

Faecal occult blood screening: knowledge, attitudes, and practice in four Hong Kong primary care clinics

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Objectives To assess primary care patients for their awareness, knowledge, and attitude towards colorectal cancer and screening, to report on the uptake of faecal occult blood test screening and the results of screening, and explore predictors of screening uptake.

Design Cross-sectional study.

Setting Four primary care clinics in Hong Kong.

Patients A total of 1664 patients aged 50 to 74 years attending the clinics in the period July 2006 to July 2007.

Main outcome measures Percentage of subjects who were aware that colorectal cancer is common and curable at an early stage, and who knew that faecal occult blood test or colonoscopy is useful for screening; relevant knowledge score; uptake rate of faecal occult blood testing; rate of testing positive; and factors predicting uptake.

Results A total of 1645 questionnaires were collected. In all, 89% (95% confidence interval, 88-91%) were aware that colorectal cancer is common, 95% (94-96%) believed faecal occult blood test and colonoscopy are useful for screening, and 58% (56-61%) achieved a knowledge score of 50% or above. The uptake rate of the faecal occult blood test was 35%. Uptake was higher among those with a positive family history (odds ratio=1.57; 95% confidence interval, 1.08-2.27; P=0.02), those who were more aware that colorectal cancer is common (1.86; 1.29-2.69; P=0.001), and that colorectal cancer is potentially curable at an early stage (1.76; 1.32-2.36; P=0.0001). Rate of testing positive was 2.1% (95% confidence interval, 0.9-3.3%); no colorectal cancer was detected and the neoplasia detection rate (for cancers and adenomas) was 5.1 per 1000 subjects screened.

Conclusions Patients were aware that colorectal cancer is common in our community, and faecal occult blood test or colonoscopy is useful for screening. The uptake of screening was low, though relatively higher for those with a positive family history and greater awareness of the high frequency and potential for cure of colorectal cancer. Faecal occult blood test positivity rate was 2.1%, and neoplasia detection rate 5.1 per 1000 screened.

Key words

Colorectal neoplasms; Mass screening;
Occult blood

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New knowledge added by this study

- The study population was highly aware that colorectal cancer is common in our locality and that faecal occult blood test (FOBT) or colonoscopy is useful for screening.
- The actual uptake/acceptance rate of FOBT screening was low.
- Predictors of FOBT screening uptake for colorectal cancer included: a positive family history, high awareness that it is common, and that it is curable at an early stage.

Implications for clinical practice or policy

- What people know and believe about a disease may not fully translate into decisions to take up the screening intervention on offer.
- Effective customised health advice should respect individual beliefs, concerns, and possible misconceptions about perceived norms and environmental constraints.

Introduction

Colorectal cancer (CRC) is the second most common incident cancer in Hong Kong in both males and females.¹ In 2008, the age-standardised incidence rates of CRC in Hong

Kong (per 100 000 standard population) were 45.8 for males and 30.5 for females, which were comparable to those in the United States, Australia, and Japan, and higher than in Canada, United Kingdom and mainland China.¹

The faecal occult blood test (FOBT) is one of the most common means of CRC screening. It can diagnose CRC at a less advanced stage than when clinical symptoms manifest,^{2,3} and is currently the only form of screening shown to reduce CRC disease-specific mortality in population-based randomised trials.⁴⁻⁷

Many countries like the United States, Australia, United Kingdom, Canada, Japan, etc have promoted population screening for CRC with FOBT from the age of 50 years. Nevertheless, recent data revealed that less than half of age-eligible adults adhere to such national screening guidelines.⁸⁻¹³ Thus, uptake of FOBT screening varied depending on gender, age, and level of deprivation.^{14,15} Customised screening recommendations taking account of patient preferences,¹⁶ and improved communication with the health care providers could nevertheless improve CRC screening rates.¹⁷

In Hong Kong, a telephone survey conducted in 2002 revealed that people were deficient in knowledge about CRC and screening; and a majority surveyed were not willing to join a free screening programme.¹⁸ In the subsequent years however, there has been greater media coverage on CRC screening programmes, both local and worldwide. This might have influenced the public and changed the community's attitude and intentions on CRC screening. In this respect, a literature search identified no further studies in evaluating more current primary health care practice in our local population.

