Original Article

Health Behavior Constructs Scale (HBCS) for Breast Cancer Screening: Development, Validity and Reliability

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Abstract

Introduction: Given the importance of screening as one of the healthy behaviors in breast cancer, the aim of this research is to develop and evaluate the psychometric characteristics of Health Behavior Constructs Scale (HBCS) for breast cancer screening.

Method: In this cross-sectional study, 376 women who referred to Javaheri Health Center during the study period due to health problems, were selected through convenience sampling method. Then, the instrument was developed and its content and face validities were examined. To ensure divergent and convergent validity, Depression, Anxiety, and Stress Scale (DASS-21) was used. Internal consistency method (Cronbach's alpha) was used to determine the reliability of the questionnaire. Finally, confirmatory factor analysis was used to assess the construct validity of the Health Behavior Constructs Scale and SPSS and LISREL software were applied for analyzing data.

Results: The findings of this study provided strong supports, which confirmed the content and face validities. Regarding the convergent and divergent validity, perceived vulnerability, perceived severity and deterioration, and perceived barriers have a direct and significant relationship with the three variables of depression, anxiety, and stress. On the other hand, perceived self-efficacy and perceived motivation had a significant inverse correlation with all three variables of depression, anxiety, and stress. The results of the Cronbach's alpha indicated the appropriate internal consistency of the whole questionnaire and its components. Cronbach's alpha for the whole questionnaire was 0.75. According to confirmatory factor analysis, the goodness of fit indicators of proposed model were confirmed (Chi-Square/df: 1.98, RMSEA: 0.05, SRMR: 0.06, CFI: 0.92, IFI: 0.92, TLI: 0.92) and all paths were significant (P<0/05).

Conclusion: HBCS is a reliable and valid tool for measuring the screening behavior of breast cancer in Iranian women and it appears to be a comprehensive and useful instrument for assessing women's beliefs related to breast cancer and breast cancer screening.

Declaration of Interest: None

Keywords: Breast cancer, Health behavior constructs, Screening.

Introduction

Breast cancer is the most common type of cancer among women worldwide (1,2) which reported as the second leading cause of cancer death in women (3). According to the American Cancer Society, breast cancer alone will account for a quarter of all cancers in the future (4). In 2010, 5.3 million people in developed countries and 5.2 million people in developing countries have had breast cancer (5). Additionally, according to global cancer statistics in 2020 conducted in 185 countries, female breast cancer has surpassed lung cancer as the most commonly diagnosed cancer, with an estimated 2.3 million new cases (11.7%) (6).

Breast cancer poses many challenges for women. Diagnosis, treatment, consequences and effects that result from different treatment methods lead to psychological distress such as stress, anxiety and depression, and these reactions can reduce psychological well-being in patients with breast cancer (7,8, 9). In addition, hair loss, weight gain, fatigue, pain, severe wound infection, altered skin sensation in the surgical area, and dry skin are other physical effects of breast cancer treatments (9). Besides, the presence of some underlying psychological factors can be challenging for these patients. Shahvaroughi Farahani et al. (10) reported that high-functioning depressive traits and dissociation are high and also preoccupied attachment style is one of the most frequent attachment patterns among women with breast cancer. These mental variables can affect the remission process or the advancement of the disease and in many cases due to these psychological variables, psychotherapy is needed for improving patients' mental health. In some studies, findings have shown that some psychological interventions and protocols such as object relation approach (11) or acceptance and commitment therapy (12) can be beneficial for these patients.

Given the physical and psychological consequences of breast cancer, prevention of this disease is important (13,14). Theoretical models of health behaviors in health psychology have been provided as guidelines and pivotal for research and intervention in preventing disease and promoting individuals' health that each model specifies the components of health behaviors and how they relate to each other. The differences among the various models are due to the influence of each of them on a group of constructions compared to the other constructs affecting health behaviors and ultimately indicate that there is no absolute and final pattern (15). Twenty years ago, Weinstein argued that because of the lack of comparisons among different models, we cannot obtain a comprehensive understanding of the mechanisms involved in health behavior (16). Although research in this field is growing rapidly, progress in understanding these behaviors is very limited (17). One of the most significant health behaviors among women is screening behavior for breast cancer (18,19). Screening behaviors that include regular breast tests (self-assessment, clinical evaluation, and mammography) have been identified as the most effective early detection methods for breast cancer (20). Some studies have shown that screening behaviors are affected by different factors and it would be beneficial to explore and notice to these factors for improving screening behaviors (21).

