

RESEARCH ARTICLE

Investigating Factors Associated with FOBT Screening for Colorectal Cancer Based on the Components of Health Belief Model and Social Support

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Abstract

Introduction: This study aimed to investigate the factors associated with FOBT screening for colorectal cancer based on the components of Health Belief Model and social support in Fasa City, Fars Province, Iran. **Materials and Methods:** This was a cross-sectional study carried out on 240 subjects in people of Fasa city who had 50 years old and above. The subjects in this study were assigned to two groups of 120 patients. The first group included people over 50 years, who referred to the diagnostic laboratories for doing FOBT, but the second group included people aged 50 years and above who did not refer to a laboratory for doing FOBT and were assessed by questionnaires at home. Data were collected through a questionnaire based on health belief model and perceived social support. **Results:** The referring group included 61.3 percent women and 38.7 percent men, with a mean age of 65.24 ± 8.01 . The non-referring group included 59.7 percent women and 40.3 percent men, with a mean age of 64.21 ± 7.53 ($p=0.24$). In the referring group, 64.2 percent had undergone FOBT in the past year, while in the non-referring group only 12.72 percent had done so ($p=0.001$). The results showed that the referring group obtained higher scores on awareness about CRC and ways to prevent it, and on HBM Model constructs, and social support compared to the non-referring group ($p<0.001$). In addition, the referring group reported significantly lower Perceived Barriers compared to the non-referring group ($p<0.001$). **Conclusion:** The results showed significant differences between the two groups in terms of HBM components and perceived social support for doing FOBT. Therefore, theory-based educational interventions can be used to increase individuals' Perceived Severity, Perceived Susceptibility, and Perceived Benefits and reduce their Perceived Barriers in order to empower and encourage people to perform FOBT.

Keywords: FOBT- Health Belief Model- screening- Fasa city

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Introduction

Cancer is now considered the second leading cause of mortality throughout the world. One of the most common and lethal cancers is of Colorectal Cancer (CRC). About one million new cases of CRC are diagnosed every year around the world and nearly half of them lose their lives due to this disease (Weitz et al., 2005). CRC is the third most common cancer in men (10 percent of all cancer cases) after lung and prostate and is the second most common cancer in women (4.9 percent of all cancer cases) after breast cancer in the world (Ferlay et al., 2013; Jemal et al., 2011; Jemal et al., 2010). CRC is the third and fifth most common cancer among Iranian women and men respectively (Etemad et al., 2009). According to International Organization for Research on Cancer, the incidence of CRC among Iranian men and women is 8.7

and 6.4 per 100,000 with mortality rates of 6.3 and 4.6 per 100,000 respectively (Ghahremaniet al., 2016; Mokarram et al., 2009). Given the shocking rate of incidence and mortality of CRC, its prevention is particularly important and crucial. Since CRC is slow in its progress, 90 percent of people diagnosed with it can be treated. Regular screening is one of the best and most valuable methods for early diagnosis of this disease. Among the available screening tests for CRC, FOBT (Fecal occult blood test) has priority over other methods due to its simplicity and low cost (Azeem et al., 2016; Mokarram et al., 2009). Thus, in the CRC screening in the U.S., first, people with medium and high risk do FOBT and if the result is positive, they will undergo more rigorous tests including sigmoidoscopy or colonoscopy (Brouse et al., 2003). Given the above statistics relating to the prevalence and mortality rate of CRC, prevention

