

THE EFFECT OF EDUCATIONAL INTERVENTION ON THE PATIENT'S WILLINGNESS TO CARRY OUT THE IMMUNOCHEMICAL FAECAL OCCULT BLOOD TEST FOR COLORECTAL CANCER

VPLIV IZOBRAŽEVALNEGA UKREPA NA PACIENTOVO PRIPRAVLJENOST ZA IZVEDBO IMUNOKEMIČNEGA TESTA ZA DOLOČANJE OKULTNE KRVI V BLATU ZA RAKA DEBELEGA ČREVEESA IN DANKE

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Received/Prispelo: Oct 6, 2014
Accepted/Sprejeto: Apr 1, 2015

Original scientific article/Izvirni znanstveni članek

ABSTRACT

Keywords:

screening, colorectal cancer, immunochemical faecal occult blood test, general practitioner

Background. There is now compelling evidence that screening for colorectal cancer may result in significantly reduced mortality. Screening tests for colorectal cancer are not systematically performed in Bulgaria.

Aim. This article explores the effect of an educational intervention on the willingness of patients to participate in the screening for colorectal cancer with the immunochemical faecal occult blood test in the home setting.

Materials and methods. A before-after design study of the effects of educational intervention comprising distribution of a brochure and one-to-one discussion with a GP. A self-administered, original questionnaire was administered before and after the intervention to 600 randomly selected patients in 40 general practices (15 patients per practice) in Plovdiv district.

Results. The intervention led to an increase with >20% of the patient's knowledge of the importance of the test and on how to carry out the test. Statistical analysis indicated that there was an increase in knowledge after the educational intervention about the usefulness of the test (24.8% in males, 18.3% in females) and its performance (22.7% in males, 25.4% in females).

Conclusion. The educational intervention has significantly influenced the patient's awareness about the test's usefulness and its self-administration. It improved the awareness by providing an easy access to information, thus fostering the active involvement of the patients. A strength of the intervention was the patient-centered approach in providing additional information through one-to-one discussions, and it ensured a higher quality of the preventive screening in the general practice.

IZVLEČEK

Ključne besede:

presejanje, rak debelega črevesa in danke, imunokemični test za določanje okultne krvi v blatu, splošni zdravnik

Uvod. Sedaj obstajajo prepričljivi dokazi, da presejanje za raka debelega črevesa in danke lahko bistveno zniža stopnjo smrtnosti. Presejalni testi za raka debelega črevesa in danke se v Bolgariji ne izvajajo sistematično.

Cilj. Članek raziskuje učinek izobraževalnega ukrepa na pripravljenost pacientov za presejanje za raka debelega črevesa in danke z imunokemičnim testom na domu za določanje okultne krvi v blatu.

Metode. Študija "prej in potem" učinka izobraževalnega ukrepa, ki vključuje razdeljevanje brošure in osebni pogovor s splošnim zdravnikom. Prvotni vprašalnik je bil pred in po ukrepu razdeljen 600 naključno izbranim pacientom in 40 splošnim ambulantam (15 pacientov na ambulantno) v okraju Plovdiv.

Rezultati. Ukrep je prinesel več kot 20 % povečanje zavedanja pacientov o pomenu testa in o načinu njegove izvedbe. Statistična analiza je pokazala, da po izobraževalnem ukrepu obstaja porast znanja o uporabnosti testa (24,8 % pri moških, 18,3 pri ženskah) in njegovem delovanju (22,7 % pri moških, 25,4 % pri ženskah).

Zaključek. Izobraževalni ukrep je bistveno vplival na pacientovo zavedanje o uporabnosti testa in njegovi izvedbi. Povečal je zavedanje z zagotavljanjem enostavnega dostopa do informacij in s tem spodbudil aktivno udeležbo pacientov. Ukrep je bil uspešen zaradi pristopa, usmerjenega k pacientu, pri zagotavljanju dodatnih informacij prek osebnih pogovorov in je prinesel višjo kakovost preventivnega presejanja v splošnih ambulantah.