Many studies have investigated the different models and theories of health

behaviors on screening behavior in women with breast cancer. In a qualitative research aimed to study the factors affecting screening of breast cancer which was based on a combined model of planned behavior and self-efficacy, it was concluded that the level of knowledge and attitude of female-workers in the reproductive age towards screening methods was very low (22). Examination of factors associated with screening behavior in immigrant African women with breast cancer showed that out of 112 participants, %61 had never had a mammogram (23). Another study about the determinants of female cancer screening behavior among Indian women also found that younger, more educated and employed women use screening behaviors (24). A study also found that lack of awareness, depression, fatigue, embarrassment of examination, fear of being ill, limited access, and high cost are considerable barriers of screening (22). In a prospective study, theory of planned behavior was applied as a theoretical framework to identify determinants of breast cancer screening behavior. It was displayed that individual variables such as family history, presence of breast cancer in close relatives, and fear of breast cancer diagnosis are effective on screening for breast cancer (25).

Although conducted research has examined the components of health behavior in patients with breast cancer, a comprehensive model that can measure different elements of health in breast cancer has not been designed. Therefore, the aim of the present study was to develop a tool to examine the components of health behaviors in breast cancer by considering the Iranian culture factors and assess its validity and reliability.

Methods

The current research is a cross-sectional study. The statistical population of the study consisted of all literate (at least elementary) women between the ages of 30 and 70 who referred to health and treatment centers in Tehran. The sample includes 376 women who referred to Javaheri Health Center during the study period due to health problems and were selected through convenience sampling method. The sample size was based on multivariate data analysis for evaluating path analysis and confirmatory factor analysis models between 500 and 300 individuals (26). Women from the statistical population were selected to participate in the study who had no history of breast cancer. These 376 participants were chosen according to their age (30-70 years old) and educational level (at least elementary) and living area (Tehran). Exclusion criteria were having history of breast cancer and disability tor answering questionnaires due to severe physical or mental disorders.

To conduct the research, the necessary coordination was first achieved with the authorities of the Javaheri Health Center (which is a suitable center for collecting samples due to its geographical location, range and the number of clients and

providing specialized services for women). Then two psychology graduate students were trained by the researcher on the purpose of the study, the sample characteristics, and how to conduct the research questionnaires. After preparing the questionnaires, the required numbers were given to the presenters, and they attended the clinic every morning during the working hours, following the coordination with the authorities of the health and treatment center. They provided the questionnaires to the women who met the inclusion criteria and retrieved the questionnaires after providing the necessary information and giving sufficient time to complete them. A total of 400 questionnaires were collected during the study. Each questionnaire consisted of demographic information questionnaire, Health Behavior Constructs Scale (HBCS) for breast cancer screening, and Depression, Anxiety, Stress Scale (DASS). Questionnaires were collected, and several cases were rejected because of some defects. Finally, 376 questionnaire packages were prepared for data entry and data analysis. The participants were asked to answer them single-handedly. In addition to the needed guideline that was described in the questionnaires' instructions, it was mentioned that participants should abstain from writing their names. Participants' consent was gained, and it was explained to them that their private information would be kept confidential. The following Instruments were used:

Demographic information questionnaire: In this study, to collect demographic data, some research related to the subject were examined, and then the required data were assessed. Eventually, the researcher prepared an 8-item questionnaire. The first five items contain general demographic information: 1) Age (Response), 2) Education at three levels (below diploma, diploma, bachelor degree or higher), 3) Marital status at three levels, 4) Occupation in three levels (housewife, employee, self-employment), 5) Having or not having children. The three remained items include demographic information related to health behavior as follows: 6) History of breast problems (other than cancer), 7) Severe medical illness (asthma and diabetes, etc.), 8) Family history of breast cancer.

