RESEARCH ARTICLE

Psychometric Properties of the Persian Version of Champion's Health Belief Model Scale for Colorectal Cancer Screening

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Abstract

Background: Colorectal cancer is a serious health problem. Early detection of colorectal cancer is crucial for treatment and reducing mortality. Beliefs related to colorectal cancer have been found to be a factor in a person's decision about colorectal cancer screening programs. To determine such beliefs, a valid and reliable instrument is necessary. Objective: The aim of this study was to adapt and determine the psychometric properties of the Persian version of Champion's Health Belief Model Scale of breast cancer screening in the measurement of beliefs toward colorectal cancer (CRC) screening. Materials and Methods: The 'forward-backward' procedure was applied to translate the instrument from English into Persian. This study was conducted in Iran from June 2012 to May 2013. A convenience sample of 200 individuals aged 50 years and older was recruited from the population at the outpatient clinics in the three teaching hospitals. Validity was assessed using content, face and construct validity. To test reliability, the internal consistency was assessed by using Cronbach's alpha coefficient and test-retest (intraclass correlation coefficient) analyses. Exploratory factor analysis was used to assess the construct validity and determine the factors of adapted Champion's Health Belief Model Scale. Results: The mean age of the participants were 62.5 years (SD=10.8 years) and the majority of them (75.5 percent) were female. The results of exploratory factor analysis indicated a six-factor solution for the questionnaire (benefits, motivation and confidence, seriousness, susceptibility, emotional barriers and background barriers) that jointly accounted for 55.52% of variance observed. Cronbach's alpha of the subscales ranged from 0.57 to 0.89 and test-retest reliability ranged from 0.81 to 0.93 indicating a good range of reliability. Conclusions: The findings of this study suggest that the Persian version of Champion's Health Belief Model Scale of CRC screening has good psychometric properties and could be an appropriate measure for health beliefs related to CRC screening in national and international studies.

Keywords: Colorectal cancer screening - Champion's health belief model scale - validity- reliability– Iran

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Introduction

Colorectal cancer (CRC) is a significant serious health problem and the fourth leading cause of cancer death over the world (Yusoff et al., 2012). It is the third most common cancer diagnosed and is the second leading cause of cancer death among both genders in the United States, accounting for 11% of all cancer deaths (James et al., 2002). Although previously a predominantly Western disease, the incidence of CRC is increasing in Asia (Sung et al., 2005). In Iran, the age-standardized incidence (ASR) from 2005-2009 is 38.0 per 100,000 population (Safaee et al., 2012) and is the most prevalent cancer among males and second among females (Alireza et al., 2005). Because of the nature of this disease and the increasing rate, it is highly preventable and suitable for screening (Katz et al., 2007). Early detection of colorectal cancer is crucial for treatment and detection in related mortality (Levin et al., 2008). Despite the importance of CRC screening, screening rates are low (Honda et al., 2005). Taylor believes that the lack of participation in screening programs can be justified based on health belief model (Taylor et al., 1999). The Health Belief Model (HBM) was created by social psychologists in the 1950s in the US Public Health Services to find why people did not participate in health-screening programs (Gipsh et al., 2004; Salz et al., 2009). There are six key concepts in the HBM including: *i*) perceived susceptibility (is one's belief regarding the chances of developing a condition); *ii*) perceived severity (a person's opinion of the seriousness of a condition and its sequelae); *iii*) perceived benefits (the opinion of the effectiveness of some advised action to reduce the risks of a condition); *iv*) perceived barriers (one's beliefs regarding the total costs of implementing the recommended action); *v*) confidence (one's intention to take the recommended action); and *vi*) motivation related to performing the health behaviors (Rosenstock, 1966; Rosenstock et al., 1988).

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Few studies have examined beliefs and behaviors related to CRC screening in Iranians people. The results of a previous study conducted in Iran about knowledge toward CRC screening among people aged 50 years and older, showed that more than half of the participants had never heard about colorectal cancer screening tests (Salimzadeh et al., 2011). Javadzadeh et al. (2012) found that a significant relationship between knowledge and all domains of HBM excepting perceived benefits among individuals more than 50 years old (Javadzade et al., 2012). The most common reasons cited for not doing CRC screening were lack of knowledge and the belief that it is not necessary. Understanding of attitudinal components of health-related behavior has been important. Assessing patients' needs and designing educational strategies accordingly may lead to more effective cancer screening programs.

