

Applying the Health Belief Model in Predicting Breast Cancer Screening Behavior of Women

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Background: Breast cancer is the most common cancer among Iranian women. However, early detection of this cancer leads to a timely treatment and better prognosis, which significantly improves the survival rate in patients.

Objectives: The purpose of this study was to predict the breast cancer screening behavior of women who referred to health centers in Dezful, Iran, using the health belief model (HBM).

Patients and Methods: This descriptive-analytical study was conducted on 226 women who were selected with cluster sampling method from those referred to Dezful health centers. Data collection tool was a researcher made questionnaire based on the constructs of the HBM. Data analysis was performed using SPSS software and through methods of descriptive statistics, Pearson correlation, and regression.

Results: According to the findings of the study, the knowledge and performance of women were poor, and there was a significant relationship between women's performance and variables of knowledge, perceived sensitivity, perceived benefits, perceived barriers, self-efficacy, and cues to action. In addition, variables of knowledge ($P=0.001$), perceived sensitivity ($P=0.022$), and self-efficacy ($P=0.001$) were predictors of performance in women participating in this study.

Conclusions: Poor knowledge and performance of women indicates a crucial need for formal educational programs to sensitize women regarding the importance of breast cancer screening. These educational programs should consider factors affecting breast cancer screening behaviors.

Keywords: Breast Cancer; Cancer Screening; Mammography; Breast Self-Examination

1. Background

Breast cancer is the most common cancer among women in developed and developing countries (1), and the second leading cause of cancer death in women worldwide (2). According to the American Cancer Society, about 232670 new cases of breast cancer were diagnosed in 2014 among women in the United States (3). Statistics in Iran also showed that the incidence of breast cancer has doubled in the past 30 years with the average incidence rate of 10 years earlier than developed countries (4). Also, the age-standardized incidence rate (ASR) has been reported at 23.65 per 100000 people (5). In Khuzestan province, it ranks the first among cancers in women with a mean age of 23.36 years, with the number of 2529 cases and a prevalence of 31% according to the latest report of cancer census. Therefore, breast cancer is considered as a major concern throughout the world and Iran (6).

The office of disease prevention and health promotion (ODPHP) in the US in its healthy people 2020 program has set goals such as reducing the mortality rate of breast cancer, reducing cancer stages, and enhancing sensitivity

and participation of women in breast cancer screening in its ongoing program (7). The key in reducing breast cancer mortality is early diagnosis of the disease (8), which with timely treatment will increase the survival rate of more than 90% of patients (9). Thus, participation of women in diagnostic and screening programs is vital.

Timely diagnostic approaches include awareness of early signs and symptoms of the disease, monthly breast self-examination (BSE), clinical breast examination (CBE), and mammography. Monthly BSE is an effective and inexpensive method that can decrease breast cancer death about 50% (10). About 60% of cancer cases can be diagnosed by CBE. Recent studies have shown that CBE has a sensitivity of 54% and the specificity of 96% (11). Mammography is also able to detect tumors of breast cancer 1-3 years before a mass can be detected by the person (12).

Currently, the most important phenomenon threatening the health of our society is population aging. As the population of the country is quickly approaching the age of over 40 years, breast cancer will soon become one of the main

health problems in the society (13). However, it seems that breast cancer screening among Iranian women is very low and only a few of them do breast cancer screenings. According to a study conducted by Fouladi et al. in 2013, only 27% of participated women have used BSE, and 6.8% mammography as the screening methods 1 year prior to study (14).

Early diagnosis of disease can take place only with women's participation, which is affected by factors such as social norms, cultural sensitivity (15, 16), socioeconomic status, lack of knowledge, mental disorders (17, 18), fear of breast cancer diagnosis, and negative attitudes toward the results (19). In Iran, due to different factors in adopting breast cancer screening behaviors as well as lack of structured educational programs, screening takes place at a very low rate (20). Therefore, paying attention to this problem is necessary in order to promote breast cancer control behavior via models of changing behavior (21).