Health Behavior Constructs Scale (HBCS) for breast cancer screening: The present study was designed by the researcher to measure the constructs of health behavior models specifically for women's health behavior (breast cancer screening), called the HBCS for breast cancer screening. The Health Behavior Constructs Scale contains a set of health behavior determinants used in the most well-known and most used health behavior models. The models considered are the Health Belief Model (HBM), the Theory of Designed or Reasoned Behavior (TPB / TRA), and Social Cognitive Theory (SCT); and the employed constructs are the main constructs used in the models. These structures, which are predominantly equivalent and are used in different

terms in the models, are as follows: a) Attitudinal beliefs containing a set of health behavior barriers, health behavior benefits, and health motivation constructs, b) Self-efficacy beliefs that comprising a set of self-efficacy and perceived behavioral control constructs, c) Normative beliefs constituting a set of subjective norm constructs, social support, and motivation to comply with the norm, d) Risk-related beliefs including a set of perceived susceptibility constructs, and perceived severity or deterioration.

The Health Behavior Constructs Scale for breast cancer screening consists of three sections and a total of 40 items as follows:

Part I: item 1 to item 30. Question 1 to 24 evaluates the models of health belief, reasoned action/planned behavior and social cognition constructs as follow: Question 1 to 3: Perceived susceptibility, Question 4 to 9: Perceived severity and deterioration, Question 10 to 14: Perceived benefits, Questions 15 to 24: Perceived Barriers, Questions 25 to 30: Perceived Self-efficacy or Perceived Behavioral Control**.** This section is measured through five points on a Likert scale. Scores of 1= strongly disagree, 2= disagree, 3= no opinion, 4= agree, 5= strongly agree indicate the degree of belief expressed, and the higher the scores, the stronger the feeling about the material. All items of the scale were positively correlated with the desired behavior (breast check-up), except for perceived barriers (15 to 24) that were negatively correlated with the desired behavior (breast check-up).

Part 2: Questions 1 to 3: Measures normative beliefs or social support. A five-point Likert scale was used to rate this section. Scores of 1= not at all, 2= little, 3= somewhat, 4= high, 5= very high indicate the level of social support for health behavior, and the motivation to comply with important people in life for health behavior.

Part 3: Question 1 to 7: Measure healthy motivation, and include health-promoting behaviors such as proper nutrition, physical activity, annual checkups, and the importance of health for the individual. The items in this section are rated on a five-point Likert scale from strongly disagree to strongly agree. Scores of 1= strongly disagree, 2= disagree, 3= no opinion, 4= agree, 5= strongly agree and shows the amount of health motivation and higher scores indicate stronger health motivation.

The development and validation of the Health Behavior Constructs Scale for breast cancer screening took place during the following steps:

In order to determine the structure of the questionnaire, the most common and popular health behavior models and theories were identified and selected. These models include the Health Belief Model (HBM), Theory of Planned Behavior or Theory of Reasoned Action (TPB/TRA), and Social Cognition Theory (SCT). Then, the main constructs of these models that predict health behavior were extracted. These constructs contain common concepts expressed in different models with different terms.

Constructions and their common methods were obtained from reviews of related researches and studies (27, 28, 29). These constructs are attitudinal beliefs (health behavior barriers constructs, health behavior benefits, and health motivation); self-efficacy beliefs (self-efficacy constructs and perceived behavioral control); normative beliefs (constructs of individual norms, social support, and motivation to comply with norms); risk-related beliefs (perceived susceptibility constructs and perceived severity or deterioration).

To determine the face validity of the tool, a version of the questionnaire was provided along with a survey sheet to 3 obstetricians, to assess the apparent shape of the tool. To determine the content validity of the tool, a version of the questionnaire was provided along with a survey sheet to 3 psychologists to evaluate the tool content. The second version of the questionnaire was prepared after collecting the experts' opinions and making changes and modifications. Then, to assess the reliability of the tool, the questionnaire was given to 40 women referring to health centers clinics, and Cronbach's alpha was calculated and used to imprint and modifies the questionnaire. Reliability of the scale was obtained: 0.75; also, internal consistency of the questions was calculated (correlation of each question with other questions and correlation of each question with the whole test); difficult questions or questions whose correlation with other questions was low, were identified, and removed or modified to increase reliability. After making the necessary revisions, the final version of the questionnaire was obtained.