This pilot study was therefore conceived to gain further insight into the current situation and the various factors that influence patient decisions to undertake FOBT screening. It also reported on the uptake rate and outcomes of screening. The research team endeavoured to provide more information to fellow researchers in our locality and perhaps generate a balanced discourse among stakeholders on CRC screening in Hong Kong.

Methods

After obtaining approval from the Ethics Committee from our administrative body, the FOBT study was conducted in four designated health care clinics. Three of these served government servants, their dependents, and pensioners. The fourth was a training centre in Family Medicine, which served referred patients from other primary health care clinics. Randomly selected subjects aged 50 to 74 years who attended the four clinics during the study

香港四間基層醫療診所中病人對於大便隱血檢查的知識、態度和實踐

目的 評估基層醫療診所中病人對於大腸癌及其篩檢的認知、知識及態度，報告他們接受大便隱血檢查的比率和檢查結果，以及探討篩檢比率的預測因子。

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患者 2006年7月至2007年7月期間到以上診所應診的1664名病人，他們年齡介乎50至74歲。

主要結果測量 認為大腸癌屬於普遍病患以及早期大腸癌可治癒的病人比率、認為大便隱血檢查和大腸鏡檢查有效的病人比率、有關的知識分數、接受大便隱血檢查的比率、願意接受檢查的預測因子，及大便隱血檢查結果呈陽性的比率。

結果 共收回問卷1645份，其中89%被訪者認為大腸癌屬於普遍病患（95%置信區間：88-91%）；95%認為大便隱血檢查和大腸鏡檢查均為有效的篩選工具（95%置信區間：94-96%）；58%被訪者的知識分數達50%或以上（95%置信區間：56-61%）。接受大便隱血檢查的比率為35%。以下三項因素都與較高的接受率有關：陽性家族病史（比數比=1.57；95%置信區間：1.08-2.27；P=0.02）、認為大腸癌屬於普遍病患（比數比=1.86；95%置信區間：1.29-2.69；P=0.001）和認為早期大腸癌可治癒（比數比=1.76；95%置信區間：1.32-2.36；P=0.0001）。大便隱血檢查結果呈陽性的比率為2.1%（95%置信區間：0.9-3.3%）。被訪者中未發現有大腸癌病例。腫瘤檢出率（包括癌及腺瘤）為每1000名被篩檢的人中有5.1人。

結論 被訪者認為大腸癌屬於普遍病患，並認為大便隱血檢查或大腸鏡檢查均對篩檢有效。一般來說，接受篩檢的比率偏低。然而，有大腸癌陽性家族病史、認為大腸癌病發率偏高以及認為早期大腸癌可治癒的被訪者，他們接受篩檢的比率相對較高。大便隱血檢查結果呈陽性的比率為2.1%。腫瘤檢出率為每1000名被篩檢的人中有5.1人。

period and who consented to participate in the study were recruited. Exclusion criteria were: a known history of CRC, colonic polyps, or any concurrent bowel conditions with active bleeding.

To avoid a sudden upsurge in surgical referrals, the numbers recruited were capped to eight patients per working day (spanning the period July 2006 to July 2007). Thus, two patients were randomly selected from the booked appointments of that day at each study site, according to a random number table. Those who had appointment numbers corresponding to the random numbers of that day, and who fulfilled the inclusion criteria were invited to participate in the study. If the offer was refused, the next patient on the appointment schedule was asked, and so on, until the designated patient numbers for that clinic and that day were recruited.