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1 INTRODUCTION

Compelling evidence exists from randomised controlled trials that screening for colorectal cancer (CRC), using faecal occult blood tests (FOBT), may result in significantly reduced incidence and death rates from CRC (1). The Council's recommendation on cancer screening (2003/878/EC) encourages EU Member States to develop appropriate actions and measures in implementing national cancer screening programs with a population-based approach. However, by the end of 2007, only few EU Member States have organized widespread mass screening with this test (2). National programs and guidelines for CRC screening in different countries have made recommendations based on the following finding from a number of randomised clinical trials: FOBT may be carried out with equal success both at home and in outpatient practice or physicians' offices (3-9). It has been shown that patients use a home-based FOBT more commonly than an office-based FOBT (2). The good practice, or 'the gold standard' adopted worldwide, requires that, in cases of positive screening test results for occult blood loss, a further diagnostic evaluation by colonoscopy and active follow-up are performed (1, 9, 10).

The involvement of a physician, especially GPs, in CRC screening can be very effective in improving compliance, according to the findings of several studies from different countries (11-14). However, organisational measures should be implemented and primary health care providers, including general practitioners (GPs), should be adequately trained in order to ensure that they are able to deliver high quality screening (2, 14, 15). Increasing knowledge and awareness of healthy individuals were associated with higher intentions to participate in colorectal cancer screening (12, 16). Unlike other countries, where FOBT is a part of organized screening programs, currently no systematic population-based screening for CRC is performed in Bulgaria (1-5, 8, 11). The Bulgarian National Centre on Health Information and Analysis provides data on the prevailing tendency of increasing morbidity and mortality rates due to CRC (17, 18). The Bulgarian healthcare system is designed as a three-stage model, with GPs as gate keepers. GPs are financed per capita and some additional payments for prophylactic activities not including CRC screening. However, by 2009 the screening for CRC with gFOBT was non-population-based and conducted with the assistance of GPs. This was discontinued due to poor compliance between GPs and health insured persons. The present study was inspired by the evidence from different countries across the world, that performance of the iFOBT in the home setting stimulated patient involvement and improved efficiency and effectiveness of CRC screening (2, 14, 19, 20). To date, there are no published studies

of patients' views about CRC screening with iFOBT in Bulgaria.

The aim of this study was to explore the effect of an educational intervention on the willingness of patients to participate in the screening for CRC by the immunochemical faecal occult blood test in a home setting.

2 METHODS

2.1 Study Design

This before-after design study is part of a University Research Project № 06/2011, entitled: 'Patient-centred approach to increase promotional activity and screening for CRC in general practice' (http://meduniversity-plovdiv.bg/bg/nauchna_dejnost/menu_vup/1664-vup2).

The current study evaluated the intervention effect on patients' willingness to participate in the screening for CRC. The study took place in the period from June to September 2011 in the practices of the participating GPs. The effect of the educational intervention was studied by two anonymous and self-administered questionnaires (pre-coded for identification) completed before and after the administration at a single visit to the GP practices. After being informed and instructed, consenting patients completed the first questionnaire in a waiting room, and returned it prior to receiving a brochure and a one-to-one discussion delivered by the GP. After the patients saw their GP and had time to read the brochure, they were asked to complete the second questionnaire (identical to the first one) and return it to the GP office. If reminders were needed, the patients were asked to return the completed questionnaire to the GP office in one week.

2.2 Ethics

The overall design of the study, interventions, tools and informed consent forms were approved by the Ethics Committee of the Medical University of Plovdiv, Protocol №2/24.03.2011.

2.3 Recruitment

The estimated minimum sample size of patients was 384, based on the results from a pilot study of proportions of studied variables - the importance of the test and sufficiency of information and an error of 5%. Since the expected percentage of non-response to questionnaire surveys is very high in Bulgaria, considering the probability of missing data or participation drop-out, this number was increased to 600.