During the study, the HBCS scale was offered to 376 women referring to the clinic, and the alpha coefficient was calculated for each part of it. Evidence for the validity of the scale relies on face validity and content validity, which was confirmed by 3 obstetricians and 3 clinical psychologists.

Depression Anxiety Stress Scale (DASS_21): Negative affect were measured by using the brief 21-item version of Depression Anxiety Stress Scale (DASS_21) that is a widely applied measure of negative affect in adults (30). A great deal of literature shows that DASS is a reliable and valid measure of depression, anxiety and tension/stress in both nonclinical and clinical populations (31). It was also found that the respondents displayed the extent to which they experienced each of the symptoms represented in the items during the previous week on a 4-point Likert type scale ranging from0 (Did not apply to me at all) to 3 (Applying to me very much) (30). In this study, Cronbach's alpha and reliability of the questionnaire were 0.85.

Confirmatory factor analysis was used to assess the construct validity of the Health Behavior Constructs Scale for breast cancer screening and SPSS and LISREL software were applied for analyzing data.

Results

The present study aimed to determine the psychometric properties of the Health Behavior Constructs Scale for breast cancer screening. The

first table shows demographic information of the participants.

Table 1. Demographic information of the participants

Demographic Variable		Frequency	Percentage
Education Level	**High School Diploma**	152	%40.4
	Diploma	167	%44.4
	Bachelor's Degree	57	%15.2
Marital Status	**Married**	342	%91
	Divorced	25	%6.6
	Single	9	%2.4
A History of Breast Problems	**Having a History of Breast Problems**	30	%8
	Not Having a History of Breast Problems	346	%92
A History of Serious Medical Illness	**Having a History of Serious Medical Illness**	104	%27.7
	Not Having a History of Serious Medical Illness	272	%72.3

The study was attended by 376 female participants which in terms of education level, 152 of them (40.4%) had a high school diploma, 167 (44.4%) had a diploma and 57 (15.2%) had a bachelor's degree. In terms of marital status, 342 (91%) were married, 25 (6.6%) divorced, and 9 (2.4%) single. In terms of having/not having children, 355 (94.4%) had children, and 21 (5.6%) had no children. About 30 (8%) had a history of breast problems (except cancer), and 346 (92%) did not. 104 women (27.7%) had a history of serious medical illness (asthma, diabetes, hypertension, heart problems, etc.), and 272 (72.3%) did not have a history of serious medical illness. About 52 (13.8%) had a history of breast cancer in their family members, and 324 (86.2%) did not. The mean and standard deviation of the participants' age were 49.23 and 9.28, respectively.

In the following, the second table presents the descriptive statistics of mean, standard deviation, minimum, and maximum of the research variables; the results of the reliability of this tool are then shown, and finally results related to the validity of the questionnaire will be presented.

Table 2. Descriptive statistics of mean, standard deviation, minimum, and maximum of the research variables

Variable	Mean	Standard Deviation	Minimum	Maximum
Perceived Vulnerability	6.51	2.75	3	15
Perceived Severity and Deterioration	17.30	6.83	6	30

Perceived Benefits	20.85	3.81	7	25
Perceived Barriers	26.34	6.88	10	46
Perceived Self-Efficacy	21.03	8.04	6	30
Normative Beliefs	13.01	5.11	4	20
Perceived Motivation	28.17	5.49	7	35
Depression	5.48	4.99	0	21
Anxiety	5.57	4.63	0	21
Stress	8.38	5.34	0	21

The internal consistency method was used to determine the reliability of the questionnaire; results of the Cronbach's alpha indicated the appropriate internal consistency of the whole questionnaire and its components. Cronbach's alpha for the whole questionnaire was 0.75 and perceived vulnerability, perceived severity and deterioration, perceived benefits, perceived barriers, perceived self-efficacy, normative beliefs, and perceived motivation were 0.85, 0.84, 0.77, 0.63, 0.95, 0.91, and 0.75, respectively, which all components showed appropriate reliability.

