RESEARCH ARTICLE

Measuring Beliefs Related to Colorectal Cancer Screening Behavior among Iranian Middle-Aged and Elderly: a Psychometric Study

Shiva Khashij[1], Fatemeh Jalilian[1], Masoumeh Vaezi[2], Maryam Jalilian[1], Hassan Gharibnavaz[1], Touraj Ahmadi-Jouybari[1]*, Zahra Naghibifar[3], Hadis Karami[4]

Abstract

  The annual fecal occult blood test is a very important method for colorectal cancer early detection through screening. Our aim was to assess psychometrics of instrument measuring beliefs related to fecal occult blood test uptake among Iranian middle-aged and elderly, based on the theory of planned behavior. This cross-sectional study was performed on 150 middle-aged and elderly who were randomly selected to participate voluntarily in Kermanshah, in the west of Iran. The studied constructs included attitude, subjective norms, perceived behavior control, and behavior intention. Data were analyzed with SPSS software (ver. 21.0). The mean age of the respondents was 59.1 years [SD: 6.73], in the range from 50 to 73. All of the loads of the exploratory factorial analysis were larger than 0.4. KMO was calculated as 0.756. Overall, four factors under investigation accounted for 82% of the variance in the hypothesized model. Cronbach's alpha for the measured constructs of attitude, subjective norms, perceived behavior control, and behavior intention were 0.92, 0.88, 0.70 and 0.88, respectively. Our findings indicated the final scale to be adequately reliable and valid for measurement of these constructs for prediction of fecal occult blood test uptake among Iranian middle-aged and elderly.

Keywords: Early detection of colorectal cancer- psychometrics- attitude

Introduction

  The major concern of many health systems is preventing the occurrence of chronic diseases (Torre, 2016). Cancer is one of the most important causes of morbidity and mortality in all countries, and the fifth leading cause of death worldwide; also, cancer is the third most common cause of death in Iran (Siegel et al., 2015; Keyghobadi et al., 2015). Among cancers, colorectal cancer ranks third among the most commonly diagnosed cancers worldwide (Siegel et al., 2017). Statistics show that five thousand persons are annually diagnosed with colorectal cancer in Iran, and based on Iranian annual national cancer registration report, colorectal cancer is the third most common cancer in women and fifth in Iranian men; this highlights the importance of program development for prevention, control, and management of this health problem (Azadeh et al., 2008). The most important risk factors of colorectal cancer include; age is over 50 years, poor nutrition, physical inactivity, smoking, genetics, and family history of colorectal cancer (Johnson

et al., 2013). In Iran, the age of patients diagnosed with this cancer is lower than developed countries (Dolatkhah et al., 2015). Since colorectal cancer has a slow progression rate, regular screening for early diagnosis as well as treatment is of value; if colorectal cancer is diagnosed in earlier stages using screening methods, the 5-year survival rate will be 95%; however, if not diagnosed at early stages, this rate will be only 5% (Brenner et al., 2016). Common diagnostic/screening tools for colorectal cancer used are sigmoidoscopy, colonoscopy, barium enema, and fecal occult blood test (Zorzi et al., 2015). Regarding the importance of early diagnosis of colorectal cancer and performing screening tests, it seems necessary to develop programs on a regular basis aiming to encourage high-risk groups to participate in this screening test (Levin et al., 2008; Zavoral et al., 2014). In addition, human behavior is reflective of various determinants and recognition of this causality relationship is crucial for understanding the effective determinants and applying theories can help experts in recognizing the effective cognitive determinants on human behavior (Mirzaei-Alavijeh et

[1]Clinical Research Development Center, Imam Khomeini Hospital, Kermanshah University of Medical Sciences, Kermanshah, [3]Shahid Beheshti University of Medical Sciences, [4]Tehran University of Medical Sciences, Tehran, Iran, [2]Faculty of Medicine, Kateb University, Kabul, Afghanistan. *For Correspondence: dr.ahmadi_jouybari@yahoo.com

