Screening for colorectal cancer: sense and sensibilities

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Abstract

Purpose: In this paper we investigate the reasons for non-participation in a trial programme for colorectal cancer (CRC) screening in Flanders. Besides, the feasibility and possibilities of a full-blown screening programme in Flanders are examined, given the context of a low participation rate in breast cancer screening.
Methods: A trial programme for CRC screening was set up for all average-risk persons aged 50 to 74 years in three Flemish regions to obtain information about potential participation rates, and to compare two invitation strategies. Faecal samples were analysed for precursors of CRC using an immunochemical faecal occult blood test (iFOBT). A questionnaire was administered to participants and non-participants of the trial programme to find out whether and to what extent the taking of a sample of one's own stool is a taboo. This could be of great importance concerning the participation rate.
Results: In total, 19,542 persons were invited to participate in the trial programme for CRC screening, of whom 18,541 were found to be eligible. The overall participation rate was 44.3%. The three regions varied in participation rates: with 60.9% in the most rural region to 34.3% in the most urban region. Of 2,000 questionnaires sent to participants, 1,385 were returned (69.3%). The response in the non-participants was 43.2% (691 questionnaires of 1,600 returned).
Conclusions: A population-based screening programme for colorectal cancer by means of an iFOBT proves to be feasible, since adequate participation rates were obtained and because of the absence of a 'stool taboo' in Flanders.

Introduction

Colorectal cancer (CRC), also called colon cancer or large bowel cancer, is one of the most common malignant tumours in the Western world.

Due to its high incidence and mortality, the slow progression from adenoma to carcinoma, the high patient survival in case of early detection and removing of the cancer-containing polyp by colonoscopy or surgery, CRC seems to be an ideal candidate for screening. Screening for colorectal cancer by FOBT can reduce mortality from the disease by about 15% [1].

Screening programmes for CRC are being developed and implemented throughout the Western World [2–6]. The European Code Against Cancer recommends a population-based approach for CRC screening [7]. In other words, it makes sense to screen for CRC. On the other hand, taking a sample of one's own stool is not really evident. When taking a stool sample is perceived as the ultimate taboo, only a low participation rate can be expected. It is clear that there can be a big gap between the sense of colorectal cancer screening on the one hand and the sensibilities on the other. People do not always act 'reasonably'. To map the possible sensibilities in the target group which go together with a colorectal cancer screening test, the case of the Flemish trial programme will be described.

As 5,207 cases of CRC were reported in Flanders in 2008, the incidence in Flanders is highly comparable with that in the Western and Northern European countries [8].

In Flanders, 1,717 people died of the disease in 2008 [9]. CRC is the second most common form of cancer among women (13.4% of new cancer cases), after breast cancer (35.3%). Among men it is the third most common cancer (13.8%), after prostate (27.0%) and lung cancer (16.6%) [8].

Recently, the Flemish Government called for a trial programme on CRC screening to explore whether a programme of early detection of CRC in people aged 50 to 74 years would be feasible in Flanders and how useful it would be. At this moment, the only cancer screening programme in Flanders is the breast cancer screening programme, which was implemented

in 2001. The participation rate of the Flemish breast cancer screening programme is 48%, which is low compared to neighbouring countries [10,11]. This low participation rate makes it an excellent case for assessing the sensibilities related to CRC screening: Flemish people are not very willing when it comes to participation in cancer screening programmes.

However, in screening programmes in general, the participation rate, together with a high-performance test, is of primary importance since it determines to a large extent the efficiency of the programme [7]. Only with an adequately high participation rate in a screening programme can the cause-specific mortality due to CRC be properly reduced on a population level. Given the relatively low participation rate for breast cancer screening in Flanders, it was unclear whether people belonging to the target group would participate in the trial programme on CRC screening. First of all, Flanders only had experience with women participating in cancer screening programmes. Secondly, nobody knew how Flemish men and women would react to taking a sample of their own stool.