When the randomly selected subjects presented at the reception counter of the clinic, each was given a questionnaire to complete and invited to undertake a FOBT. The questionnaire was self-administered and consisted of 11 questions collecting basic information on demographics, family history, awareness and knowledge about CRC, and attitude towards CRC screening. The knowledge score was calculated as the percentage of correct answers on six sub-questions about the clinical symptoms of CRC. After completing the questionnaire, subjects decided whether they would undergo a FOBT. Those who agreed returned the completed questionnaire to nurses, and made arrangements to attend a briefing session to explain the logistics of the stool sample collection. Each participant signed a consent form for the FOBT screening, received a set of three test slides (Coloscreen), and an information leaflet on dietary restriction requirements. After the stool samples were collected, participants returned the three test slides to clinic for further processing within 10 days. Patients with a positive FOBT in any of the three test slides were referred to a pre-arranged surgical unit for further investigations, primarily a colonoscopy,

and subsequent follow-up. Patients who declined the FOBT nevertheless completed the questionnaire and returned it to the nurses. The flow programme of the study is shown in the Figure.

Statistical analysis

The questionnaire data (listed in Table 1) were analysed using the SAS version 9. Frequencies were described as percentages. The Chi squared test was applied to compare nominal categorical variables. To adjust for confounding, multivariate logistic regression was performed; FOBT uptake was the dependent variable, whereas independent variables included age, family history, awareness of the increasing prevalence of CRC and the potential for cure, and a knowledge score on CRC symptoms. Stepwise selection was selected. A two-sided P value of less than 0.05 was considered statistically significant.