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measures are of high importance. That is because CRC is often asymptomatic in the early stages, but as the disease progresses, symptoms such as rectal bleeding, blood in the stool, change in bowel habits, pain and cramping in the lower abdomen, and weakness and excessive fatigue due to anemia resulting from hemorrhage appear. Despite the growing trend of this disease around the world, a decline of the disease has been observed in the United States that is partly due to increased screening tests performed and the resulting early detection and treatment (Garcia et al., 2007). The majority of deaths from CRC can be prevented by doing screening tests (Alireza et al., 2005). The 5-year survival rate for CRC is closely related to the stage in which it is diagnosed. If it is detected at early stages, the survival rate increases to 90 percent; therefore, regular screening is considered one of the most valuable diagnostic methods for the disease (Menon et al., 2003). According to Taylor, the Health Belief Model (HBM) that explains health behavior could well be used to explain the lack of participation in screening (Taylor et al., 1999). HBM, which was used in this study as a theoretical framework, is widely used to assess the health beliefs about screening behaviors (Hajializadeh et al., 2013). According to this model, if people believe that they are prone to diseases such as cancer (Perceived Susceptibility), perceive the severity and risk of its complications in their life (Perceived Susceptibility), deem the proposed behaviors useful in reducing the risk or severity of the disease (Perceived Benefits), can overcome the inhibiting factors such as cost, time, etc. (Perceived Barriers), and has confidence in their abilities to perform the behavior in ways that enable them to achieve the desired result (Perceived Self-Efficacy), they are more likely to engage in health-promoting behaviors such as CRC screening (Glanz et al., 2008). This model is used more for the collection of data on individual behavior variables, but these are not the only variables leading to behavior (Ryan, 2009; Sharma, 2016). Programs used for adjustment of preventive behaviors will be successful if they are flexible and tailored to the features and characteristics of the people. Social cognitive theory is one of the theories used in research related to osteoporosis. According to this theory, cognitive factors, environmental factors and behavior have a mutual relationship with each other (Levers-Landis et al., 2003). To compensate for the shortcomings of HBM, social support from social cognitive theory was also examined in this study. Investigations show that social support has positive effects on aspects of self-care activities. Social support has been defined as facilities others provide for the individual. It also refers to the knowledge that makes an individual believe that he has the respect and love of others; others consider him a valuable individual; and he belongs to a social network of mutual relationships and obligations. Evaluation of social support is done through further evaluation of others as sources of support including the spouse, family members, and friends (Wilkinson and Marmot, 2003). The study conducted James et al., (2002) with the aim of assessing the role of Perceived Barriers and Perceived Benefits in doing CRC screening test showed a significant relationship between these

components and doing the screening tests. The researchers showed that Perceived Susceptibility among people referring to labs for doing FOBT was significantly higher than that of other groups indicating the positive impact of Perceived Susceptibility on doing the test (Chenet et al., 2010; Griffith, 2009). Von Wagner et al., (2009) showed that higher Perceived Self-Efficacy leads to greater participation in CRC screening. They also found that higher health literacy could increase Self-Efficacy and ultimately increase participation rates in such screening. Also, Brouse et al., (2003) investigated the barriers to FOBT in a qualitative study and showed that low awareness, weak communication skills, low self-efficacy and low Perceived Susceptibility had a direct relationship with low rates of FOBT. Results presented by Javadzadeh et al., (2011) in a study entitled barriers related to fecal occult blood test for colorectal cancer screening in moderate risk individuals based on the health belief model in Isfahan city, the mean scores of HBM components in individuals with a history of FOBT had a statistically significant difference with those who did not do the test. Among people referring to the laboratory, those who had had a history of FOBT test in the past year had significantly higher scores on awareness, Perceived Susceptibility, Perceived Severity, Perceived Self-Efficacy, and Perceived Benefits than those of the group that had not carried out the test in the past year. They also obtained lower scores on perceived barriers. The group referring to the laboratory had higher scores on awareness of CRC and ways to prevent it, Perceived Susceptibility, Perceived Severity, and Perceived Self-Efficacy compared to the non-referring group. In addition, the non-referring group reported significantly more barriers (Javadzade et al., 2012). Tastan et al., (2013) reported a lack of awareness (81.3 percent) as a major barrier to screening for CRC. Beydoun et al., (2008) study in America in 2008 with the aim of determining predictive factors of screening for CRC showed that among demographic factors, factors of age, marital status, education, income, place of residence (urban and rural), history of smoking, history of chronic disease, and having insurance policy could predict CRC screening. They reported that Fear, embarrassment and lack of physician recommendation were as barriers to screening. Sung et al., (2008) carried out a study to determine the factors influencing CRC screening based on HBM. It was found that awareness about the symptoms and risk factors were directly related to CRC screening. Perceived Susceptibility and Perceived Barriers were also associated with screening. The physician's recommendation and insurance coverage were the most important cues to action (Sung et al., 2008). Britain et al., (2012) and Purnell et al., (2010) showed that social support played a significant role in doing CRC screening. Programs for CRC Screening have been in place in Iran since the end of 2010 with aim of reducing the rate of CRC in the country. However, despite the impact of screening programs on early detection and treatment of cancer, the majority of the at-risk population do not participate in the screening program (Shouri Bidgoli et al., 2015). Considering the importance of early detection of CRC and little efforts made to do the FOBT, as an FOBT is a