At first, statistical assumptions were investigated. Kaiser-Meyer-Olkin (KMO) test for sampling adequacy (810) and Bartlett's test of sphericity (χ^2= 10048.183, P= 0.001) indicated the ability of scale materials to measure the components. Confirmatory factor analysis was used to assess the construct validity of the Health Behavior Constructs Scale. For this purpose, a seven-factor model was defined, each measured through its observable variables. The hypothetical 7-factor model is shown in Fig. 1, and according to Table 4, it can be seen that all paths are significant at the P<0.05 level. Also, the goodness of fit indices of this model are reported in Table 3. Absolute and comparative fit indices were applied to determine the hypothetical model fit. Although the Chi-Square index was used in the present study to evaluate the overall fit of the model, it is strongly influenced by sample size, and in the large samples generally shows a good fit to the model (32). Due to this limitation, the ratio of Chi-Square to the degree of freedom or CMIN/df is also reported, which minimizes the effect of sample size on the Chi-Square indicator. Although there is no agreement on the acceptable value of this indicator, values below 3 usually display a good fit to the model. The RMSEA and SRMR are also the main indicators of model goodness of fit. For an optimal fit, the RMSEA value model should be smaller than 0.1 and preferably smaller than 0.08. Additionally, the SRMR value should be less than 0.08 (33). For the CFI, TLI and IFI indices, values above 0.9 indicate model acceptance, and values above 0.95 indicate good model fit (33). For the hypothetical model, all the indicators show the appropriate fit

of the model. Figure 1 illustrates the model of standardized coefficients.

Table 3. Goodness of fit indicators of the proposed model

Chi-Square	Chi-Square/df	RMSEA	SRMR	CFI	IFI	TLI
1422.73	1.98	0.05	0.06	0.92	0.92	0.92

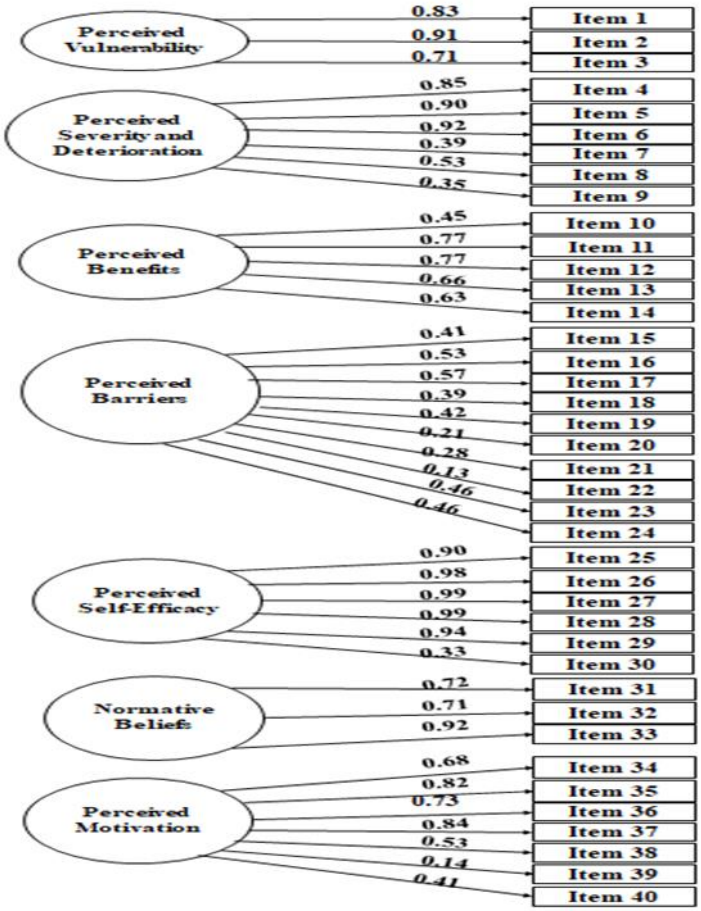

Figure 1. Standard coefficients of 7-factor proposed model

Table 4 shows the non-standard coefficients, standard coefficients, T values, and significance level for all hypothetical model paths. Based on the values of T and significance level, it can be concluded that all paths are significant.