Results

After 1 year, 1664 subjects had been invited to

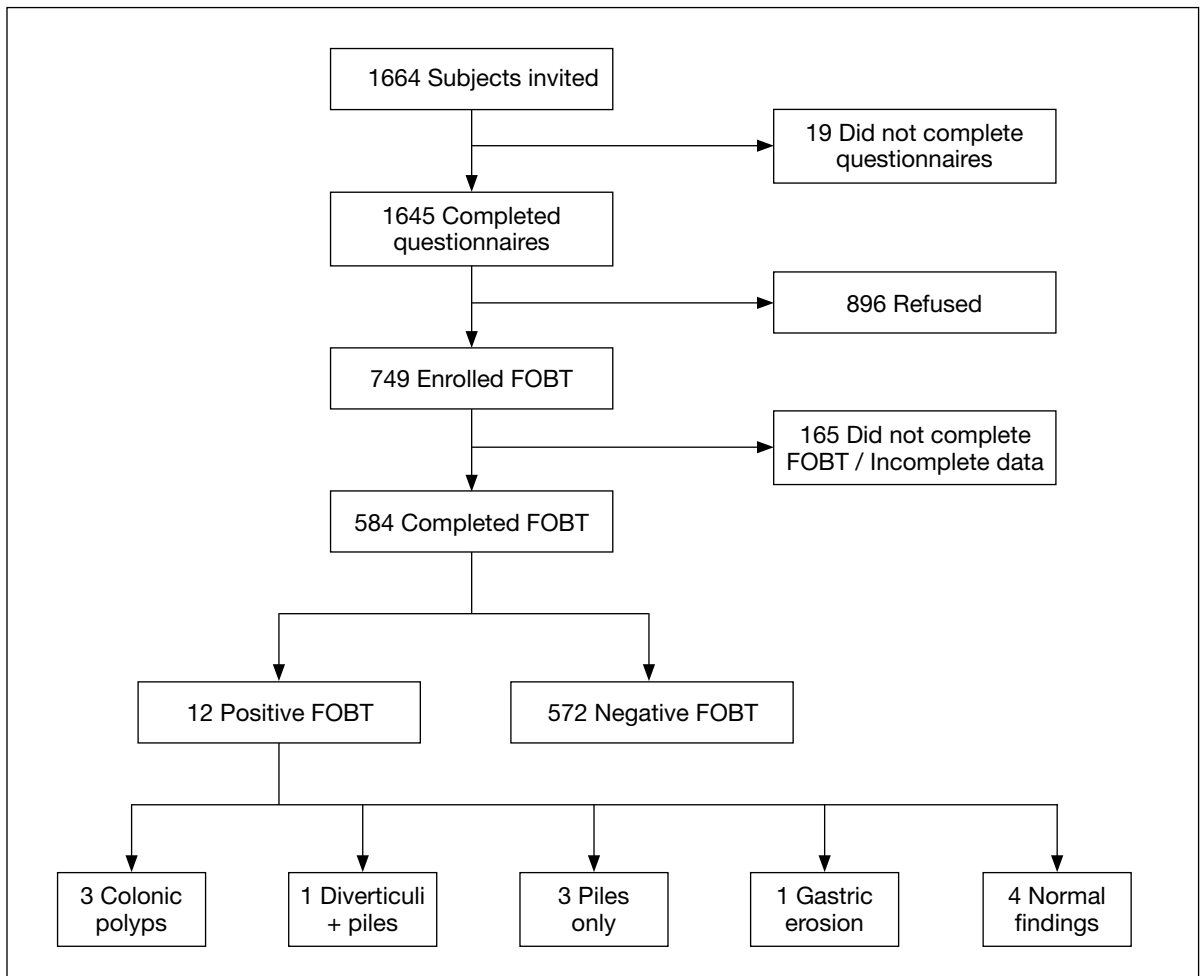


FIG. Flow programme of the study
FOBT denotes faecal occult blood test

participate in the study, 1645 (99%) of whom completed the questionnaires. After completing the questionnaire, 749 (45%) agreed to have FOBT screening, but not all of them had returned the three test slides. The FOBT uptake, defined as the proportion of those invited and returned all three FOBT test slides, was 35% (584/1664).

Questionnaire survey

The data from the questionnaire are summarised in Table 1. In all, 69% of the respondents were aged 50 to 60 years.

Regarding knowledge and awareness on CRC, 89% (95% confidence interval [CI], 88-91%) of the respondents were aware that CRC was a common cancer in Hong Kong, and 80% (95% CI, 78-82%) knew the disease was potentially curable in its early stage. As for knowledge on clinical symptoms, 58% (95% CI, 56-61%) of the respondents achieved a knowledge score of above 50%.

Regarding attitudes towards CRC screening, approximately 95% (95% CI, 94-96%) of the respondents recognised that the FOBT and colonoscopy were tools for screening CRC. Regarding a postulated free population screening programme using the FOBT or colonoscopy, 79% (95% CI, 77-79%) would consider the former, whilst 70% (95% CI, 68-72%) would prefer the latter.

To further analyse views on postulated free population screening using the FOBT or colonoscopy, multivariate logistic regression analysis was performed; dependent variables included keenness for FOBT or colonoscopy whilst the independent variables included: age, family history, awareness of the increasing prevalence of CRC and its potential curability, knowledge score, and perception that FOBT or colonoscopy was useful for CRC screening. Subjects who were keen for FOBT screening were significantly younger (age <55 years, with an odds ratio [OR] of 1.49 and 95% CI, 1.13-1.96; P=0.005), more likely to have positive family history (OR=2.20; 95% CI, 1.28-3.77; P=0.004). They were also more aware of the high prevalence (OR=2.70; 95% CI, 1.89-3.87; P<0.0001) and potential for cure of CRC (OR=1.80; 95% CI, 1.33-2.42; P=0.0001). Those who thought that FOBT screening was useful for CRC screening were more keen to participate in such screening (OR=1.81; 95% CI, 1.11-2.95; P=0.02). Similarly, subjects who were interested in colonoscopy screening were more aware of the increasing incidence (OR=2.19; 95% CI, 1.55-3.08; P<0.0001), and potential for cure of CRC (OR=1.61; 95% CI, 1.23-2.12; P=0.0006); and those who thought that colonoscopy was useful for CRC screening were more likely to participate in colonoscopy screening programmes (OR=3.55; 95% CI, 2.17-5.80; P<0.0001). Knowledge scores on

TABLE 1. Descriptive statistics from the questionnaire data (n=1645)