cost-effective method for CRC prevention and control, despite inconsistencies in the findings of previous studies, this study aimed to determine factors associated with doing FOBT screening for CRC based on HBM components and the amount of Perceived social support among people over 50 years in Fasa, Iran. This can help take a major step forward to improve health services and training programs aimed at increasing peoples' participation in CRC screening programs and ultimately reducing the incidence of and mortality from this cancer.

Materials and Methods

This study is a cross-sectional study carried out on 240 subjects in people of Fasa city who had 50 years old and above. Fasa is a city in the South of Iran that situated in 440 kilometers north of Persian Gulf. The aim was to determine the factors associated with CRC screening. The subjects in this study were assigned to two groups of 120 patients. The first group included people over 50 years, who referred to the diagnostic laboratories for doing FOBT, but the second group included people aged 50 years and above who did not refer to a laboratory for doing FOBT and were assessed by questionnaires at home. To select subjects in the first group, 120 of the patients referring to laboratories at specialized and ultra-specialized hospitals of Vali-e-Asr (AS) and Shariati for doing FOBT or submitting the FOBT samples to these places were selected randomly. The subjects of the second group (N=120) were selected from a population of Fasa city population using convenience sampling method. As inclusion criteria, the subjects had 50 years or above; they and their first-degree relatives had not been diagnosed with colorectal cancer and benign colorectal polyps; and they were able to answer the items given their physical and emotional state and their consent to participate in the study. As exclusion criteria, if the individuals and their first-degree relatives had been diagnosed with colorectal cancer, inflammatory bowel disease, colon polyps, hemorrhoids, and ulcers; and if they did not consent to participate in the study or answer the questionnaire items incompletely, they were excluded from the study.

Data were collected through a questionnaire based on health belief model and perceived social support. Health belief model is a psychological health behavior change model developed to explain and predict health-related behaviors, particularly concerning the uptake of health services. This model suggests that people's beliefs about health problems. Social support has been defined as assistance available from other people for an individual. It also refers to one's belief that one is respected and loved by others, is a valuable individual with dignity, and belongs to a social network of relationships and mutual obligations (Jeihooniet al., 2016; Kouhpayeh et al., 2017). Validity and reliability of the HBM questionnaire were confirmed in Javadzadeh's study. To this end, after review of the related literature, the developed questionnaire was reviewed by a number of faculty members and experts in gastroenterology for face and content validity. To check the reliability, the questionnaire was administered

to 40 individuals and the results were investigated using Cronbach's alpha test with 95percent confidence intervals or the significance level of 0.05. The Cronbach's alpha for the whole questionnaire was 0.86 (Javadzade et al., 2012). The HBM questionnaire contained 53 items and 9 sections (7 items for demographic data; 10 items to assess awareness about CRC and methods of CRC screening with three-choice answers of Correct / Wrong / I do not know; 4 items to measure Perceived Susceptibility, 5 items to measure Perceived Severity, 5 items to measure Perceived Benefits, and 12 items to measure Perceived Barriers on a 5-point Likert scale with responses including strongly agree / agree / no idea / disagree / totally disagree; 5 items to measure Perceived Self-Efficacy on a 4-point Likert scale with responses including not at all /sometimes / often / always; and 2 multiple-choice questions to assess the Cues to Action from physicians/ health care providers/ mass media, etc. Items on performance included two questions related to the history of FOBT in the past year and intention to do it in the future. The scores obtained for each component was calculated on a 100 scale. MSPSS (Multidimensional Scale of Perceived Social Support Instrument) was used to evaluate the perceived social support. MSPSS has three subscales measuring support from family, friends and significant others in 12 items on a 7-point Likert scale (strongly disagree / disagree / somewhat disagree / no idea / somewhat agree / agree / strongly agree) and has good internal consistency. The Cronbach's Alpha of the instrument was 0.91 and it has acceptable concurrent and factorial (Fischer and Corcoran, 2007). All questionnaires were completed via an inquiry by trained interviewers. The results were analyzed via SPSS 22 using descriptive statistics and χ^2 , ANOVA, t-test, Mann-Whitney, and Kruskal-Wallis.