Shiva Khashij et al

al., 2016a; Mirzaei-Alavijeh et al., 2016b; Motlagh et al., 2016). In this regards, one of the theories used to predict behaviors of human beings is theory of planned behavior (Steinmetz, 2016). Theory of planned behavior is a very popular and usable theory noted in several studies for cancer screening behavior (Symonds et al., 2015; Sieverding et al., 2010; Mirzaei-Alavijeh et al., 2018a; Mirzaei-Alavijeh et al., 2016c). According to the theory of planned behavior, the primary determinants of future behavior are one's intention to perform the behavior and the individual perception of has control over behavior (perceived behavioral control). In turn, intentions are predicted by three determinants: a) attitudes are a person's positive or negative evaluation of performing the focal behavior, b) subjective norms are a person's perception of other people's opinion regarding behavioral performance and c) perceived behavioral control refers to a person's sense of control over performing the behavior under study (Steinmetz, 2016). On the other hand, studies stated that the lack of standard instrument is one of the important barriers in conducting the study pertinent with psychology and several study indicated having standard scale is very important to need assessment for health planning program (Jalilian et al., 2016a; Hosseini et al., 2016; Jalilian et al., 2016b; Mirzaei-Alavijeh et al., 2016b; Jalilian et al., 2017). Therefore, considering the importance of the issue, the aim of this study was psychometrics of the instrument of fecal occult blood test uptake-related beliefs measurement among Iranian middle-aged and elderly for colorectal cancer early detection.

Materials and Methods

Participants and Procedure

This study was an exploratory factor analysis study was done among 150 male and female who older than 50 years old in Ravansar city, the Kermanshah in the west of Iran during 2016. To enroll the subjects and collect data the following stages were done. First, different areas of the city were classified based on the division of the geographical region, next for each social class one health centers were selected (a total of two health centers were selected). Then, using simple random sampling method with the proportional to size, the subjects were selected in each cluster by using the medical records of the residents available at the centers. At the next step, the subject's postal address was documented and he/she was interviewed at his/her residential place. The sample size consisted of one hundred and fifty persons; since incomplete questionnaires were excluded, the result of the response rate was 96% (N=144). This study has been approved by the institutional review board at the Kermanshah University of medical sciences (KUMS. REC.1394.269).

Measures

The background variables assessed in this study included: age (years), sex (male, female), education level (illiterate and primary school, secondary and high school, diploma, academic), positive history of colorectal cancer in family (yes, no), and economic status (very weak, weak,

average, good, very good).

Theory of planned behavior scale was designed based on a standard questionnaire (Symonds et al., 2015; Sieverding et al., 2010) and included 15 items under four constructs including (a) attitude; (b) subjective norms; (c) perceived behavioral control; (d) behavioral intention. Five items were designed to measure attitude toward undergoing a fecal occult blood test. Four items were designed to measure subjective norms toward undergoing a fecal occult blood test. Three items were designed to perceived behavioral control toward undergoing a fecal occult blood test. Three items were designed to evaluate intention toward undergoing a fecal occult blood test. In order to facilitate participants' responses to the items, all items were standardized to a five-point Likert scale, ranging from one (strongly disagree) to five (strongly agree).

Data Analysis

To evaluation the reliability and validity following four stages (Translation/back-translation process, classical item analysis, and exploratory factor analysis) were done.

First Stage; Translation/back-translation process

In this section the English version of the questionnaire was translated into Persian by two mastered translators and was translated back to English after consulting with some professors and a third person who had total experience of both languages. To finalize the adaptation, item clarity, content validity, and length of the questionnaire, a pilot study was carried out with the translated and revised tools that consisted of two steps: at first, tools were submitted by ten academic experts who were specialist in the internal diseases, psychology, behavior change, health education and promotion. The experts rated relevance of each question on a Likert type ordinal scale (1 = not relevant to 4 = very relevant). In this section, the minimum value for content validity index (CVI) and content validity ratio (CVR) were considered 0.79 and 0.62, respectively (Knapp and Brown, 1995). Then pilot study was done among 20 subjects who were similar to study population to assess respondent comprehension and the feasibility of the instruments. The measurement of item impact indicator concerning all the sentences was lower than 1.5 and none of the options were excluded.

Second Stage; Classical Item Analysis

For classical item analysis, mean, standard deviation, and corrected item-total correlation (CITC) all of items was examined. In this section based on our result, three items (one item from subjective norms, one item from perceived behavior control and one item from behavior intention) was removed. Totally, 12 finalized items were used for the explanatory and confirmatory factor analysis.