Inclusion criteria: health-insured at an average risk for CRC (asymptomatic individuals aged over 45 years) who had had at least one consultation with a GP in the previous 12 months.

Exclusion criteria: people with previous colorectal cancer, adenomas, inflammatory bowel disease, a recent (≤ 2 years) colorectal endoscopy, or two first-degree relatives with colorectal cancer were excluded.

A two-stage sampling technique was used to recruit the participants. In the first stage: Through the coordinator of the local association of GPs and personal e-mails, 100 GPs were invited (50% sample of all GPs from the Plovdiv municipality), of which 40 GPs responded. In the second stage: 15 health-insured individuals were recruited from each GP practice - a total of 600. Eligible subjects were randomly selected using a lottery method, within the roster of their general practitioner.

2.4 Intervention

The adopted approach aimed at supporting an active involvement of patients in the decision-making about their health, their engagement and empowerment by purposeful education and encouragement of good compliance with GPs (21).

The educational intervention was designed and implemented to influence the willingness of patients to participate in CRC screening. A specially designed information brochure was given to the patients and additional information concerning CRC screening was provided through one-to-one discussion with their GP.

The brochure contained illustrations and concise information on CRC prevalence and risk factors, screening target populations, a description of potential benefits and harm or risk of the screening, the essence of the test and instructions for its application in a home setting. The brochure is available from the corresponding author upon request.

The distribution of the brochure was intended to facilitate a direct effect with the opportunity for later reference at home. The use of one-to-one discussions in our study is consistent with the recommendations from updated systematic reviews about various interventions to increase the participation in the screening for CRCs with FOBT (14, 22).

2.5 Questionnaire and Measures

The questionnaire was developed on the basis of preliminary conceptual model for patient education. Tools used in other screening studies in Bulgaria were also explored (23). The initial version of the questionnaire was discussed with GPs, surgeons and gastroenterologists, then revised and piloted in the study of 60 patients.

The questionnaire included 10 questions and was administered twice (before and after the intervention), and it consisted of a single choice closed and semi-open ended questions in several panels: The first panel included

demographics (gender, age, level of education), i.e. explanatory phenomena (EP); the second panel - observed outcomes (OO): significance and usefulness of the test - OO(1); personal interest and readiness to perform the test at home - OO(2); preferred sources of receiving additional health information - OO(3); preferred method to obtain health information - OO (4). The answers of semi-open questions were to be submitted for additional analysis and classification before the final data processing. However, none of the respondents used the option for semi-open questions.

The results indicated that the original anonymous questionnaire had sufficient face and construct validity and reliability. Cronbach's Alpha (α) was from 0.81 to 0.86 for the results concerning changes in awareness and willingness of patients to perform iFOBT.

2.6 Statistical Analysis

The data is presented as mean and standard deviation ($\pm$ SD) or number (percentage), as appropriate. All percentages were computed on the basis of all 499 respondents, both before and after the educational intervention, unless stated otherwise. The following statistical analyses were used:

- descriptive statistics presents the frequency distribution, mean and standard deviation;
- non-parametric analyses (χ^2 test - testing of hypotheses between categorical variables; Wilcoxon signed-rank test - it tests the hypotheses of differences between two related samples; Mann-Whitney test - it tests the hypothesis of differences between two independent samples).
- logistic regression analysis (0 - not readiness and not willingness, 1 - readiness and willingness) is used to determine which factors exert influence on the readiness of the respondents to perform the test.

A two-sided significance level of 0.05 was applied. The data was elaborated and analysed using the software package SPSS version 17.0.

3 RESULTS

3.1 Patient Characteristics

The response rate was 83.2% (499 patients from the initially approached 600), based on the number of patients who returned and correctly completed both parts of the questionnaire (before and after the educational intervention).

The analysis of socio-demographic characteristics (gender, age and education) between the study participants and non-participating patients, according to the GPs, showed

no significant differences ($P=0.086$), which allowed us to accept these results as representative of the surveyed population.