The primary objective of the Flemish trial programme on CRC screening was to obtain information about potential participation rates for such a programme in Flanders. The secondary objective was to find out how taking a sample of one's own stool is considered: as a tricky business, an annoying activity or as a simple test, and which factors influence the (un)acceptability of the test. When taking a stool sample is seen as a taboo, this might heavily mortgage the participation rate.

Methods

Study population

Between February and December 2009, all inhabitants aged 50 to 74 years (n = 19,542) from three selected regions in Flanders, the northern, Dutch-speaking part of Belgium, were invited to take part in the trial programme. These three regions were: Borgerhout, selected as an urban region; Schilde, selected as a residential region, and Vosselaar, selected as a rural region.

The study focussed on persons with an average risk for CRC, aged 50 to 74 years. Exclusion criteria were: having symptoms like blood in the faeces; persistent bowel obstruction or diarrhoea; having had a colonoscopy in the past ten years; having or having had CRC, colitis ulcerosa or Crohn's disease. In either case, persons were advised then to contact their general practitioner (GP) instead of participating in the trial programme.

Invitation procedure

The trial programme was set up with two invitation strategies. Either a direct invitation with a letter and faeces sampling set were sent by surface mail (mail group) or an invitation with a letter to visit the general practitioner (GP) without a faeces sampling set was sent by surface mail (GP group). The latter group was then later provided with the sampling set by the GP.

From the municipal databases, random samples were taken according to street address, to ensure relative blinding to the invitation strategy, and randomised to mail or GP group. Next, persons were systematically invited to participate in screening.

All invitations included a letter, an information leaflet and a reply form. The invitation for the mail group also included a faeces sampling set, whereas the invitation for the GP group did not include a faeces sampling set. The latter, however, did include instructions to consult the GP for more information and to collect the faeces sampling set at the GP's practice.

The information leaflet covered a wide range of topics, including the nature and purpose of the study, CRC incidence and mortality, the target population, the benefits of screening, the faeces sampling procedure, false positive and negative results, follow-up colonoscopy and organisational and logistic information. The faeces sampling set was accompanied by a manual and a collection paper to facilitate the sampling procedure.

Faeces sampling sets were distributed to all GPs in the three regions and in the neighbouring regions. GPs were also provided with background information, a flow chart of the screening programme and the GPs' role, the Flemish Guidelines for GPs regarding CRC screening, a concise slide show that the GPs can use to inform their patients on screening criteria, the use of the faeces sampling set and follow-up colonoscopy.

During the trial programme a free telephone helpline, e-mail address and website were established to provide advice, support and further information [12]. Information leaflets in twelve different languages were accessible through the website [12].

A reminder letter with cross-over invitation design was sent after six weeks. Accordingly, persons who initially received an invitation from the mail group and not responded within six weeks, were sent an invitation from the GP group, and vice versa.

Procedure of participation

Participants were asked to obtain one faecal sample with the sampling set. No specific dietary or medication restriction was stipulated. Reply forms and faecal samples had to be returned to the laboratory by means of a self-addressed envelope. Next, the sample was analysed for precursors of CRC, i.e. polyps or colorectal cancer, using an immunochemical faecal occult blood test (iFOBT).

iFOBT and follow-up colonoscopy

IFOBT samples were processed using an automated reading technique (OC-sensor Diana, Eiken Chemical Co., Ltd., Tokyo, Japan) allowing quantitative measurement of the haemoglobin content (in ng/ml) in stools [13]. The cut-off value for a positive test was set at 75 ng/ml of haemoglobin. The use of an automated iFOBT is recommended by several experts because of its efficient use for mass-screening and its good sensitivity and specificity for detection of malignant neoplasias [14–19]. Further, the iFOBT was reported to have a lower level of overall burden, e.g. no dietary restriction and a single sample requirement, which translates into higher participation rates [20,21].

Both the participant and the participant's GP (for mail and GP group, as participants from both groups were asked to provide the name of their GP on the reply form) received the results within ten (working) days by surface mail. Follow-up examination was recommended when the iFOBT was positive, i.e. an iFOBT-value $\geqslant$75 ng/ml, by means of colonoscopy. In case of a positive iFOBT, the GP was informed two days earlier than the participant to guarantee that GPs were informed in advance. Accordingly, the GP referred the participant for follow-up colonoscopy.