Table 4. Non-standard coefficients, standard coefficients, T values, and significance level for all hypothetical model paths

Path	Non-standard coefficient	Standard coefficient	T value	P
Perceived Vulnerability to Item 1	1.14	0.83	14.92	0.001
Perceived Vulnerability to Item 2	1.21	0.90	15.04	0.001

Perceived Vulnerability to Item 3	1	0.71		
Perceived Severity and Deterioration to Item 4	2.70	0.85	6.95	0.001
Perceived Severity and Deterioration to Item 5	2.90	0.90	7.02	0.001
Perceived Severity and Deterioration to Item 6	3	0.92	7.04	0.001
Perceived Severity and Deterioration to Item 7	1.08	0.38	5.29	0.001
Perceived Severity and Deterioration to Item 8	1.74	0.53	6.12	0.001
Perceived Severity and Deterioration to Item 9	1	0.35		
Perceived Benefits to Item 10	0.89	0.45	7.48	0.001
Perceived Benefits to Item 11	1.16	0.76	11.17	0.001
Perceived Benefits to Item 12	1.50	0.77	11.20	0.001
Perceived Benefits to Item 13	1.36	0.65	10.31	0.001
Perceived Benefits to Item 14	1	0.62		
Perceived Barriers to Item 15	0.73	0.41	5.48	0.001
Perceived Barriers to Item 16	0.93	0.53	6.37	0.001
Perceived Barriers to Item 17	0.90	0.56	6.55	0.001
Perceived Barriers to Item 18	0.70	0.39	5.32	0.001
Perceived Barriers to Item 19	0.73	0.41	5.54	0.001
Perceived Barriers to Item 20	0.47	0.20	3.24	0.001
Perceived Barriers to Item 21	0.54	0.27	4.12	0.001
Perceived Barriers to Item 22	0.24	0.12	2.06	0.001
Perceived Barriers to Item 23	0.94	0.46	5.88	0.001
Perceived Barriers to Item 24	1	0.46		
Perceived Self-Efficacy to Item 25	4.14	0.90	6.77	0.001
Perceived Self-Efficacy to Item 26	4.42	0.98	6.85	0.001
Perceived Self-Efficacy to Item 27	4.84	0.99	6.82	0.001
Perceived Self-Efficacy to Item 28	4.47	0.98	6.86	0.001
Perceived Self-Efficacy to Item 29	4.24	0.94	6.82	0.001
Perceived Self-Efficacy to Item 30	1	0.33		
Normative Beliefs to Item 31	1	0.72		
Normative Beliefs to Item 32	0.98	0.71	70	0.001
Normative Beliefs to Item 33	1.23	0.92	7.44	0.001
Perceived Motivation to Item 34	0.86	0.68	7.41	0.001
Perceived Motivation to Item 35	1.05	0.82	7.84	0.001
Perceived Motivation to Item 36	1.30	0.73	7.59	0.001
Perceived Motivation to Item 37	1.25	0.84	7.88	0.001
Perceived Motivation to Item 38	0.84	0.53	6.70	0.001
Perceived Motivation to Item 39	0.34	0.14	2.53	0.001
Perceived Motivation to Item 40	1	0.41	14.92	0.001

As can be seen in Table 4, the T-test for all paths was greater than 1.96, indicating that all paths were significant.

As presented in Table 5, to assess the convergent and divergent validity of this questionnaire, the correlation coefficients of the Health Behavior Constructs Scale with the variables of depression, anxiety, and stress were calculated.