Characteristic*	No. (%)†
Centre	
1	502 (31)
2	457 (28)
3	341 (21)
4	345 (21)
Total	1645
Gender	
Male	866 (53)
Female	778 (47)
Total	1644
Age (years)	
50-55	602 (37)
56-60	520 (32)
61-65	252 (15)
66-70	196 (12)
≥71	72 (4)
Total	1642
Family history of CRC in first-degree relatives	
Yes	165 (10)
No	1464 (90)
Total	1629
Agreed to participate in FOBT‡	
Yes	893 (54)
No	752 (46)
Total	1645
CRC is the second commonest cancer in Hong Kong	
Agreed	1432 (89)
Disagreed	173 (11)
Total	1605
CRC is potentially curable if detected in early stage	
Agreed	1293 (80)
Disagreed	319 (20)
Total	1612
Knowledge score on clinical symptoms of CRC§	
0	30 (2)
1	86 (5)
2	163 (10)
3	403 (25)
4	488 (30)
5	260 (16)
6	200 (12)
Total	1630
FOBT is useful for CRC screening	
Agreed	1509 (94)
Disagreed	88 (6)
Total	1597
Colonoscopy is useful for CRC screening	
Agreed	1536 (95)
Disagreed	75 (5)
Total	1611
Keen for FOBT screening, if there is such a programme free of charge in our community	
Agreed	1290 (79)
Disagreed	335 (21)
Total	1625
Keen for colonoscopy screening, if there is such a programme free of charge in our community	
Agreed	1118 (70)
Disagreed	485 (30)
Total	1603

* CRC denotes colorectal cancer, and FOBT faecal occult blood test

† Data were missing for some patients

‡ Of the 893 subjects who were agreeable to FOBT screening in the completed questionnaire, only 749 finally turned up for screening

§ The assessment consists of 6 true or false questions, with each response accounting for 1/6 of the total score

symptoms were not associated with willingness to participate in either FOBT or colonoscopy screening.

Faecal occult blood test results

Overall, the FOBT uptake was 35%. Among the 584 participants who returned all the three test slides within the specified time limit, 12 had positive test results yielding a rate of 2.1%.

Logistic regression analyses showed that positive predictors of FOBT screening included: a family history of CRC (OR=1.57; 95% CI, 1.08-2.27; P=0.02), more awareness that CRC is a common cancer in Hong Kong (OR=1.86; 95% CI, 1.29-2.69; P=0.001), and that it is potentially curable if detected early (OR=1.76; 95% CI, 1.32-2.36; P=0.0001) [Table 2]. The area under receiver operating characteristic (ROC) curve was 0.58. On the other hand, a high knowledge score on CRC symptoms was not associated with increased uptake of screening (P=0.24).

All of the subjects with a positive FOBT result were seen by a surgeon, 10 by the same surgeon in a

pre-arranged surgical unit; due to technical issues, the other two were seen by other surgeons. They had 100% compliance to subsequent suggested management. After clinical evaluation, nine colonoscopies, two barium enemas, one rigid sigmoidoscopy, and one upper endoscopy were performed. The findings from these investigations are listed in Table 3. In summary, no CRC was diagnosed, whilst three patients were found to have colonic polyps. This corresponded to a neoplasia detection rate (for cancers and adenomas) of 5.1 per 1000 subjects screened, of which one subject (1.7 per 1000 persons screened) carried a significant malignant potential. Thus, the positive predictive value of a positive FOBT result for any adenoma was 25.0%. There were no complications from these investigation procedures.

Discussion

In Hong Kong, CRC is a common cancer. In the past few years, both the number of new cases and deaths from CRC have escalated and since 2002 that has overtaken liver cancer as the second most common incident cancer in Hong Kong.¹

The effectiveness of FOBT screening has been supported by randomised controlled trials,⁴⁻⁷ and both flexible sigmoidoscopy and colonoscopy screenings are supported by case-control and cohort studies.¹⁹⁻²²

However, to implement screening for CRC at a population level is a much more complicated and delicate issue, requiring consideration of various factors such as costs, performance of the screening tool in a given population, public knowledge and acceptance of screening, and the infrastructure to support the programme over many years.

In 2010, the Cancer Expert Working Group (CEWG) updated the “Recommendations on Colorectal Cancer Screening” and published their evidence-based deliberations in September 2010.²³ The CEWG concluded that there was insufficient evidence to support implementation of a territory-wide local screening programme for CRC in Hong Kong. It recommended that individuals aged 50 to 75 years may consider screening for CRC, either by annual or biennial FOBTs; or flexible sigmoidoscopy every 5 years; or colonoscopy every 10 years. This recommendation differs from implanting a universal screening programme, as it favoured enabling individual an informed choice. Health care providers were advised to discuss the best screening test with their patients, according to their individual risk profile, potential risks and benefits from receiving a screening test, and the implications of false-positive and false-negative results.