The Champion's Health Belief Model Scale (CHBMS) is an instrument developed and revised by Champion in the years 1984-1993 to identify beliefs regarding breast cancer screening behaviors. The scale was applied in different populations but mostly in breast cancer and Western cultures (Champion, 1984; 1999). The CHBMS has been used extensively in different studies (Watts et al., 2003; Wu and Yu, 2003; Ozsoy et al., 2007; Taymoori and Berry, 2009; Medina-Shepherd and Kleier, 2010; Nergiz-Eroglu and Kilic, 2011; Baysal and Polat, 2012; Erbil and Bölükbaş, 2012; Fouladi et al., 2013; Tastan et al., 2013; Yilmaz et al., 2013).

Jacobs adapted the CHBMS, only by substituting ''colon cancer'' for ''breast cancer'' in the wording of the questions with the same items (Jacobs, 2002). However, a valid and reliable instrument for determining the beliefs of Iranians aged 50 and older related to the recommendation of CRC screening has not been reported. Therefore, the aim of this study was to adapt for CRC screening, translate and assess the psychometric properties of the Persian version of Champion's Health Belief Model Scales (CHBMS) in the measurement of Iranians's beliefs about CRC screening.

Materials and Methods

Study design and participants

This cross sectional study has been performed in June 2012 to May 2013 in Qom, a provincial city in the central region of Iran. A convenience sample of 200 individuals aged 50 years and older was recruited from population at the outpatient clinics in the three teaching hospitals (Nekooi, Shahid Beheshti, Kamkar hospitals). The inclusion criteria were being 50 years or older, not having had CRC and the ability to communicate in Persian language.

Instruments

For data collection, two questionnaires were used as follows: *i*) To collect clinical and socio-demographic information of the participants, a questionnaire was used that was consisted of questions about age, gender, marital status, employment, education, health insurance and family history of CRC; *ii*) Health belief was assessed using the CHBMS. This instrument was originally developed by Champion in 1993 and revised in 1997 and 1999 to assess beliefs towards breast cancer screening.It contains 61 items with 8 subscales.We substitute ''colon cancer'' for ''breast cancer'' in the wording of the questions in 6 subscales (with Champion's permission). The items related to breast self-examination in the confidence subscale and mamogram were divided from the instrument.Finally, 36 items remained to assess health beliefs for colorectal cancer screening according to 6 subscales; perceived susceptibility (5 items), perceived seriousness (7 items), perceived benefits (6 items), perceived barriers (6 items), health motivation (7 items) and confidence (5 items). Items were formatted with a 5-point likert scale, from 1 (strongly disagree) to 5 (strongly agree).

Translation

After receiving permission from the original author (Champion, 1999) for the translation and application of the CHBMS for colorectal cancer screening, the instrument was translated based on the international quality of life assessment project (IQoLAP) guideline (Gandek and Ware, 1998). The questionnaire was translated from English to Persian by two professional translators and the primary Persian version of the questionnaire was developed based on the comparison of the two translations. Next, the questions were adapted for CRC screening instead of breast cancer. The Persian version was back-translated to English by two professional translators who has never seen the original version before. Back-translated versions and The original CHBMS were compared item by item and a final Persian version of the questionnaire was obtained.

To test the content validity of the scale, a multidisciplinary panel was developed including an Entrogastrologist, two general physicians, two health education professors and five professors in nursing. They were asked to comment on the reasonability, suitability, attractiveness and logical sequence of items as well as conciseness and comprehensiveness of the questionnaire. Moreover, in order to assess the questionnaire's face validity, it was given to 10 individuals aged 50 and older to test its comprehensibility and legibility. According to the presented comments and perspectives by the experts and participants, some items of the questionnaire were slightly simplified and modified.

Data collection

For data gathering, the study procedure was explained to the individuals who met the eligibility criteria. The instrument was applied by face-to-face interview technique. Questionnaire completion took between 10 and 15 minutes.

Data analysis

Participants characteristics and the score of each domain of the CHBMS were analyzed by using descriptive statistics. The construct validity of the questionnaire was performed using exploratory factor analysis. Principle components analysis with varimax rotation was applied. The Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of

Sphericity were used to assess the appropriateness of the sample for the factor analysis. Eigen values above 1 and scree plot were used to determine the number of factors. Factor loadings equal or greater than 0.4 were considered appropriate (Nunnally, 2010). Internal consistency of each scale of the CHBMS was determined using Cronbach's alpha. Cronbach's α coefficient of 0.7 or above was considered to be satisfactory (Schneider, 2004). Test-retest reliability was assessed by computing the intraclass correlation coefficient. The time interval for this assessment was 2 weeks in this study. An ICC >0.80 indicated good test–retest reliability and stability (De Boer et al., 2004).

