RESEARCH ARTICLE

Is Health Locus of Control a Modifying Factor in the Health Belief Model for Prediction of Breast Self-Examination?

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Abstract

  <u>Background</u>: Breast cancer is one of the most common cancers among women in the world. Early detection is necessary to improve outcomes and decrease related costs. The aim of this study was to assess the predictive power of health locus of control as a modifying factor in the Health Belief Model (HBM) for prediction of breast self-examination. <u>Materials and Methods</u>: In this cross- sectional study, 400 women selected through the convenience sampling from health centers. Data were collected using part of the Champion's HBM scale (CHBMS), the Health Locus of Control Scale and a self administered questionnaire. For data analysis by SPSS the independent T test, Chi square test, logistic and linear regression modes were appliedl. <u>Results</u>: The results showed that 10.9% of the participants reported performing BSE regularly. Health locus of control did not act as a predictor of BSE as a modifying factor. In this study, perceived self-efficacy was the strongest predictor of BSE performance (Exp (B) =1.863) with direct effect, while awareness had direct and indirect influence. <u>Conclusions</u>: For increasing BSE, improvement of self-efficacy especially in young women and increasing knowledge about cancer is necessary.

Keywords: Breast cancer - breast self examination - Health Belief Model - health locus of control

Introduction

Breast cancer is the most common cancer among women worldwide (Yan Yee., 2009). In Iran, breast cancer is also the most common cancer among women and includes 21.4% of all malignancies in women (Noroozi et al., 2011). This problem, due to disability and premature death, can impose a burden to society. Breast cancer is a stressful experience that coincides with a significant relationship between the levels of emotional distress and loss of daily function.

Early diagnosis plays an essential role in reducing mortality from breast cancer. Strategies for early detection of breast cancer in women, include performing breast self examination (BSE), clinical examination or mammography. Since breast self-examination has a critical role in the diagnosis of disease, it is important that women constantly do this as a professional behavior. But unfortunately, despite the benefits of regular breast self-examination, only a small number of women are engaged in this action (Petro-Nustus et al., 2002). Therefore, it is necessary to identify the factors influencing in BSE.

Effectiveness of training programs and identifying factors influencing unhealthy behavior changes greatly depends on the proper use of theories and models used in health education. Health Belief Model (HBM) is a cognitive model that can be used to identify the factors influencing screening behavior (Noroozi et al., 2011; Tastan et al., 2011). According to this model, behavioral belief along with modifying factors is effective in shaping behavior. Behavioral belief includes constructs such as perceived susceptibility, perceived severity, perceived benefits and barriers, health motivation and self-efficacy (Canbulat et al., 2008). Modifying factors include demographic variables, personality traits and individual awareness that can play a role in shaping behavior in the direct or indirect (through Behavioral belief) ways.

However, screening behaviors is under the individual control and whether it is done or not can be linked to the locus control. The concept of Health Locus of Control is an important factor in the perceived control in the individuals' health behavior. Health Locus of Control has been derived by Rotter from social learning theory. Based on this construct, the individual perceptions of life events may be attributed to the internal, external and chance factors. People with internal Locus of Control believe that their actions determine the consequences and outcomes of their health, those who have external Locus of Control believe that other powers such as doctors, nurses or family members determine their health, and people with chance Locus of Control think that their health is determined by fate, luck and chance (Rowe et al., 2005). In other words, to explain the behavior, Rotter considers both strengthening the external and the internal cognitive

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processes (Schultz et al., 2005). So it seems that the Health Locus of Control as a modifying factor (similar personality traits) can play an important role in shaping behavior.

In the field of the relationship between the Health Locus of Control and performance of health behavior, we can refer to Rowe's study on the relationship between the Health Locus of Control and perceived risk for breast cancer in healthy women. In this study it was found that there is a significant relationship between the internal locus of control and perceived risk for breast cancer (Rowe et al., 2005). In another study that was conducted to investigate the relationship of breast self-examination and the Health Locus of Control, it was concluded that there is a relationship between breast self-examination and the internal locus of health control, but there is no significant relationship between external and chance locus of control and breast self-examination behavior. In such a way that in one study, self-efficacy and perceived susceptibility construct were a strong predictor for performing breast self-examination and in other study, severity and perceived barriers were stronger predictors (Hallal., 1982; Cheryl et al., 1999; Schultz et al., 2005; Noroozi et al., 2011).

However, so far, no study has been conducted with the combination of the HBM and the Health Locus of Control constructs to predictive the power of health locus of control as modifying factor in Health Belief Model. Also there are some disagreements on the effective constructs of HBM. So aim of this study is recognition of predictor power of health locus of control as a modifying factor in Health Belief Model (HBM) for prediction of breast self-examination, so that it can be used to design effective educational programs.