The faeces sampling set and the testing in the laboratory were free of charge, the costs for the follow-up colonoscopy were charged to the participant.

The pathway of the Flemish trial for CRC screening is summarised in Fig. 1.

Ethical approval

Ethical approval for the implementation of the Flemish trial was given by the Ethics Committee of the University Hospital of Antwerp (registration number B30020095696). All participants gave written informed consent for participating in the trial using the iFOBT.

The proceeding of the study was guided by the Working Group Colorectal Cancer Screening from the Flemish Government.

Data collection and analysis

The participation rate of the trial programme can give a good indication of the willingness of the target group to take a stool sample of themselves. The overall participation rate was assessed as the total number of persons obtaining a sample and completing the reply form relative to the number of persons being invited and eligible for screening. The analysis was limited to all participant records with informed consent.

However, the participation rate does not reveal the experience of the participants. Moreover, it is of utmost importance to also get some idea why people from the target group do not participate. Therefore, a process evaluation was performed to gather information on these topics. A questionnaire by surface mail was administered to participants and non-participants.

From all participants to the trial programme, a random selection of 2,000 people was made (1,000 mail group and 1,000 GP group). In addition to socio-demographic variables, questions were asked concerning the appreciation of the invitation method, the materials used (invitation letter, leaflet, folder, website) and the test (iFOBT). A random sample of 1,600 non-participants also received a questionnaire which, amongst others, asked for the reasons why they did not take part in the trial programme. The non-participants were offered a list of 23 statements on possible reasons not to take part in the trial programme. It was possible to indicate more than one reason. The questionnaires were analysed by means of SPSS and SAS. Chi-square is used to report possible differences between groups, where $P < 0.05$ is considered as statistically significant.

Results

Out of the 18,541 eligible persons, 8,219 obtained a faecal sample and returned this to the laboratory, resulting in an overall participation rate of 44.3%.

Of the 2,000 questionnaires sent to randomly selected participants, 1,385 were returned, which means a total response of 69.3% (71.5% in the GP group and 67.0% in the mail group). Of the 1,600 questionnaires sent to non-participants, 691 were returned (response rate 43.2%).

The distribution of the respondents according to region, educational level and family composition is presented for the GP and mail groups in Tables 1–3.

An important topic concerned the feasibility of obtaining the stool sample and the attitude towards it. Therefore, we asked the respondents from the GP