Ethical considerations

Permission to use the original CHBMS was obtained from Victoria Champion. The study research proposal was approved by the deputy of research, Qom University of Medical Sciences. Ethical approval was granted by the Medical Ethics Committee, the Qom University of Medical Sciences that corroborated the ethical considerations throughout the study. Participation in this study was free to withdraw from the study at any time without having any effect on their treatment process. The participants were provided with information about the study process. Those who voluntarily agreed to participate in this study signed written informed consent.

Results

Sample characteristics

Mean and standard deviation of the participants' age was 62.47±10.78 years and 75.5 percent of participants were female. Most of the patients (88%) were from urban districts. 68.5 percent of participants were married. The majority of the samples (95%) have no previous CRC screening. More information about the personal characteristics of the study participants are presented in Table 1.

Table 1. Sociodemographic Characteristics of the Sample (N=200)

Characteristics		Frequency	%
Age, years	59	17	8.5
	60-69	117	58.5
	≥70	66	33
Gender	Male	49	24.5
	Female	151	75.5
Marital status	Married	137	68.5
	Single	7	3.5
	Divorced	4	2
	Widow	52	26
Employment	Housekeeper	139	69.5
	Retired	30	15
	Unemployed	16	8
	Full-time/part-time	21	10.5
	Other	2	1
Education level	Illiterate	110	55
	Primary school	47	23.5
	Middle school	10	5
	High school	24	12
	University	7	3.5
Residence	Urban	176	88
	Rural	24	12

Table 2. Principal Component Analysis of the Persian Version of Champion's Health Belief Model Scales (CHBMS)

Item	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6
Benefits						
BEN3	0.84					
BEN1	0.83					
BEN4	0.83					
BEN5	0.78					
BEN2	0.76					
BEN6	0.73					
Motivation and Confidence						
MOT4		0.67				
MOT3		0.67				
MOT6		0.62				
CON2		0.6				
CON5		0.6				
MOT7		0.56				
MOT2		0.56				
MOT5		0.56				
CON3		0.52				
CON1		0.5				
Seriousness						
SER4			0.74			
SER5			0.68			
SER3			0.62			
SER2			0.58			
SER6			0.5			
SER7			0.48			
SER1			0.41			
Susceptibility						
SUS2				0.89		
SUS1				0.82		
SUS4				0.76		
SUS5				0.75		
SUS3				0.76		
Emotional barriers						
BAR2					0.8	
BAR3					0.77	
BAR1					0.73	
Background barriers						
BAR4						0.74
BAR6						0.58
BAR5						0.5

*CON indicates confidence; BEN, benefit; MOT, health motivation; SUS, susceptibility; BAR, barrier; SER, seriousness

Table 3. Reliability of the Persian Version of Champion's Health Belief Model Scales (CHBMS)

Domain score	M (SD)	Item no.	Alpha	ICC	p value
Benefits	3.79 (0.63)	6	0.89	0.9	0.001
Motivation and confidence	3.81 (0.85)	10	0.81	0.8	0.001
Seriousness	3.27 (0.74)	7	0.76	0.81	0.001
Susceptibility	2.25 (0.75)	5	0.68	0.93	0.001
Emotional barriers	3.36 (1.05)	3	0.8	0.93	0.001
Background barriers	3.66 (0.75)	3	0.57	0.91	0.001

Validity

The Kaiser-Meyer-Olkin adequacy was 0.74 and Bartlett's test of sphericity was significant ($p<0.001$), showing sampling adequacy.

Factor analysis with principal component factor analysis and varimax rotation was used to determine construct validity by excluding items with factor loading less than 0.4. After varimax rotation, a total of 36 items loaded significantly on six factors which were slightly different from original CHBMS. All 6 factors had an eigenvalue greater than 1, with an explained variance

of 55.52%. A total of items except for two item loading ranged from 0.48 to 0.89. Two items were deleted (factor loading <0.4).

The first factor was perceived benefits (13-18); The second factor was motivation and Confidence (26-34, 36); The third factor was perceived seriousness (6- 12); The fourth factor was perceived susceptibility (1-5); The fifth factor was emotional barriers (19-21) and The sixth factor was background barriers (22-24). More information in this respect is reported in Table 2.

Reliability

Cronbach coefficients for the six subscales ranged between 0.57 and 0.89. For the test–retest reliability, the ICC coefficients ranged between 0.81 and 0.93 for the overall score significant (p<0.001). Table 3 shows the internal consistency and the test retest reliability of the CHBMS.