The mean age of respondents was 54.9 ± 9.8 years. Socio-demographic characteristics of patients are presented in Table 1.

Table 1. Socio-demographic characteristics of patients.

Parameters	N (%)
Gender	
Male	145 (29.1%)
Female	354 (70.9%)
Age	
≤ 50	203 (40.8%)
51-60	166 (33.4%)
61-70	89 (17.8%)
≥71	40 (8.0%)
Level of education	
High	236 (47.3%)
Medium	228 (45.7%)
Low	35 (7.0%)

3.2 Willingness to Participate in CRC Screening

The proportion of the surveyed group who was ready and willing to carry out the CRC test before and after the education was relatively high - 85.8% and 87.3%, respectively. The results showed that, after the intervention, the awareness and knowledge of the target group significantly increased (Table 2).

Table 2. Patients' opinions on the importance, usefulness and procedures for the performance of iFOBT.

Questions	Answers	Before education* N (%)	After education* N (%)	P-value
Is it important for you to take this test?	Yes / Yes, I do	369 (78.5)	403 (80.9)	P=0.502
	No (not entirely or not at all)	56 (11.9)	50 (10.1)	
	I cannot answer	45 (9.6)	45 (9.0)	
Do you have enough information about the usefulness of the test?	Yes / Yes, I do	248 (50.3)	347 (70.4)	P=0.001
	No (not entirely or not at all)	245 (49.7)	146 (29.6)	
	I cannot answer	-	-	
Do you have enough information on how to carry out the test?	Yes / Yes, I do	229 (46.4)	353 (71.7)	P=0.001
	No (not entirely or not at all)	265 (53.6)	139 (28.3)	
	I cannot answer	-	-	

*Note: All numbers (percentages) are computed out of all respondents with valid answers (out of all 499 respondents).

The analysis confirmed the usefulness of educational materials. After having read the brochure and the discussion with a GP, the proportion of those who needed more information about iFOBT significantly decreased by 26.0% (124) ($P=0.005$).

When asked 'In your opinion, who may inform you best on the test?' the respondents rated as first their general

practitioner, followed by other physicians. Having a discussion with a physician, regardless of his/her specialty, was considered the best way to get informed on the screening and on early diagnosis of malignancies of the digestive system, which confirmed the general confidence patients had in physicians (Table 3).

Table 3. The influence of gender on the measured indicators before and after education.

Questions	Before education†			After education†		
	Male, N (%)	Female*, N (%)	P value	Male, N (%)	Female*, N (%)	P value
Readiness to perform the test						
Yes, I am willing	111 (80.3)	307 (88.2)		115 (81.6)	317 (89.8)	
No	17 (12.0)	21 (6.0)	$P=0.049$	22 (15.6)	25 (7.1)	$P=0.014$
I cannot answer	11 (7.7)	20 (5.8)		4 (2.8)	11 (3.1)	
Preferred sources for obtaining health information						
General Practitioner	85 (59.4)	307 (88.2)		85 (59.4)	174 (49.3)	
Other specialty physician	56 (39.2)	21 (6.0)	$P=0.427$	56 (39.2)	178 (50.4)	$P=0.040$
Other (relative/friend)	2 (1.4)	20 (5.8)		2 (1.4)	1 (0.3)	
Preferred method to obtain health information on early diagnosis of digestive system diseases††						
Discussion with the GP	98 (68.5)	198 (56.3)	$P=0.015$	93 (65.0)	196 (55.5)	$P=0.050$
Discussion with other specialty physician	77 (55.8)	201 (56.9)	$P=0.529$	80 (55.9)	207 (58.6)	$P=0.582$
Reading printed materials	39 (27.3)	112 (31.8)	$P=0.319$	35 (24.5)	110 (31.3)	$P=0.133$
Searching Internet	26 (18.3)	80 (22.7)	$P=0.279$	24 (16.8)	80 (22.7)	$P=0.145$
Via the media (radio or TV)	23 (16.1)	43 (12.3)	$P=0.256$	20 (14.0)	39 (11.0)	$P=0.360$

† All numbers (percentages) are computed out of all respondents with valid answers (out of all 499 respondents)

* Male vs female

†† The total percentage exceeds 100%, due to the possibility for indicated of more than one answer.