Third Stage; Exploratory Factor Analysis

SPSS software (ver. 21.0) was applied for exploratory factor analysis. In this section, we used Kaiser-Meyer-Olkin (for measure of sampling adequacy), Bartlett's Test, and Scree Plot (to confirm strengths greater number of agents). In addition, estimated reliability

was done by using alpha Cronbach coefficient for each constructs questionnaire.

Results

The mean age of respondents was 59.05 years [SD: 6.73], ranged from 50-73 years. More details of demographic characteristics of the participants are shown in Table 1.

The explanatory factor analysis was used to determine the factorial structure of the questions. In this analysis, the KMO test which is the efficiency index of the sampling was measured at 0.765. Bartlett's Test was also significant (P<0.001) which shows the data are appropriate for the factorial analysis. Based on the results taken from statistical analysis, four factors were extracted based on specific values of more than 1 and factorial loadings of 0.4 or higher. Totally, four factors explained 82% of the assumed model changes. The detailed results are shown in Table 2.

Based on the obtained results, the instrument acceptable internal stability and Cronbach's alpha was in the range of 0.70 to 0.92 for different structures in which the results are shown in table 1. The scree plot diagram of the structures is also given in Figure 1.

Table 3 shows bivariate associations among the predictor variables, which were several of them, statistically significant at either 0.01 level. For example, intention of uptake fecal occult blood test was associated with the attitudes (r= 0.416), and subjective norms (r= 0.290), while not correlated with perceived behavior

Table 1. Demographic Characteristics of the Participants

Variables	Number	Percent
Age		
50-59 years old	81	56.3
60-69 years old	46	31.9
70-75 years old	17	11.8
Sex		
Men	57	39.6
Women	87	60.4
Education		
Illiterate and primary school	92	63.9
Secondary and high school	31	21.5
Diploma	19	13.2
Academic	2	1.4
Positive history of colorectal cancer in family		
No	135	93.8
Yes	9	6.2
Economic Status		
Very Weak	2	1.4
Weak	18	12.5
Average	81	56.2
Good	40	27.8
Very Good	3	2.1

Table 2. Obtained Findings of the Exploratory Factor Analysis

| No	Items	1	2	3	4
	Attitude				
	Uptake fecal occult blood test for you is:				
1	Pleasant	0.832			
2	Effective for colorectal cancer prevention	0.88			
3	Embarrassing	0.905			
4	Painful	0.781			
5	Peace of Mind	0.817			
	Subjective norms				
1	My friends encourage me to test for fecal occult blood.		0.86		
2	My family encourages me to test for fecal occult blood.		0.894		
3	Most people who are important for me think that I should uptake fecal occult blood test for prevention of colorectal cancer.		0.933		
	Perceived behavior control				
1	It is hard for me to uptake fecal occult blood test				0.913
2	If you want to uptake fecal occult blood test, do you think how self-controlled you are?				0.788
	Behavior intention				
1	If you are recommended to take the fecal occult blood test; do you do this test?			0.906	
2	I intend to uptake fecal occult blood test this year.			0.865	
	Variance (%)	38.646	22.183	12.3	9.173
	Total Variance	82.301			
	Alpha coefficient of the structures	0.92	0.88	0.85	0.7
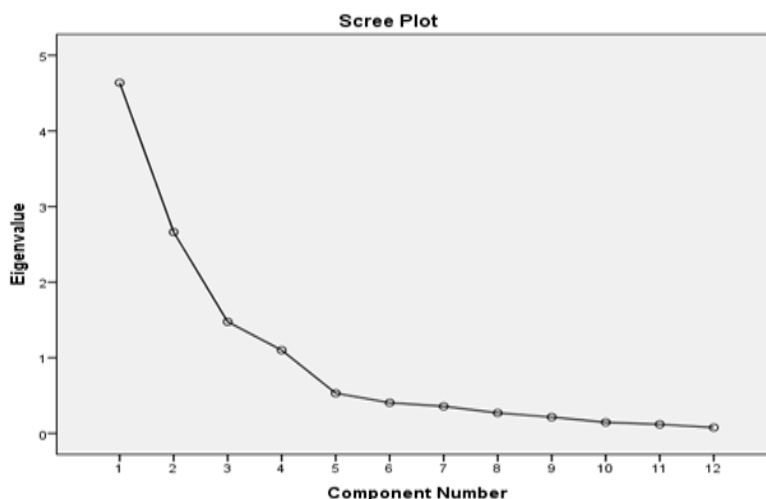
Figure 1. The Scree Pot of the Structures Studied among the Participants

Table 3. Correlation between Different of Theory of Planned Behavior Variables

	X^1	X^2	X^3
X^1. Attitude	1		
X^2. Subjective norms	0. 073 0.385	1	
X^3. Perceived behavior control	0.342** < 0.001	0.01 0.01	1
X^4. Behavioural Intention	0.416** < 0.001	0.290** < 0.001	0.076 0.367

**, $P<0.01$

control (r = -0.076).