One of the effective models in prediction of cancer behaviors is the health belief model (HBM) (22). HBM that was developed by Hochbaum and Rosenstock in 1950s for health education specialists (23), includes constructs such as perceived sensitivity, perceived Severity, perceived barriers, perceived benefits, self-efficacy, and cues to action. According to HBM, individuals should believe that even in the case of no symptom of disease, they might have it. When people see themselves at risk of a disease (perceived sensitivity), realize that a disease has potentially serious consequences (perceived severity), believe that preventive action has positive results (perceived benefits), the barriers of that behavior is less than its acquired benefits (perceived barriers), and they believe in doing health behavior (self-efficacy), it is more likely to do that behavior (24, 25).

Several studies have been done in Iran about different cancers such as cervical cancer (26), gastric cancer (27) and so on using HBM. In addition, few studies have been done about predictive constructs of HBM in adopting breast cancer screening behavior among women (28, 29). However, there are conflicting findings about predicting power of different constructs of HBM (29, 30). For example, in Tavafian's study, the constructs of self-efficacy, perceived barriers, and perceived benefits were powerful in predicting the breast self-examination in the studied sample of Iranian women (31). In another study conducted on Chinese women, perceived sensitivity and perceived barriers had significant power in predicting breast self-examination (28). Therefore, these conflicting findings demand further research on this issue.

2. Objectives

The current study aimed to predict breast cancer screening behaviors of women referred to health centers in Dezful, Iran using the Health Belief Model constructs.

3. Patients and Methods

This research was a cross-sectional study conducted from November 2014 to February 2015. The sample size

with 20% attrition rate was estimated at 226 women that were selected using random cluster sampling method from 15 health centers in Dezful. The inclusion criteria were as follows: aged 20 to 60 years, having family file in the selected health centers, not having breast cancer or other cancers, Persian literate, not breastfeeding or being pregnant, and willingness to participate in the study.

3.1. Data Collection Tools

The data were collected via a questionnaire consisting of 4 sections: 1) demographic questions with 16 questions about age, occupation, etc. 2) knowledge questions regarding breast cancer screening methods with 19 questions, 3) thirty-five questions designed according to HBM constructs, and 4) three questions related to breast cancer screening performance.

In knowledge section, a correct answer was given one point and wrong answer were given zero point (total score was ranged between 0 and 19). The third part of the questionnaire contained questions related to HBM constructs, including perceived benefits (8 items), perceived sensitivity (6 items), perceived barriers (8 items), perceived severity (4 items), self-efficacy (4 items), and cues to action (5 items) that were scored using 5-point Likert-type scale (I completely agree = 5; I agree = 4; I have no opinion = 3; I disagree = 2; and I completely disagree = 1).

The questionnaire was designed based on previous studies. To check the validity of the questionnaire, content validity was used, so that the questionnaire was evaluated by 10 experts of Ahvaz Jundishapur University of Medical Sciences and their corrective comments were applied to the questionnaire. The reliability of the various parts of the questionnaire using Cronbach α was satisfactory as follows: perceived sensitivity (0.90), perceived severity (0.82), perceived benefits (0.85), perceived barriers (0.97), perceived self-efficacy (0.82), and cues to action (0.94).

3.2. Ethical Considerations

This study was approved by the Ethics Committee affiliated to Ahvaz Jundishapur University of Medical Sciences (Ethics Code: ajums.rec.1393.366). In this study, researchers were committed to ethical issues of obtaining informed consent from participants, respect for voluntary participation, and inform the participants of the purpose of the study.

4. Results

A total of 226 women participated in the study with the response rate of 100%. The average age of the participants was 39 ± 9 years ranging from 20 to 59 years. In terms of education, the majority of women participating in the study had diploma (43%), were housewives (76%), and were married (84%). Other descriptive indicators of the variables under study are presented in Table 1.