Results

The referring group included 61.3 percent women and 38.7 percent men, with a mean age of 65.24 ± 8.01 . The non-referring group included 59.7 percent women and 40.3 percent men, with a mean age of 64.21 ± 7.53 . In the referring group, 83.70 percent ($p=0.17$) were married while 67.5 percent of the non-referring group were married. Both groups reported their economic status as medium and medium-high ($p=0.056$). Most participants in both groups had high school education with no significant difference between the two groups in this regard ($p=0.78$).

In the referring group, 64.2 percent had undergone FOBT in the past year, while in the non-referring group only 12.72percent had done so ($p=0.001$).

The Cues to Action reported by the referring group were physicians and check-ups by rates of 62 and 28 percent respectively. The subjects in this group reported family members, health care workers, and mass media as the sources of information in the area of FOBT and CRC prevention with a rate of 45, 42, and 40 percent respectively.

Table 1 shows that in the referring group, those who had a history of FOBT in the past year obtained significantly higher scores on awareness, Perceived Susceptibility,

Table 1. Mean Scores of HBM Components and Social Support in The Referring Group for Participants with/without a History of FOBT in the Past Year

Component	With FOBT history in the past year	Without FOBT history in the past year	T-test significance level
	Mean ± SD	Mean ± SD	P-value
Awareness	45.6±18.1	31.8±17.2	p<0.001
Perceived Susceptibility	44.2±9.2	31.3±11.2	p<0.001
Perceived Severity	48.3±12.4	41.6±10.3	p<0.001
Perceived Benefits	64.3±12.5	48.7±13.1	p<0.001
Perceived Barriers	36.3±14.9	55.4±15.3	p<0.001
Perceived Self-Efficacy	57.5±21.4	29.6±12.8	p<0.001
Social Support	52.6±14.8	34.6±10.7	p<0.001

Perceived Susceptibility, Perceived Benefits, Perceived Self-Efficacy, and social support and lower scores on Perceived Barriers than did people of the same group who had not carried out the test in the past year.

Table 2 shows that in the non-referring group, those who had a history of FOBT in the past year obtained significantly higher scores on HBM components and social support and lower scores on Perceived Barriers than did people of the same group who had not carried out the test in the past year.

Table 3 shows the participants' scores in the two groups on HBM components and social support. The results showed that the referring group obtained higher scores on awareness about CRC and ways to prevent it, and on Perceived Susceptibility, Perceived Severity, Perceived Benefits, Perceived Self-Efficacy, and social support compared to the non-referring group. In addition, the referring group reported significantly lower Perceived Barriers compared to the non-referring group.

Table 2. Mean Scores of HBM Components and Social Support in the Non-Referring Group for Participants with/without a History of FOBT in the Past Year

Component	With FOBT history in the past year	Without FOBT history in the past year	T-test significance level
	Mean ± SD	Mean ± SD	P-value
Awareness	42.2±17.3	30.3±16.4	p<0.001
Perceived Susceptibility	43.4±8.6	30.7±10.8	p<0.001
Perceived Severity	44.6±10.9	40.6±10.1	p<0.001
Perceived Benefits	57.3±11.2	49.9±12.4	p<0.001
Perceived Barriers	35.4±15.1	40.9±16.4	p<0.001
Perceived Self-Efficacy	53.1±20.4	40.3±13.6	p<0.001
Social Support	50.8±16.1	29.6±11.3	p<0.001