Materials and Methods

This cross sectional study was accomplished on 400 women aged 20 to 50 years, who were referred to health centers in Bushehr city (Iran). The sample size was determined based on determination coefficient of 0.4 and in a total of 12 variables in the regression model. The samples in this study were selected by convenience sampling, in a way that at first, five health centers out of 10 in Bushehr were selected randomly (by lottery), and the sample size in each center were determined based on the proportion of 20 -50 years women. Exclusion criteria for this study were the diagnosed breast cancer during the study, mental health problems, physical disabilities and illiteracy.

For data collection in this study, questionnaires were completed with self-report. Data collection instruments consist of three questionnaires includes: 1) self-administered questionnaire included the socio-demographic variables of the participants and breast self-examination behavior, 2) Champion's Health Belief Model Scale (42 questions) and awareness of cancer (15 items). the questions related to Champion Scale separately consists of 5 questions about perceived susceptibility (personal vulnerability), 7 questions on perceived severity (perceived depth of the risk and seriousness of the complications), 6 questions to measure perceived benefits (positive results from avoiding exposure to a disease), 6 questions about perceived barriers (barriers to behavior), 11 questions related to perceived self-efficacy (confidence in one's ability to successful behavior performance), and 7 questions about the health motivation (health-related beliefs and behaviors) that all were measured by 5-level Likert scale. Awareness questions had scores of 0 or 1, and the range of 0-15, and 3) Multidimensional Health Locus of Control (Form B) Scale (MHLCS) with 18 questions which was measured internal, external and chance control of health with the same number of questions (6 questions for each dimension) and 6-level Likert scale.

Validity and reliability of Champion Scale for screening breast cancer behavior among Iranian women has been measured (Taymoori et al., 2009). This scale was reliable and the ranges of Cronbach's alpha coefficients were 0.75 (health motivation) to 0.94 (self-efficacy). Cronbach's alpha coefficient in awareness scale was 0.81.

Validity and reliability of Multidimensional Health Locus of Control Scale have been assessed and approved (Wallston, 2007). In this study, Cronbach's alpha coefficient in MHLCS was 0.81.

Prior data collection, aim of study was explained for samples and the participants were told that all information

Table 1. Relationships between Quantitative Modifying Factors and BSE Performance

Quantitative modifying factors	BSE Yes	BSE No	P Value
	Mean± SD	Mean± SD	
Age	30.90±8.08	29.74±8.16	0.174
Awareness	6.11±3.50	4.04± 3.14	<0.001
Internal HLOC	28.01±4.53	28.31±5.75	0.705
External HLOC	25.80± 5.08	26.35±6.42	0.357
Chance HLOC	18.97±5.61	19.62±6.57	0.309

Table 2. Relationships between Qualitative Modifying Factors and BSE Performance

Qualitative modifying factors		BSE Yes	BSE No	P Value
		No (%)	No (%)	
Education	Under diploma	44 (37.3%)	70 (62.7%)	0.005
	Diploma	50 (41.8%)	65 (58.2%)	
	college degree	80 (57.1%)	58 (42.9%)	
Marriage	Yes	160 (46%)	188 (54%)	0.436
	Single	12 (38.7%)	19 (61.3%)	
Family history	Yes	25 (53.2%)	22 (46.8%)	0.258
	No	149 (44.9%)	183 (55.1%)	

would be kept secret and anonymous.

The data obtained from the total of 400 completed questionnaires for BSE performance were coded and entered into the statistical package for social sciences (SPSS) version 18.0. Descriptive statistics were used to examine the characteristics of the sample. Then the participants were divided into two groups. BSE group 1, the women aged 20 years and older who reported to perform BSE and group 2, the women with the same age who did not perform BSE. Differences between the two groups were assessed by t-test and chi square test. Logistic regression analysis was conducted to assess the direct effects of HBM constructs and modifying factors (demographic variables, awareness and three dimensions of health locus of control) on BSE performance. Then linear regression model was conducted to assess the indirect effects of modifying factors in effective construct or constructs (defined in the logistic regression model) as a dependent variable. In all tests, the level of significance was 0.05.