Discussion

The aim of this study was to determine psychometrics of the instrument measuring beliefs related to fecal occult blood test uptake among Iranian middle-aged and elderly for colorectal cancer early detection based on the theory of planned behavior. The results of the present study indicated that final scale is adequately reliable and valid for measurement of the constructs of theory of planned behavior for prediction of fecal occult blood test uptake. Furthermore, our results indicated four theory of planned behavior variables described 82% of the assumed model changes. In addition, attitude, subjective norms, behavior intention and perceived behavior control were the predicted the highest variance percentages of the assumed model, respectively.

Attitude is defined as a person's beliefs about the results of a behavior and his/her evaluation of them (Steinmetz, 2016). Our result indicated attitude among the theory of planned behavior variables is predicted highest variance percentages of the assumed model. Furthermore, attitude towards uptake fecal occult blood test was significantly correlated with the intention towards uptake fecal occult blood test. In this regards, Damery et al., (2010) reported in their previous work positive attitudes were associated with personal experience of

colorectal cancer screening. In addition, Taskila et al., (2009) carried out a research on people aged 50–69 years in the West Midlands in England and reported find ways to increase the acceptability of screening among asymptomatic patients is very important. Therefore, it seems that designing and implementation of educational programs to increase positive attitude toward uptake fecal occult blood test may be usefulness of the results in order to increasing fecal occult blood test.

Subjective norms are agreed and genesis criteria, which regulate people behaviors (Steinmetz, 2016). Several study indicated subjective norm is a one of important cognitive determinants can be predict cancer screening behavior (Lo et al., 2015; Rogers et al., 2014). Consistent with previous studies our finding indicated the significant correlation between subject norms toward undergoing a fecal occult blood test and intention towards uptake fecal occult blood test. For example, Lo et al., (2015) reported that perceived barriers, social norms, and knowledge of screening behaviors as important predictors for undergoing colorectal cancer screening tests. In addition, Rogers et al., (2014) in their study note that male role norms are beliefs regarding rules, expectations, or social norms that dictate what an African American man considers an acceptable masculine attitude and behavior regarding colorectal cancer screening behavior. In current study one item of subjective norms questioner (Physicians and health personnel want me to test for fecal occult blood) was deleted in CAI because of CITC under 0.4.

Perceived behavioral control mean that's mean having control over behavior (Steinmetz, 2016). Our study indicated two items was selected for measuring perceived behavior control to uptake fecal occult blood test was good CITC. However we cannot find significant correlated between perceived behavior control and intention to uptake fecal occult blood test.

Limitations
The findings reported in this study have certain limitations. For example, the information is based on self-reporting, which always faces the risk of recall bias and we do not know how it could have affected the results.

In conclusion, overall, the present study offers a measurable theory of planned behavior constructs for measuring beliefs related to colorectal cancer screening behavior among Iranian middle-aged and elderly. This scale can be applied for behavior change studies among Iranian people with aim of determine cognitive determinants related to uptake fecal occult blood test based on the theory of planned behavior.

Author's Contributions

Shiva Khashij, Touraj Ahmadi-Jouybari and Fatemeh Jalilian developed the original idea the protocol of study. Hassan Gharibnavaz and Masoumeh Vaezi participated in data analyze. Hassan Gharibnavaz and Maryam Jalilian participated in data collection and writing manuscript. All authors provided comments and approved the final manuscript.

Statement of Human Rights

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional. This study has been approved by the institutional review board at the Kermanshah University of medical sciences, Iran (IR.KUMS.REC.1394.269).

Informed consent

Research subjects were explained regarding the study procedure and confidentiality of information as well as the purpose of this study and all of them were enrolled in the study based on their consent.

Compliance with ethical standards
Conflict of interests

The authors declare no conflict of interest.

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