Discussion

Many studies have been conducted to identify beliefs regarding CRC. Most of these studies aimed at the designing intervention studies to promote CRC screening behaviors. To recognize such beliefs, a valid and reliable instrument is necessary. The aim of this study was to adapt and assess the psychometric properties of the CHBMS related to CRC.

In this study, the CHBMS was translated based on the instrument translation guidelines. The face and the content validity of the questionnaire were confirmed after minor revisions.

We employed the exploratory factor analysis method for evaluating the construct validity of the CHBMS. The KMO value was equal to 0.74 and the Bartlett's test was significant (p<0.001), indicating the appropriateness of the factor analysis model. The final instrument contained six subscales with 34 items. These subscales included benefits, motivation and confidence, seriousness, susceptibility, emotional barriers and background barriers.

The differences between the original and the Persian versions of CHBMS were: *i*) Two items of the instrument were deleted. ''I want to discover health problems early'' was removed from the health motivation subscale. Similarly, the item, ''I can recognize normal and abnormal changes in my bowel habits'' was deleted from the confidence subscale because of loading lower than 0.40; *ii*)In the Persian version, the 'perceived barriers' sub-scale of the original version was divided into two sub-scales including 'emotional barriers' (consisting of three items) and 'background barriers' (consisting of three items). The literature concerning the transcultural reliability and validity of this scale related to CRC is limited. Ozsoy et al. (2007) evaluated the psychometric properties of the Turkish language version of the CHBMS and reported a structure consisting of five factors including: confidence, benefits, health motivation, susceptibility, barrier, health motivation and seriousness (Ozsoy et al., 2007).

The study findings also revealed that CHBMS had acceptable internal consistency. Coronbach's alpha for different subscales of CHBMS ranged from 0.57 to 0.89. Two sub-scales—including 'susceptibility' and 'background barriers'—had a Coronbach's alpha less than 0.70. Waltz et al. (1993) noted that the number of items of a measure directly contributed to the magnitude of its Coronbach's alpha. Champion reported Coronbach's alpha coefficients between 0.75 and 0.93 for the original version of the CHBMS. Ozsoy et al. (2007) reported Cronbach alpha coefficients for the 5 subscales ranged between 0.54 and 0.88. Coronbach's alpha coefficients in a study conducted by Jacobs et al. (2010) were between 0.60 and 0.78.

In this study, test-retest reliability coefficients ranged from 0.81 to 0.93 indicating a good range of reliability. Compared to the original version, the Iranian version had better results with regard to the domains. Ozsoy et al. (2007) reported a range of stability between 0.72 and 0.91 for the Turkish version of the CHBMS.

In conclusion, the findings of this study suggest that the CRC screening CHBMS is a reliable and valid instrument that can be used to measure's health beliefs related to CRC screening. This questionnaire can also be used to guide the development of more effective educational interventions.

Non-random sampling and a relatively small sample size restrict the generalizability of the study findings. Consequently, multi-cultural studies with larger sample sizes and with groups of first-degree relatives of individuals with CRC are recommended.

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References

Baysal HY, Polat H (2012). Determination of the breast cancer risk levels and health beliefs of women with and without previous mammography in the eastern part of Turkey. *Asian Pac J Cancer Prev*, **13**, 5213-7.

Champion VL (1984). Instrument development for health belief model constructs. *ANS AdvNursSci*, **6**, 73-85.

Champion VL (1999). Revised susceptibility, benefits, and barriers scale for mammography screening. *Res Nurs Health*, **22**, 341-8.

Erbil N, Bölükbaş N (2012). Beliefs, attitudes, and behavior of Turkish women about breast cancer and breast self-examination according to a Turkish version of the champion health belief model scale. *Asian Pac J Cancer Prev*, **13**, 5823-8.

Fouladi N, Pourfarzi F, Mazaheri E, et al (2013). Beliefs and behaviors of breast cancer screening in women referring to health care centers in northwest Iran according to the champion health belief model scale. *Asian Pac J Cancer Prev*, **14**, 6857-62.

Gandek B, Ware Jr JE (1998). Methods for validating and norming translations of health status questionnaires: the IQOLA project approach. *J Clin Epidemiol*, **51**, 953-9.

Gipsh K, Sullivan JM, Dietz EO (2004). Health belief assessment regarding screening colonoscopy. *Gastroenterol Nurs*, **27**, 262-7.