Results

Overall, 400 women aged 20 to 50 years with a mean age of 8.08 ± 27.30 participated in this study. In terms of education, 22.6% (n=88) have been educated under diploma, 41.3% (n=161) were graduated from high school, and 36.2% participants (n=141) had obtained college degree. Most participants (n =358, 91.3%) were

married. Concerning their awareness, 35.8% participants (n=143) had no knowledge about cancer and had not used any source, 12.2% participants (n=49) had acquired their knowledge from the health providers, 11% (n=44) from books, 4.2% (n=17) from friends, 15.5% (n=62) from mass media, and 8.1% participants (n=32) had used several sources. 9% patients (n=36) had other sources and 4.2% (n=17) participants did not report any source for their knowledge. A family history of breast cancer was reported by 12% (n=48) of the participants. Regarding the signs and symptoms of breast cancer, 14.2% participants (n=57) reported some symptoms of cancer.

In this study, 45.9 % women (n=177) was performed BSE, but only 10.9% women (n=42) stated that they performed BSE on a regular monthly basis. Quantitative modifying factors (three dimensions of health locus control, age, and awareness) are statistically compared in Table1, and qualitative modifying factors (education, marriage, and family history) are shown in Table 2. BSE performance was significantly related to attending school for college degree, and having knowledge. No significant associations were identified between performing BSE with three dimensions of health locus of control and other variables.

The CHBMS components of the two BSE groups have been presented in Table 3. Significant differences between the two groups were observed for the subscales of benefits (p =0.00), barriers (p =0.01), and self-efficacy (p =0.00).

Logistic regression analysis was used to assess predictor power of three dimensions of health locus of control, other modifying factors, and CHBMS components for performing BSE. In the logistic regression analysis, three dimensions of health locus of control didn't have direct effect in BSE. Perceived self-efficacy and awareness had significant odds ratios. The results revealed that the women with greater perceived self-efficacy were almost two time more likely to perform BSE than those with lower perceived self-efficacy (OR=1.86), and the women with greater knowledge were one time more likely to perform BSE than those with lower perceived self-efficacy (OR =1.13). The amounts of regression coefficients and

Table 3. Relationships between CHBMS Subscales and BSE Performance

CHBMS subscales	BSE Yes Mean± SD	BSE No Mean± SD	P Value
Perceived susceptibility	2.11± 0.86	2.16± 0.93	0.537
Perceived seriousness	3.35± 0.95	3.55±1.07	0.061
Perceived benefits	4.21± 0.72	3.99± 0.89	0.009
Perceived barriers	1.88± 0.69	2.07± 0.40	0.014
Perceived self-efficacy	3.56± 0.74	3.01± 1.00	<0.001
Health motivation	4.28± 0.50	4.24± 0.58	0.412

Table 4. Regression Coefficients and Odds Ratio in Logistic Regression for BSE performance

Variables/ constructs			B	Exp(B)	P Value
Constructs	Perceived susceptibility		0.065	1.067	0.637
	Perceived seriousness		-0.239	0.787	0.055
	Perceived benefits		0.078	1.081	0.635
	Perceived barriers		-0.248	0.781	0.149
	Perceived self-efficacy		0.622	1.863	0
	Health motivation		-0.15	0.861	0.534
Modifying factors	Internal HLOC		-0.034	0.967	0.244
	External HLOC		-0.007	0.944	0.812
	Chance HLOC		0.013	1.013	0.568
	awareness		0.125	1.133	0.001
	age		-0.002	0.998	0.889
	Marriage		-0.519	0.595	0.261
	Education	Diploma/under diploma	-0.149	0.862	0.66
		College degree/under diploma	0.117	1.124	0.757
	Family history		-0.479	0.62	0.198

significance level of constructs and variables have been presented in Table 4.

Perceived self-efficacy was only construct that affects the BSE, therefore linear regression model was used to assess the indirect predictors of performing BSE (by perceived self-efficacy) for three dimensions of health locus of control, and other modifying factors. Three dimensions of health locus of control didn't have indirect effect in BSE. Age ($p<0.001$) and awareness ($p=0.001$) were determinant factors of self-efficacy and had indirect effects on BSE. In this way, one unit change in age and awareness scores would increase the amount of perceived self-efficacy to 0.03 and 0.05, respectively. Therefore perceived self-efficacy constructs directly, awareness variable both directly and indirectly, and age indirectly are considered as predictive factors for BSE.

Discussion

According to the findings, the frequency of regular BSE (monthly) among Iranian women who referred to health care centers has been very low, three dimensions of health locus of control didn't have direct and indirect effects in BSE, and awareness about cancer and the perceived self-efficacy are the most important factors affecting this behavior. In addition to the direct effect, awareness also has had indirect effect on BSE through self-efficacy.