Over the 1-year period of this study, 1664 subjects were invited to participate in the study, and

TABLE 2. Logistic regression analysis on factors predicting uptake of faecal occult blood test

Variable	Odds ratio	95% Confidence interval	P value
Aware that CRC* is common	1.86	1.29-2.69	0.001
Think that CRC is curable at early stage	1.76	1.32-2.36	0.0001
Positive family history of CRC	1.57	1.08-2.27	0.02

* CRC denotes colorectal cancer

TABLE 3. Investigation outcomes of subjects with positive faecal occult blood test

Patient No.	Investigation(s) done	Result(s)
1	Barium enema Upper endoscopy	Normal Gastric erosion
2	Colonoscopy	Hyperplastic polyp
3	Colonoscopy	Piles
4	Colonoscopy	Colonic polyp: tubulovillous adenoma with severe dysplasia Rectal polyp: sessile serrated adenoma
5	Colonoscopy	Diverticuli and piles
6	Proctoscopy only	Piles
7	Colonoscopy	Normal
8	Colonoscopy	Normal
9	Colonoscopy	Normal
10	Colonoscopy	Sigmoid polyp: tubular adenoma
11	Colonoscopy	Normal
12	Rigid sigmoidoscopy Barium enema	Piles Normal

TABLE 4. Number of Chinese newspaper reports related to colorectal cancer by years²⁴

Year	No.
1998-2000	169
2001-2003	248
2004-2006	577
2007-2009	1099

1645 (99%) completed the questionnaires. There were 11 multiple-choice questions that were short and easy to understand. Before the study, a simplified test-retest reliability test was performed on a sample of 13 clinic staff (doctors, nurses, clerks, and workmen) within a 2-week interval. The concordance rate between the first and second questionnaire was 93%.

Our questionnaire survey showed that most (89%) of the respondents were aware that CRC was a common cancer in Hong Kong, and many (80%) knew that the disease was potentially curable if detected at an early stage. Regarding attitudes towards CRC screening, 95% of the respondents agreed that the FOBT and colonoscopy were useful for screening; 70 to 79% of them were willing to participate in a free CRC screening programme.

Notably, there was some discrepancy between our results and those from a telephone survey conducted in 2002.¹⁸ At that time, Hong Kong residents were generally less aware of CRC and screening; about 9% of those surveyed were able to recognise its importance in the community and that less than 30% showed a definite interest in joining a free screening programme.¹⁸ With the passage of 6 years and the dissimilar designs and objectives of the two studies, it may not be meaningful to compare their findings. Moreover, the subjects sampled in this study were attending primary care clinics for various reasons, being persons in the workforce or their family members or government pensioners who aged 50 to 74 years, whereas those recruited for the 2002 telephone interview study were from the general population aged 18 to 80 years. However, it is also possible that in the intervening few years, our population could have become more health conscious. More intensive health information was communicated to them, and newspaper reports about colon cancer have increased substantially (Table 4²⁴). Thus, to some degree, the improvement in awareness about CRC and willingness to participate in screening might reflect a genuine increase of knowledge and concern about health over the years. The results of this study might therefore be considered as confirming a previous suggestion that local health care providers were performing an important service in terms of promoting screening interventions.¹⁸

As for the predictors of FOBT screening uptake, our logistic regression analysis demonstrated that a positive family history of CRC and higher awareness of the high incidence of potentially curable disease were associated with increased uptake of screening. However, knowledge about clinical symptoms per se did not affect the uptake of screening. Another study has also shown that being a close relative of a CRC patient was positively related with willingness to undergo CRC screening,²⁵ and that clinical knowledge alone was an inadequate stimulus for adherence to screening.²⁶ However, the area under ROC curve was 0.58 only, which indicated merely fair predictive power with the three identified predictors combined. As suggested by other studies, other possible covariates which might have been considered in the analysis included: gender, level of education, and insurance cover.^{27,28} Moreover, the phenomenon of social marketing might have a role to play in the complex determination of health screening behaviour.