Table 3. Mean Scores on HBM Components and Social Support in the Two Groups

Component	Referring to the laboratory	Not referring to the laboratory	ANOVA significance level
	Mean ± SD	Mean ± SD	P-value
awareness	49.3±10.8	38.3±10.3	p<0.001
Perceived Susceptibility	51.1±9.3	36.9±10.2	p<0.001
Perceived Severity	62.3±9.1	50.4±9.9	p<0.001
Perceived Benefits	59.4±8.8	43.1±10.3	p<0.001
Perceived Barriers	43.1±11.1	58.2±7.4	p<0.001
Perceived Self-Efficacy	54.6±12.7	41.3±13.1	p<0.001
Social Support	49.6±9.5	40.8±11.1	p<0.001

Discussion

Due to the high prevalence of deaths from CRC, preventing this cancer is important. Given the presence of diagnostic tests for precancerous lesions and the possibility of CRC treatment in early stages, screening is a good choice for this disease. Since the early diagnosis of this cancer increases the patients' chances of survival, screening for rapid detection of this cancer is essential (Levin et al., 2008). In this study, two groups of people aged 50 years and above in Fasa participated in the study. The first group included participants who had referred to laboratories for doing FOBT in the past year, and the second group consisted of those who had not. The rate of participation in FOBT in the past year was 64.2 percent in the first group and 12.72 percent the second group. In Bae et al., (2014)'s study, 40 percent of people had done FOBT. Results of ghobadi et al., (2016) showed that 29.9 percent of the participants had done this test over the past year. The results of this study were consistent with Javadzadeh et al., (2012) study in which the non-referring group had FOBT rate of 13.3 percent in the past year, while for the referring group the rate was 60.8 percent. A similar result was obtained for demographic variables, i.e. age, sex, marital status and education, (Brennenstuhl Fuller-Thomson and Popova, 2010; Ghobadi et al., 2016; Glennet al., 2009; Javadzade et al., 2012; McGregor et al., 2007; Satia and Galanko, 2007; Zhenget al., 2006). In both groups, i.e. the referring and the non-referring groups, those who had a history of FOBT in the past year obtained significantly higher scores on awareness, Perceived Susceptibility, Perceived Susceptibility, Perceived Benefits, Perceived Self-Efficacy, and social support and lower scores on Perceived Barriers than did people of the same group who had not carried out the test in the past year. Overall, the referring group had significantly higher mean scores on HBM components and social support and lower Perceived Barriers compared to the non-referring group. The level of awareness of the subjects in this research was consistent with prior studies (Chen et al., 2010; Gwede et al., 2010; Shokar et al., 2008). The results of Ghobadi et al.,(2016); James et al., (2002); Sung et al., (2008) showed that most of the participants had a low level of awareness about CRC screening tests. Zheng

et al., (2006) showed that the level of awareness was significantly related to the increase in the CRC screening intention. In studies by Ng et al (2007), Sieverding et al., (2010), and Takano and Sogon (2008), awareness of risk factor predicted CRC screening. Weinberg et al., (2004) study showed a significant relationship between awareness and screening behavior. Perceived Severity and Perceived Susceptibility for the referring group and those with FOBT history in the past year were higher compared to those of the non-referring group and those without FOBT history in the past year. In other words, the first group felt more vulnerable to CRC and better understood the consequences and severity of the disease. This is consistent with results of other studies (Chen et al., 2010; Dassow, 2005; Javadzade et al., 2012; Weinberg et al., 2004). Some studies Perceived Susceptibility and Perceived Severity of subjects in CRC screening were at a low level (Braun et al., 2005; Salimzadeh et al., 2014; Shamsiet al., 2014). Sun et al., (2004) reported a positive correlation between Perceived Susceptibility and screening, but McCaffery et al., (2003) found the contrary. Some studies Perceived Susceptibility did not predict FOBT screening (Ghobadi et al., 2016; Shouri Bidgoli et al., 2015), but in other studies it predicted FOBT (Bae et al., 2014; Hay et al., 2003). The results of this study on Perceived Benefits and Perceived Barriers are consistent with those of studies (Gwede et al., 2010; Henry et al., 2009; Javadzade et al., 2012; Menon et al., 2003; Post et al., 2008; Shokar et al., 2006; Weinberg et al., 2004).