The rate of performing regular BSE found here was nearly identical to that (7%) of previous study conducted in the Jordanian women (Petro-Nustus et al., 2002), while the frequency of this behavior in a sample of Turkish women was 17% (Secginli et al.,), and it is reported to be 26.9 % in Jewish Women and 22.3% in Arab Women (Cohen et al., 2005). Therefore, the rate of BSE among Iranian women is low and recognition of effective factors for improving behavior is necessary.

In this study, among the modifying factors, education level and awareness about cancer were significantly associated to BSE performance. However, only awareness was the predictor of BSE performance.

These results support previous findings in this regard suggesting that well-educated women are more likely to perform BSE (Bottorff et al., 1998; Straughan et al., 2000; Cohen et al., 2005; Sadler et al., 2007; Avci., 2008). Consistent to the findings of other studies (Han et al., 2000; Cohen et al., 2005; Erbay Dundar et al., 2006; Sadler et al., 2007), in the present work, awareness about breast cancer was found to be predictor of performing BSE in Iranian women. It has been revealed that as education level and awareness increase, self-reliance, self-respect and willingness to know one's own body increase as well (Avci, 2008). These findings also suggest the urgent need for increasing women's awareness to become familiar with the feel and appearance of their breasts, and to seek medical evaluation if they notice changes in their breasts.

In some studies, education was identified as a predictor of this behavior (Noroozi et al., 2011; Cohen et al., 2005; Avci., 2008) that is inconsistent with the present study. It could be due to the overlapping of this variable with awareness about cancer. In other word, since educated

person have higher awareness, this predictor becomes stronger.

In the current study, age indirectly and through self-efficacy has influenced the BSE which is similar to the findings of many studies (Umhe et al., 2003; Secginli et al., 2006; Noroozi et al., 2011). In this study, there wasn't any significant correlation between the internal, external, and chance control with BSE. In several studies, there was no relationship between internal control and BSE (Hallal, 1982: Glenn et al., 1990), and there was a negative correlation between external control and BSE (Hallal, 1982). But in a study conducted by Pierre Angel on African-American women, there was a correlation between the internal control and BSE, and there wasn't any correlation between external and chance control with BSE performance. In a recent study, the mean scores of internal, external, and chance control were very similar, and there were not a person with highly internal or external control. Thus lack of relation could be due to this fact, therefore further study in this area is necessary.

Consistent to the findings of other studies, a family history of cancer (Noroozi et al., 2011; Cohen et al., 2005; Andersen et al., 2003; Hackshaw et al., 2003) was not associated with BSE. One explanation for these findings may be this fact that the most high risk women, consider breast cancer generally as a serious condition and uncontrollable, and didn't perform its.

Concerning the HBM, the women who performed BSE perceived higher benefits, self-efficacy, and also fewer barriers than those who did not perform BSE, and the perceived self-efficacy was considered as strong predictor of this behavior that is consistent with the results of numerous studies (Noroozi et al., 2011; Secginli et al., 2006; Avci., 2008; Umhe et al., 2003; Sadat Tavafians et al., 2009; Jirojwong et al., 2003). In other words, self-efficacy is considered as an important determinant of breast self-examination behavior.

The results of this study showed that the constructs of perceived benefits and perceived barriers were associated with BSE, but in current study unlike other studies, the constructs of perceived barriers (Cohen et al., 2005; Umhe et al., 2003), perceived benefits (Secginli et al., 2006; Cohen et al., 2005; Avci., 2008), perceived vulnerability (Secginli et al., 2006; Umhe et al., 2003), and health motivation (Secginli et al., 2006; Umhe et al., 2003) were not predictor of the behavior. Previous studies showed a contradiction concerning the relationship between these constructs and BSE that could be due to different culture. People with different cultures have different sensitivity and barriers for this behavior.

The limitations of this study are assessing breast self-examination as self-reports, in which people usually would report the behavior higher than the actual amount (Mc Caul et al., 1996). Furthermore, this study was based on a convenience sample, so that its findings of this study may not be generalized to all Iranian women. Overall, community-based programs should be expanded to different Iranian women groups to assess the actual rate of screening behaviors and effective factors on them.

Conclusion:

It can be concluded that in order to promote breast Self-

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examination behavior, it is necessary to consider training risk factors and prevention method of cancer. Furthermore, increasing self-efficacy of women through displaying educational films and practice on a model are required, and various techniques such as verbal persuasion, emotional stimulation, performance accomplishment, and modeling especially for young women who have less self-efficacy could be utilized in this important matter.

Since health locus of control was not a determinant factor, better results could be achieved by conducting more researches in this area, especially in samples with highly internal or external control. Therefore, more extensive research is required in this regard in different groups of women.

Acknowledgements

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