Honda K, Gorin SS (2005). Modeling pathways to affective barriers on colorectal cancer screening among Japanese

Americans. *J Behavioral Med*, **28**, 115-24.
Jacobs LA (2002). Health beliefs of first-degree relatives of individuals with colorectal cancer and participation in health maintenance visits: a population-based survey. *Cancer Nurs*, **25**, 251-65.
James AS, Campbell MK, Hudson MA (2002). Perceived barriers and benefits to colon cancer screening among African Americans in North Carolina how does perception relate to screening behavior? *Cancer Epidemiol Biomarkers Prev,* **11**, 529-34.
Javadzade SH, Reisi M, Mostafavi F, et al (2012). Factors associated with the fecal occult blood testing for colorectal cancer screening based on health belief model structures in moderate risk individuals, Isfahan, 2011. *J Educ Health Promot*, **1**, 18.
Katz ML, Tatum C, Dickinson SL, et al (2007). Improving colorectal cancer screening by using community volunteers. *Cancer*, **110**, 1602-10.
Levin B, Lieberman DA, McFarland B, et al (2008). Screening and surveillance for the early detection of colorectal cancer and adenomatous polyps, 2008: a joint guideline from the American cancer society, the US multiâsociety task force on colorectal cancer, and the American college of radiology. *Cancer J Clin*, **58**, 130-60.
Medina-Shepherd R, Kleier JA (2010). Spanish translation and adaptation of victoria champion's health belief model scales for breast cancer screening-mammography. *Cancer Nurs*, **33**, 93-101.
Nergiz-Eroglu U, Kilic D (2011). Knowledge, attitude and beliefs women attending mammography units have regarding breast cancer and early diagnosis. *Asian Pac J Cancer Prev*, **12**, 1855-60.
Ozsoy ShA, Ardahan M, O-zmen D (2007). Reliability and validity of the colorectal cancer screening belief scale in Turkey. *Cancer Nurs*, **30**, 139-45.
Rosenstock IM (1966). Why people use health services. *Milbank Mem Fund Q*, **44**, 94-127.
Rosenstock IM, Strecher VJ, Becker MH (1988). Social learning theory and the health belief model. *Health Educ Behav*, **15**, 175-83.
Sadjadi A, Nouraie M, Mohagheghi MA, et al (2005). Cancer occurrence in Iran in 2002, an international perspective. *Asian Pac J Cancer Prev*, **6**, 359-63.
Safaee A, Fatemi SR, Ashtari S, et al (2012). Four years incidence rate of colorectal cancer in Iran: a survey of national cancer registry data - implications for screening. *Asian Pac J Cancer Prev*, **13**, 2695-8.
Salimzadeh H, Eftekhar H, Majdzadeh R, et al (2011). More than half of senior residents in Tehran have never heard about colorectal cancer screening. *Asian Pac J Cancer Prev*, **12**, 2851-6.
Salz T, Brewer NT, Sandler RS, et al (2009). Association of health beliefs and colonoscopy use among survivors of colorectal cancer. *J Cancer Surviv*, **3**, 193-201.
Sung JJ, Lau JY, Goh K, Leung W (2005). Increasing incidence of colorectal cancer in Asia: implications for screening. *Lancet Oncol*, **6**, 871-6.
Tastan S, Andsoy II, Iyigun E (2013). Evaluation of the knowledge, behavior and health beliefs of individuals over 50 regarding colorectal cancer screening. *Asian Pac J Cancer Prev*, **14**, 5157-63.
Taylor VM, Schwartz SM, Jackson JC, et al (1999). Cervical cancer screening among Cambodian-American women. *Cancer Epidemiol Biomarkers Prev*, **8**, 541-6.
Taymoori P, Berry T (2009). The validity and reliability of champion's health belief model scale for breast cancer screening behaviors among Iranian women. *Cancer Nurs*, **32**, 465-72.
Waltz J, Addis ME, Koerner K, Jacobson NS (1993). Testing the integrity of a psychotherapy protocol: assessment of adherence and competence. *J Consult Clin Psychol*, **61**, 620.
Watts BG, Vernon SW, Myers RE, Tilley BC (2003). Intention to be screened over time for colorectal cancer in male automotive workers. *Cancer Epidemiol Biomarkers Prev*, **12**, 339-49.
Wu TY, Yu MY (2003). Reliability and validity of the mammography screening beliefs questionnaire among Chinese American women. *Cancer Nurs*, **26**, 131-42.
Yilmaz D, Bebis H, Ortabag T (2013). Determining the awareness of and compliance with breast cancer screening among Turkish residential women. *Asian Pac J Cancer Prev*, **14**, 3281-8.
Yusoff HM, Daud N, Noor NM, Rahim AA (2012). Participation and barriers to colorectal cancer screening in Malaysia. *Asian Pac J Cancer Prev*, **13**, 3983-7.