Table 5. Correlation between Health Behavior Constructs Scale and DASS

Variable	Depression		Anxiety		Stress	
	R	**P**	**R**	**P**	**R**	**P**
Perceived Vulnerability	0.169**	0.001	0.122*	0.018	0.124*	0.016
Perceived Severity and Deterioration	0.237**	0.001	0.222**	0.001	0.225**	0.001
Perceived Benefits	-0.067	0.194	0.001	0.980	0.030	0.563
Perceived Barriers	0.325**	0.001	0.256**	0.001	0.244**	0.001
Perceived Self-Efficacy	-0.182**	0.001	-0.121**	0.001	-0.109*	0.035
Normative Beliefs	0.002	0.968	0.067	0.194	0.064	0.214
Perceived Motivation	-0.167**	0.001	-0.120*	0.020	-0.111	0.031

**P<0/01, *P<0/05

As can be seen in Table 4, perceived vulnerability, perceived severity and deterioration, and perceived barriers have a direct and significant relationship with the three variables of depression, anxiety, and stress. On the other hand, perceived self-efficacy and perceived motivation had a significant inverse correlation with all three variables of depression, anxiety, and stress.

Discussion

In this study, we developed a tool for assessing health behavior factors for predicting breast cancer screening behaviors. Statistical results confirmed the goodness of proposed tool, in terms of both validity and reliability.

The high internal consistency of the whole questionnaire and its components indicated how the items are coherent in exploring the constructs. Confirmatory factor analysis was used to assess the construct validity of the Health Behavior Constructs Scale for breast cancer screening and all paths were significant. For the hypothetical model, all the indicators showed the appropriate fit of the model. The result of the convergent and divergent validity on the one hand showed perceived vulnerability, perceived severity, and perceived barriers have a direct and significant correlation with the three subscales of DASS. On the other hand, perceived self-efficacy and perceived motivation had a significant inverse correlation with all three variables of depression, anxiety, and stress.

It is the goal of many researchers interested in health behavior to understand both determinants of health behaviors and the process of health behavior change. One key route to an understanding of health behavior has been development and empirical testing of Health Behavior Theories (HBT). Research in this area has implications including (1) a better understanding of health behavior, and (2) a basis upon which interventions to improve the public health of individuals and communities can be developed and evaluate (34,35). The overriding purpose of the current study was to offer a tool to

better understanding of health behavior. We moved to accomplish this task by selecting important theoretical models of health behavior and extract main constructs of them and develop a questionnaire to measure breast cancer screening behavior. These models include the Health Belief Model (HBM), Theory of Planned Behavior or Theory of Reasoned Action (TPB/TRA), and Social Cognition Theory (SCT) and the constructs were extracted contain common concepts expressed in different models with different terms. These constructs are attitudinal beliefs (health behavior barriers constructs, health behavior benefits, and health motivation); self-efficacy beliefs (self-efficacy constructs or perceived behavioral control); normative beliefs (constructs of individual norms, social support, and motivation to comply with norms) ؛risk-related beliefs (perceived susceptibility constructs and perceived severity or deterioration).

The first part of questionnaire measures perceived susceptibility, perceived severity, perceived benefits and barriers, perceived self-efficacy and perceived cultural barriers. These are the main constructs of HBM, TPB, and SCT. The HBM proposes that perceived vulnerability to disease and disease severity combine to form 'threat', and that threat perception motivates action. According to the HBM, threat perception drives behavior but the particular action taken is determined by beliefs about the behavioral options available to counter the threat (36). In addition, the Health Belief Model appears to differ from other theoretical frameworks by including emotional arousal in its definition of severity. Rosenstock says that: "The degree of seriousness may be judged both by the degree of emotional arousal created by the thought of a disease as well as by the kinds of difficulties the individual believes a given health condition will create for him". Hence in the HBM, fear/worry forms part of perceived severity and consequently also forms part of the motivation to act.