3.3 Comparative Analyses of Significant Differences by Demographic Characteristics

The results revealed that the demographic characteristics of respondents - gender, age and level of education - affect their motivation and understanding of the usefulness and procedures of iFOBT.

The female respondents in 88.2% (312) showed greater motivation to perform iFOBT before ($P=0.049$) and after the educational intervention ($P=0.014$). The level of education influenced attitudes and motivation of respondents to perform iFOBT. University and college

graduates expressed higher motivation to perform the test than those with less than a college educational degree ($P=0.001$). With the help of binary multiple logistic regression an assessment of the influence of socio-demographic factors on the readiness of the respondents to perform the test before and after the training was made. Before training women (OR: 1,752; 95% CI: 1,019-3,010) and respondents with higher education (OR: 1,676; 95% CI: 1,286-2,183) display higher willingness to perform the test. The model with 2 variables (gender and attained degree of education) accounts for only 7% of readiness. Following education, the only determinant is gender, and

again women are more willing to perform the test (OR: 1,907; 95% CI: 1,096-3,316).

Statistical analysis indicated that there was an increase in knowledge after education about the usefulness of the test (24.8% in males, 18.3% in females) and its performance (22.7% in males, 25.4% in females). Respondents with advanced level of education (College and University) were better informed about the usefulness of the test ($P=0.011$) and how to perform the test ($P=0.004$) after the health education in comparison to those with lower educational level. People up to 60 years of age (356 (71%)), assessed the materials provided as 'definitely sufficient', they were more aware of the usefulness of the test ($P=0.003$) and how to perform it at home ($P=0.004$), compared to the older participants.

There was, however, a significant difference in preferences of female and male respondents on sources and ways of obtaining information related to prevention and early diagnosis. About 60 % (85) of male and 49.3% (174) of female participants preferred GPs as a source of information ($P=0.040$) and a discussion with him/her about the early diagnosis of different intestinal tract diseases ($P=0.015$) (Table 3). Persons with less than college level education tended to and preferred discussing the early diagnosis of digestive system diseases with a narrow specialty physician ($P=0.037$), than discussing it with their GP, which may suggest less confidence in their GPs.

Respondents over 71 years of age preferred to be informed on the early diagnosis of various intestinal tract diseases by different broadcast media (radio, TV programs) ($P=0.009$). Participants with advanced level of education showed a tendency to use more often the Internet as a source of information on the early diagnosis of different diseases of the gastrointestinal tract than other respondents ($P=0.005$). No significant gender differences were established in the preferences of other information methods and sources - printed materials, followed by the Internet, media etc.

4 DISCUSSION

4.1 Main Findings

The majority of the respondents believed that iFOBT was very important for them and they were willing to perform it at home. A significant increase of patients' knowledge about the utility of the test and the way of performing it showed effectiveness of the educational intervention. Referring to sources of information, the respondents showed no significant preference (before and after education) of GPs to other specialists, which confirmed general confidence patients had in physicians. The study revealed that patients' preferred way of receiving information on early diagnosis was primarily one-to-one discussion with physicians, regardless of their specialty;

this was followed by printed media, the Internet and other media. The reduction in patient's confidence in GPs following intervention on account of another medical specialist might be explained with the fact that, in Bulgaria, GPs are still not sufficiently trained to carry out activities related to health promotion - health education and oncological disease screening (25, 26).

We speculate that GPs should be effective mediators and coordinators of health promotion activities, and that they can play an important role in the implementation of a patient-centred approach.