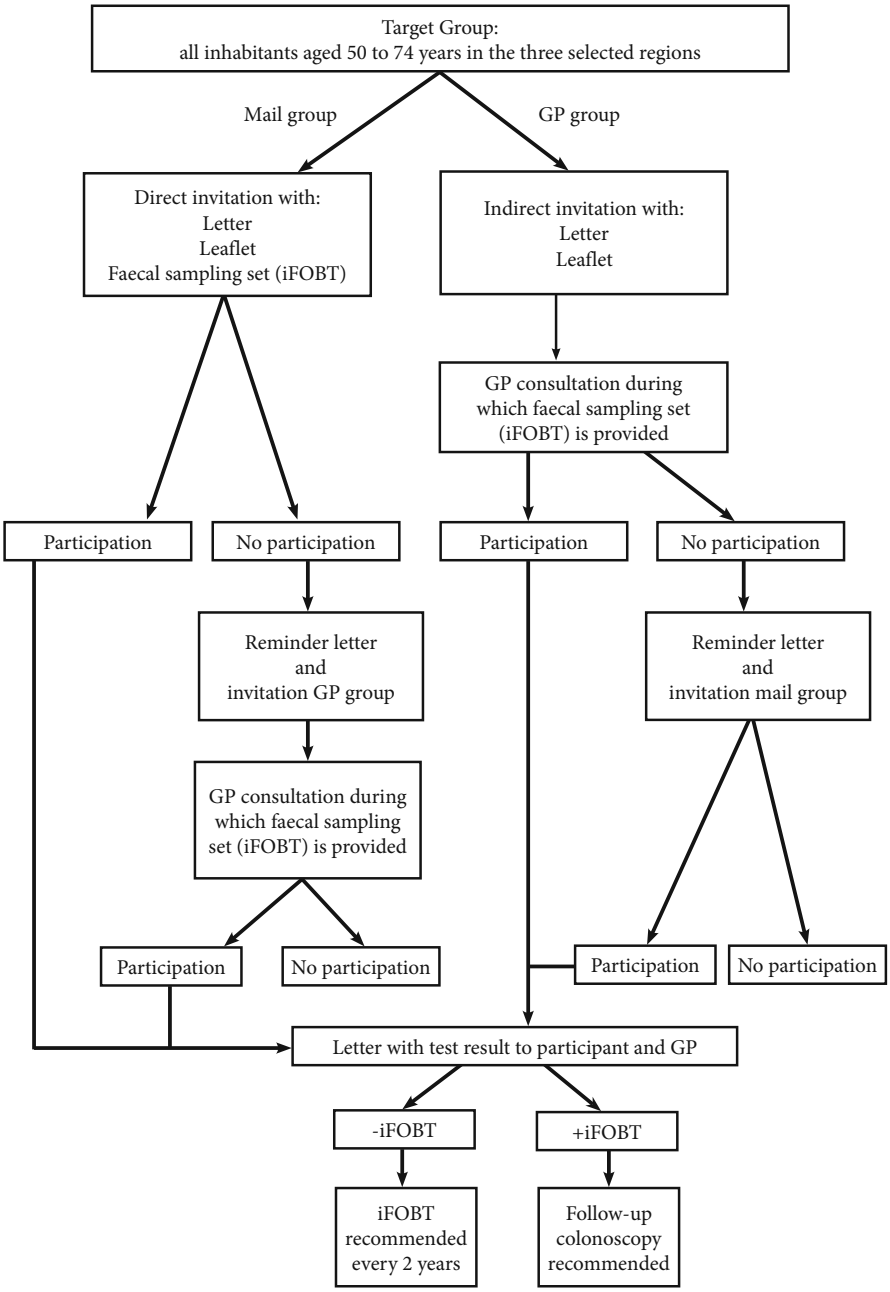

Fig. 1. Pathway of Flemish trial for CRC Screening by means of an iFOBT using two invitation strategies. Participation means "obtaining one faecal sample, completing the reply form and return all in a self-addressed envelope to the laboratory". iFOBT = immunochemical faecal occult blood test. GP = General practitioner.

and mail group the following question: 'Did you find it easy to obtain a stool sample?' Over 90% of both the GP and the mail group answered 'yes' to this question (Table 4). Between participants belonging to the GP group on the one hand and the mail group on the other, there is a big difference in receiving practical information on how to obtain a stool sample. The only guidance for the mail group was the information leaflet which accompanied the test kit. Almost all respondents from the mail group found that this information leaflet was convincing straight away to take part in the trial and obtain a stool sample (629/670 = 93.9%) and 636 (94.9%) felt happy to have received the iFOBT test kit by surface mail. Only 54 of them wished to receive more information from their GP on how to obtain the stool sample (54/670 = 8.1%).

Table 1
Respondents to the questionnaire by region

Respondents	Vosselaar	Schilde	Borgerhout	Total
GP group	206 (57.9%)	303 (52.6%)	198 (45.1%)	715 (52.2%)
Mail group	150 (42.1%)	273 (47.4%)	241 (54.9%)	670 (48.9%)
Total	356 (100%)	576 (100%)	439 (100%)	1,371 (100%)[a]

Chi-square:13.248, df = 2, $P < 0.01$
[a] Region unknown for 14 respondents.