Role of social marketing

What the subjects in this study knew and believed about a disease did not fully translate into their eventual decision in taking up the screening intervention being offered. The relatively low rate of participation and completion of FOBT screening (35%) was disproportionate to the awareness and knowledge demonstrated in the completed questionnaires. This rate of uptake was much lower than that quoted concerning cervical cancer screening, where the rate was 53%.¹⁸ Similar to our findings, other studies had also showed that CRC screening rates can fall short of recommended levels. Thus, a US study between 1998 and 2004 reported that only 25% of Medicare beneficiaries were screened, and that in 2005, half of those aged 50 years or older had never had a screening colonoscopy,¹¹ which may have obvious implications for population-based CRC screening programmes.

Health screening is a form of illness-detecting behaviour. According to various behaviour prediction theories, identifying the determinants of any health-seeking behaviour is a key step in the development of successful interventions to change such behaviour.²⁹ Fishbein's integrative model³⁰ recognised that personal beliefs, attitudes, perceived norms, and self-efficacy are all functions of one's intention to implement a certain health behaviour. Therefore, effective tailor-made health advice is best individualised by respecting patient beliefs and concerns, and addressing possible misconceptions about perceived norms and environmental constraints to their decisions.

The overall positivity rate was 2.1%, which was comparable to the 1.9% reported in the UK pilot

study published in 2004,³¹ and the 1.8% encountered in the second round of data published in 2007.¹⁴ All the 12 subjects with positive test results were assessed by a surgeon, and primary colonoscopy was offered. For subjects 1, 6, and 12 who did not undergo colonoscopy, or had an upper endoscopy in addition, the involved factors included: the physical condition of the subject, history of recent colonoscopy, personal risk profile for upper and lower gastrointestinal malignancy, and patient concerns. After investigations, all the subjects were followed up by the surgeon. The subject compliance rate with the recommendations was 100%. In the UK pilot study, the compliance rate with colonoscopy was about 82%.³¹ Understandably, population acceptance is an important element in health policy implementation.

Overall, no cancers were detected. One subject was found to have a tubulovillous adenoma with severe dysplasia, which carries a high malignancy potential. It was not the primary objective of this study to assess the efficacy of FOBT in detecting CRC for our population. With the small sample size and short duration of the study, it was not adequately powered to determine whether the FOBT would be a good screening tool for primary health care practitioners. More long-term data are required to provide answers with higher certainty.

The major limitation of our study was that the results cannot be generalised to the whole population. Three of the four participating clinics were dedicated clinics for specified patient groups (government employees, their families, and pensioners). The possible higher educational level and social status of our sampled subjects might well give more favourable responses to CRC screening issues. Secondly, though patients were generally very keen to accept the invitation to participate in the study, a small number refused for particular reasons; in which case the offer was extended to the next one on the list. Among the 1664 subjects recruited however, there were no specific records of the number of eligible

subjects and the number of refusals. Analysis of characteristics of the selected subjects who refused to participate and the replacement subjects would have helped to evaluate the presence of self-selection bias. To our knowledge, this study was the first of its type in Hong Kong to be performed in a community setting, where subjects were invited to participate in FOBT screening, free of charge; and if positive, the FOBT was to be followed by free colonoscopy and subsequent care by dedicated surgeons. It is hoped that this study may contribute to the future planning of other larger-scale population-based studies.

Conclusions

The sampled subjects in this study were highly aware of the importance and potential curability of CRC; they acknowledged that FOBT or colonoscopy is useful for screening. The actual participation rate in FOBT screening was disproportionately low. Uptake of screening was higher if there was a positive family history and greater awareness of the disease. The overall test positivity rate was 2.1% for neoplasia detection (5.1 per 1000 persons screened); one subject had a colonic polyp with malignant potential (1.7 per 1000 persons screened). The positive predictive value of a positive FOBT result for any adenoma was 25%.

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Disclaimer

This was a clinical study conducted in publicly funded clinics. The clinical findings and discussion only reflect the opinion of the involved clinicians. They are not indicative of the government's opinion.

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