The respondents with an advanced level of education expressed a greater willingness to perform iFOBT, higher trust in GPs and more frequent use of the Internet than those with a lower educational level. The younger respondents found the educational brochures more useful, while elderly people indicated broadcasting media, such as radio and TV, as their preferred source of health-related information.

4.2 Other Findings

The data consistently indicates that the lack of awareness of CRC represents one of the main determinants of the low rate of participation in screening. Provision of information is necessary to enable subjects to make an informed choice, but it is not sufficient to enhance participation (2).

Previous studies have found improved compliance of the surveyed target group in the performance of gFOBT after participation in educational programs. Face-to-face education (with nurse and/or GP) was clearly useful in improving knowledge, helping patients to make informed decisions and increasing CRC screening participation rates (14, 22, 24). Other authors reported increased use of iFOBT, which was consistently higher among women than men (5). Brawarsky and Brooks found that the level of education was not associated with adherence to testing. Furthermore, while men and women were equally likely to have a test recommendation, men were more likely to adhere and more likely to be currently tested (13).

Remuneration is one of GP's reasons for promoting CRC screening in both our studies and in the study of Berchi et al. (12). Other factors influencing GPs' screening practice were the effectiveness of the screening programme and, particularly, the sensitivity of FOBT.

Most GPs approve of their participation in such programs and think that this is particularly important in the prevention of cancer (11).

The study of Brawarsky and Brooks confirmed the role of physicians and reported a strong positive association between having a primary doctor, receiving a CRC recommendation and having a test (13). Previously,

our research implied that GPs were more likely to have negative attitudes towards gFOBT (25). General practitioners in Bulgaria do not perform group education and other interventions, described in similar studies, due to various factors (individual practices, the shortage of staff, administrative tasks overload) (21, 23, 25, 26). We could assume that, if provided with adequate incentives, GPs would increase their motivation and performance in future population-based CRC screening programmes, as in other countries (12).

4.3 Strengths and Limitations of the Study

This is the first survey of its kind in Bulgaria, with a high response rate. To avoid the influence of confounding factors, we conducted both surveys within a single visit to a GP immediately before and after the educational intervention.

The higher proportion of respondents with higher education in this study compared with the general population may be associated with the fact that the persons recruited were health-insured and over 45 years of age, suggesting that they may have had a better socio-economic status (27). Another limitation is a higher proportion of females in the sample. We also acknowledge that the study is limited by subjective assessments of the target group that may have potentially produced biased results, since the authors could not refer to the respondents' actual experience in carrying out iFOBT and further research is needed, in this regard.

4.4 Implications of the Study Results for Public Health

Implications of the population-based screening for primary care should be considered and further studied.

4.5 Possibilities for Future Research in the Field

Research is necessary, to understand the actual accomplishment of iFOBT from the target population after proper educational interventions. However, we believe that the results might be of relevance to countries facing similar challenges as Bulgaria, such as the former socialist countries and countries in the Balkan region.

5 CONCLUSION

Significant effect of educational intervention was established. The education led to increased patients' knowledge of the importance of the test and the mode if its application. Patients' gender and education level were identified as potential factors of the willingness to carry out the test. GPs were seen as a valuable and preferred source of information concerning health promotion. These results could serve as a basis for further

research to examine iFOBT acceptability by studying actual performance in the home setting. The educational brochure proved to be effective and may be used in future educational programmes and in the development of on-line tools.

ACKNOWLEDEMENTS

This study was performed with financial support of Medical University of Plovdiv by grant within the University Research Project №06/2011 in the collection of the data. The authors would like to thank for kind support and collaboration of the colleagues from the University. We are grateful to all GPs and participants who took part in this survey.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

FUNDING

The study is a part of a Medical University of Plovdiv Research Project № 06/2011, entitled: 'Patient-centred approach to increase promotional activity and screening for CRC in general practice'.

ETHICAL APPROVAL

The overall design of the study, interventions, tools and informed consent forms were approved by the Ethics Committee of the Medical University of Plovdiv.

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