Table 2
Respondents according to GP group or mail group vs. educational level

Educational level	GP group	Mail group	Total
No diploma	51 (7.2%)	53 (8.1%)	104 (7.6%)
Primary school	65 (9.1%)	58 (8.8%)	123 (9.0%)
High school (lower)	139 (19.5%)	129 (19.7%)	268 (19.6%)
High school (higher)	189 (26.6%)	186 (28.3%)	375 (27.4%)
College	187 (26.3%)	160 (24.4%)	347 (25.4%)
University	80 (11.2%)	70 (10.7%)	150 (11.0%)
Total	711 (100%)	656 (100%)	1,367 (100%)[a]

Chi-square = 1.391; df = 5; $P = 0.925$
[a] Educational level unknown for 18 respondents.

Table 3
Respondents according to GP group or mail group vs. family composition

Family composition	GP group	Mail group	Total
Living alone	95 (13.3%)	113 (17.0%)	208 (15.1%)
Single parent with children living at home	12 (1.7%)	17 (2.6%)	29 (2.1%)
Living together with partners/married	478 (67.1%)	432 (65.1%)	910 (66.1%)
Living together with partner/married with children living at home	127 (17.8%)	102 (15.4%)	229 (16.6%)
Total	712 (100%)	664 (100%)	1,376 (100%)[a]

Chi-square = 5.807; df = 3; $P = 0.121$
[a] Family composition unknown for 9 respondents.

Table 4
Respondents according to GP group or mail group vs. feasibility of obtaining stool sample

Easy to obtain a stool sample	GP group	Mail group	Total
'Yes'	655 (91.6%)	619 (92.4%)	1,274 (92.0%)
'No'	32 (4.5%)	19 (2.8%)	51 (3.7%)
Missing	28 (3.9%)	32 (4.8%)	60 (4.3%)
Total	715 (100%)	670 (100%)	1,385 (100%)

Chi-square = 3.139; df = 2; $P = 0.208$

The respondents from the GP group were satisfied as well with the information they received. More than 80% stated that the GP gave a clear explanation on how to use the test kit (588/715 = 82.2%).

To find out whether a stool taboo could be the reason for non-participants not to take part in the trial programme, we looked at the reasons they indicated for their non-participation.

A substantial part of the non-participants mentioned they had obtained a stool sample or had a colonoscopy performed in the recent past (n = 241, 34.9%). Another 63 were not eligible for screening

because of having colorectal cancer, Crohn's disease, colitis ulcerosa or other medical problems (9.1%). The remaining non-participants gave as most important reason for not taking part that they feel healthy and do not have any complaints (170/691 = 24.6%) or that no one in their neighbourhood has cancer (60/691 = 8.7%) or that they prefer a private examination with a physician (56/691 = 8.1%). There were 32 non-participants (4.6%) who do not participate because they find it annoying to obtain a stool sample, and nine (1.3%) say obtaining a stool sample is not practical. Seventeen non-participants (2.5%) say they are afraid of the result.

Discussion

Recently, the European guidelines for quality assurance in colorectal cancer screening and diagnosis were published [4]. The European Commission recommends the EU member states to organise population based screening programmes for colorectal cancer, breast cancer and cervical cancer. Experts agree on the usefulness of a qualitative high standard screening programme for colorectal cancer with a faecal occult blood test.

The prognosis of colorectal cancer is mainly dependent on the stage of the tumour. In the adenoma phase, removal of the adenoma can even prevent the occurrence of CRC [22]. But according to data from the Surveillance, Epidemiology, and End Results (SEER) programme, also in the early stages of CRC, the five-year survival is much better than when the CRC is detected in a late stage, ranging from over 90% to less than 10%, respectively [23]. Without mass screening, CRC is usually detected in a symptomatic stage, with an average 5-year survival of 50–60% [24]. Recently, a review revealed that CRC screening with FOBT can reduce the cause-specific mortality of CRC with 16% compared to no screening [25]. Moreover, CRC screening reduces mortality at favourable costs compared to breast and cervical cancer screening [26–28]. CRC meets all major criteria for implementing a screening programme. These criteria were put forward by Wilson and Jungner in 1968 [29] but are still valid, albeit in an extended and further elaborated way [30].

