>.
13. Lancaster GA, Dodd S, Williamson PR. Design and analysis of pilot studies: recommendations for good practice. *J Eval Clin Pract.* 2004;10(2):307–312. <https://doi.org/10.1111/j.2002.384.doc.x>.
14. Green PM, Kelly BA. Colorectal cancer knowledge, perceptions, and behaviors in African Americans. *Cancer Nurs.* 2004;27(3):206–215. <https://doi.org/10.1097/00002820-200405000-00004>.
15. Leung DY, Wong EM, Chan CW. Psychometric properties of a Chinese version of the Colorectal Cancer Perceptions Scale in a sample of older Chinese people. *Cancer Nurs.* 2014;37(5):E53–E60. <https://doi.org/10.1097/NCC.000000000000107>.
16. Bai Y, Wong CL, Peng X, So WKW. Colonoscopy screening behaviour and associated factors amongst first-degree relatives of people with colorectal cancer in China: Testing the Health Belief Model using a cross-sectional design. *Int J Environ Res Publ Health.* 2020;17(14). <https://doi.org/10.3390/ijerph17144927>.
17. Patton MQ. *Qualitative Research & Evaluation Methods.* 4th ed. Los Angeles: SAGE; 2015.
18. Vroman KG, Arthanat S, Lysack C. "Who over 65 is online?" Older adults' dispositions toward information communication technology. *Comput Hum Behav.* 2015;43:156–166. <https://psycnet.apa.org/doi/10.1016/j.chb.2014.10.018>.