Also, the health belief model (HBM) was one of the earliest to prominently feature perceived barriers. In the HBM, both barriers to and perceived benefits of a behavior lead to the likelihood of taking recommended action (as do other components such as perceived threat). Perceived barriers are also involved in social cognitive theory as partial determinants of self-efficacy. The construct of perceived benefits is defined as beliefs about the positive outcomes associated with a behavior in response to a real or perceived threat. The perceived benefit construct is most often applied to health behaviors and is specific to an individual's perception of the benefits that will accrue by engaging in a specific health action. For example, perceived benefits of mammography screening include a woman's beliefs about the benefits of obtaining a mammogram, e.g., "Having a mammogram will help me find breast lumps early" (28,37,38)

It should be noted that the health-related behavior is an action which is related to decreasing the risk of a certain disease outcome (39). Two expectancy value theories that are often employed in studies to predict health behavior, (the Theory of Reasoned Action and the Theory of Planned Behavior) also identify an attitudinal construct of expected consequences of an action (including benefits) that predict intentions to engage in specific behaviors (17,40).

Besides, most prominent health behavior theories include self-efficacy (or similar constructs). Self-efficacy is a proximal and direct predictor of intention and of behavior. According to Social Cognitive Theory (SCT), a personal sense of control facilitates a change of health behavior (41). Self-efficacy is directly related to health behavior, but it also affects health behaviors indirectly through its impact on goals. Self-efficacy influences the challenges that people take on as well as how high they set their goals. Individuals with strong self-efficacy select more challenging goals and focus on opportunities, not on obstacles. According to the Theory of Planned Behavior (TPB), intention is the most proximal predictor of behavior. Cognitions that affect a specific intention are attitudes, subjective norms, and perceived behavioral control (perception about being able to perform a specific behavior**)**. A typical item to assess perceived behavioral control is, "It is easy for me to do something." Self-efficacy and behavioral control are seen as almost synonymous constructs.

The second part of the questionnaire measures normative beliefs and social support. Historically, there has been a strong tendency for health researchers to use normative beliefs in the context of the theory of reasoned action to predict and influence health behaviors.

Ajzen's theory of planned behaviors similar to Fishbein's theory of reasoned action, but with the addition of perceived behavioral control—the extent to which a behavior is believed to be under the person's control. Therefore, instead of there being two causal pathways to behavior as in the theory of reasoned action, there are three. These are the attitudinal, normative, and control pathways. However, the way normative beliefs are used in the theories of reasoned action and planned behavior are similar (42).

Social support is a general rubric that encompasses at least three distinct types of support:
perceived support, enacted support and social integration. There are different measures for each of these types of support, and the types are only weakly related to each other (43). Social-cognitive perspective is primarily geared toward explaining links between perceived support and mental health, and may be relevant to physical health, insofar as mental health is important for physical health.

At last, third part of questionnaire measures health motivation, and include health-promoting behaviors such as proper nutrition, physical activity, annual checkups, and the importance of health for the individuals. This is a part of attitudinal beliefs. Attitudinal beliefs are appraisal of the positive and negative aspects of the behavior and expected outcome of the behavior. Attitudinal belief in HBM consists of benefits, barriers, and health motives; in TRA, it consists of behavioral beliefs, and evaluation of those beliefs (attitudes); in TPB, it consists of behavioral beliefs and evaluation of those beliefs (attitudes), and in SCT it consists of outcome expectations/ expectancies (34,41).

There were some limitations in this study that should be considered when interpreting these findings. Firstly, we used convenience-sampling method; hence, we cannot extrapolate the results to fit the entire population. Another

limitation is that all participants were who referred to health and treatment centers; so, generalizing the results to out-patients should be cautious. Despite these limitations, the results from this study indicated that the HBCS is a reliable and valid tool for measuring the screening behavior of breast cancer in Iranian women. In conclusion, HBCS appears to be a comprehensive and useful instrument for assessing women's beliefs related to breast cancer and breast cancer screening. Nurses and other healthcare providers to determine the beliefs prior to planning appropriate interventions could easily use it. To decrease breast cancer mortality through early detection, physicians and healthcare providers must broaden their understanding of the factors that influence women's breast cancer screening behaviors. Furthermore, health teams have an important task in giving women meaningful education aimed at preventive behaviors and encouraging a healthy lifestyle. They can provide continuing education about breast cancer screening and its importance, and help their clients to detect early signs of breast cancer.

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