However, stool is a tricky topic and one can wonder whether people belonging to the target group are eager or even willing to take a sample of their own stool. With the guajac faecal occult blood test (gFOBT), three samples have to be taken, the process of obtaining the stool sample is rather unpractical and there are diet restrictions. This can hamper participation. In our study, we used an immunochemical faecal occult blood test (iFOBT) only requiring one sample in a much more simpler way and without the barrier of diet restrictions. A randomised controlled trial by van Rossum and colleagues (2008) found that the participation rate is much higher when using an iFOBT (59.6%) compared to a gFOBT (46.9%) [21].

The participation rate for the population-based trial screening programme for CRC in Flanders was 44.3% on average for both invitation strategies. This is a very acceptable participation rate according to Flemish standards. The first screening round of the Flemish breast cancer screening programme reached a participation rate of 33% [10]. Moreover, more specifically concerning the colorectal cancer screening, it remained to be seen whether the target population was willing to take a sample of their own stool. Also, taking into account that the European guidelines set a participation rate of at least 45% as minimum and advise a desirable participation rate of at least 65%, the rates of the first Flemish trial programme were very promising [4].

The response rate concerning the postal questionnaire in participants of the trial programme was very high: seven out of ten returned a filled out questionnaire, which adds to the validity of the study.

We can see that in the urban region (Borgerhout) relatively less respondents from the GP group returned the questionnaire compared to the residential region (Schilde) and even more compared to the rural region (Vosselaar). This might be explained by the fact that in a rural region, people have a closer relationship with their GP than in an urban region. Especially because in Belgium/Flanders there is no compulsory inscription with a GP. One might suppose that medical shopping is more widespread in an urban region. In Vosselaar, participants of the GP group are maybe more convinced of the importance of colorectal cancer screening because their GP underlined this. This also stresses the importance of the GP in achieving a high participation rate for cancer screening programmes.

Concerning the family composition and the educational level, no statistically significant differences could be observed between the GP group and the mail group.

Taking a stool sample using the iFOBT did not seem to generate practical problems: almost all respondents answered that it was easy to obtain a stool sample. Given the high response rate to the questionnaire, we are rather confident that the iFOBT is a user friendly stool sampling device.

Since we had the opportunity to compare two invitation methods in our trial programme, we could also look at the need for participants to have professional guidance in explaining how to use the iFOBT. The mail group could mainly fall back on the information leaflet to get practical guidance on how to use the iFOBT. However, it seemed as if this was sufficient information to obtain a proper sample of the stool. Less than 10% wished to receive more information from their GP on how to obtain the stool sample and almost all felt happy to have received their test kit by means of surface mail. The laboratory data showed that only 0.96% of the samples they received needed a technical recall. This underlines the overall quality of the stool samples of both GP and mail group.

Of course, it is also very important to know which reasons non-participants to the trial programme have for their non-attendance. When they largely experience taking a sample of their own stool as 'not done', nasty or annoying, the opportunities to reach a high participation rate will be limited. After all, in our trial programme, the non-participants are the majority of the target group. It sounds rather astonishing that the most important reason not to take part in the trial programme is that the non-participants feel healthy and do not have any complaints. Despite all efforts already done to inform people that preventive medicine is intended for those without complaints to find the disease in an early stage, the argument of feeling healthy is still showing up. To change this attitude, an important role can be played by the GP. But at least, it makes clear that most of the non-participation is not due to a 'stool taboo'. Only a very small minority gives as a reason for their non-participation that taking a stool sample is annoying or unpractical.

Conclusion

The sense of colorectal cancer screening is clear and evidence based. That is also the reason why the European Commission recommends a population based screening programme for colorectal cancer to all its member states.

The sensibility linked to taking a sample of one's stool was not clear at all before we started a trial programme for colorectal cancer in Flanders. The results of our survey now indicate that there seems not to be something like a 'stool taboo' in Flanders. This shows great promise when Flanders will decide to roll-out the trial programme to its whole territory.

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Conflict of interest statement

The authors have no conflict of interest to declare.

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