According to results of some studies, Perceived Barriers and Perceived Benefits predicted FOBT (Ghobadi et al., 2016; Koo et al., 2012; Shouri Bidgoli et al., 2015; Wong et al., 2013). Zheng et al., (2006) showed that high level of Perceived Benefits and low level of Perceived Barriers significantly correlated with the intention of people to do FOBT. In a study on 498 American subjects aged 50 years and above, Farmer found that Perceived Barriers had a significant reverse relationship with doing FOBT, colonoscopy and sigmoidoscopy (Farmer et al., 2008). Results of our study show that bad feeling and a shortage of time were major barriers in both groups of referring and the non- referring participants, which is consistent with the findings of some of prior studies (Bajracharya, 2006; Chen et al., 2010; Kelly et al., 2007; Sun et al., 2004; Van Rijn et al., 2008). Our study finding on Perceived Self-Efficacy is consistent with results of Javadzade et al.,(2012) and Wagner et al.,(2009).

In our study, Perceived Self-Efficacy in the referring group was at a higher level compared to the non-referring group, which is consistent with the findings some studies that mentioned Self-Efficacy as a predictor of doing FOBT (Ghobadi et al., 2016; Janz et al., 2003; Salimzadeh et al., 2014; Wong et al., 2013).

The most important Cues to Action reported by the participants in the referring group were physicians and checkups and their most important sources of information were family members, health care providers, and mass media. Ghobadi et al., (2016) found 46.9 percent of the subjects reported physician's recommendation regarding stomach pain and 12.3 percent reported family members' recommendation as a reason for encouraging them to do

FOBT. The most important sources of information in our study were radio and television (32.6 percent), health care workers (21.7 percent) and family members and friends (18.3 percent). this results presented are consistent with some studies in this regard (Javadzade et al., 2012; Moghimi-Dehkordi and Safaee, 2012; Powe et al., 2009; Ruffin et al., 2009). Shamsi et al., (2014) study Cues to Action were among the predictors of CRC preventive behaviors and physicians were the most effective in health behavior associated with CRC. The results of our study showed that the amount of perceived social support for the referring group and people who had done FOBT in the past year was at a higher level than that of the non-referring group and people who did not have a history of doing this test in the past year. Social support was effective in controlling the disease through two major processes: 1) a direct effect on related behaviors such as encouraging healthy behaviors; and 2) a moderating effect via mitigation of acute and chronic health effects of stress as well as the promotion of compatibility with FOBT and CRC diagnosis (Brittain et al., 2012; Rogers and Goodson, 2014). Similarly, in some studies, social support was reported as the predictor of CRC screening (Gregory et al., 2011; Kiviniemiet al., 2011; Purnell et al., 2010; Salimzadeh et al., 2014). Brittain et al., (2012) study indicated that the role of social and family support on doing colonoscopy was reported. Rogers et al., (2015) showed that social support (84 percent) had the greatest impact on CRC screening. Christy et al., (2013) and Schoenberg et al., (2016) also reported family and supportive social networks as a factor affecting CRC screening. The results of some studies stressed the role of physicians and health care staff as support providers in doing screening tests (Brouse et al., 2004; Schoenberg et al., 2016). Griffin (2011) found no significant relationship between social support and intention to do CRC screening.

One limitation of this study was that the participants had to recall their past FOBT. In addition, the study was quantitative. It is recommended that future research utilizes qualitative and mixed research designs to obtain a deeper understanding of the issue.

In conclusion, the results showed significant differences between the two groups in terms of HBM components and perceived social support for doing FOBT. Therefore, theory-based educational interventions can be used to increase individuals' Perceived Severity, Perceived Susceptibility, and Perceived Benefits and reduce their Perceived Barriers in order to empower and encourage people to perform FOBT. Engaging support providers like family members and friends and the recommendations of physicians and health care workers can encourage people to do FOBT. Training programs through mass media like radio, television, and newspapers can be used to increase patients' awareness about CRC screening.

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