Using the Pearson correlation coefficient, there was significant correlation between knowledge, perceived sensi-

tivity, perceived benefits, perceived barriers, self-efficacy, and cues to action and performance of women, so that the higher scores of knowledge, perceived sensitivity, perceived benefits, self-efficacy, and cues to action and lower scores of perceived barriers caused higher performance in participated women. However, the Pearson correlation coefficient has not been significant at 0.05 error level between perceived intensity and performance of participated women (Table 2).

According to the results of the regression analysis, using Enter method, multiple correlation coefficient for linear combination of variables, including knowledge, perceived sensitivity, perceived intensity, perceived benefits, perceived barriers, self-efficacy, and cues to action

in studied women has been equal to $r = 0.440$ and $RS = 0.194$, which was significant at 0.05 level (Table 3).

Regarding the value of coefficient of determinations (r^2), 19% of the performance of studied women can be determined by forecasting variables of perceived sensitivity, perceived severity, perceived benefits, perceived barriers, self-efficacy, and cues to action. However, the construct of perceived barriers has inverse relationship with practicing breast cancer screening behavior. In other words, by increasing perceived barriers, breast cancer screening behaviors decrease. It is worth mentioning that perceived barriers had items such as feeling embarrassment, time consuming, forgetting, lack of privacy, and difficult breast cancer screening behaviors (Table 3).

Table 1. Descriptive Measures of HBM Constructs, Performance and Knowledge of Women Referred to Health Centers in Dezful

Variables	Mean \pm SD	Lowest Score	Highest Score
Performance	0.780 \pm 1.12	0	4
Knowledge	5.26 \pm 3.26	0	14
Perceived sensitivity	24.57 \pm 3.20	18	33
Perceived severity	9.83 \pm 1.70	5	15
Perceived benefits	33.03 \pm 4.11	21	40
Perceived barriers	24.65 \pm 7.78	8	40
Self-efficacy	22.85 \pm 5.79	7	35
Cues to action	21.22 \pm 3.95	5	25

Table 2. Pearson Correlations of Knowledge, HBM Constructs, and Performance of Women Referred to Health Centers in Dezful

Variables	r	P Value
Knowledge	0.323	0.001 ^a
Perceived sensitivity	0.259	0.001 ^a
Perceived severity	0.029	0.70
Perceived benefits	0.163	0.014 ^b
Perceived barriers	0.213	0.001 ^a
Self-efficacy	0.240	0.001 ^a
Cues to action	0.180	0.007 ^a

^a significant at 0.05.

^b significant at 0.001.

Table 3. Multiple Correlation Coefficients (Regression) Between HBM Constructs (Enter) and Variables of Performance and Knowledge

Variables Prediction	t	Beta	B	P Value
Standard (fixed) ^a	-3.196	-	-2.770	0.002 ^b
Knowledge	3.271	0.221	0.076	0.001 ^b
Perceived sensitivity	2.303	0.170	0.060	0.022 ^c
Perceived severity	0.212	0.013	0.009	0.832
Perceived benefits	0.410	0.028	0.008	0.682
Perceived barriers	1.083	0.078	0.011	0.280
Self-efficacy	3.535	0.220	0.043	0.001 ^b
Cues to action	0.246	0.017	0.005	0.806

^a Statistics: possibility (for linear regression): 0.001; multiple regression (MR), $R = 0.440$; the coefficient of determination $RS (R^2)$, $R^2 = 0.194$; F Ratio (linear regression), $F = 7.47$.

^b Significant at 0.001.

^c Significant at 0.05.

5. Discussion

Our study results showed that knowledge and perceived sensitivity were the important predictors of screening behaviors in participated women. However, perceived severity, perceived benefits, perceived barriers, and cues to action did not have significant predicting powers in breast cancer screening behaviors.

The results of the current study showed that the individuals under study had poor knowledge of breast cancer screening, and their performance was undesirable too. In other studies conducted in Iran, women's knowledge about breast cancer screening methods has been reported poor (11, 13, 30) that was consistent with our findings. This issue calls for more attention in improving general awareness of women in this area to reduce the burden of disease on the society.

In this study, the women's performance regarding breast cancer screening has been low. Bakhtari Aghdam et al. (29) and Akhigbe in Nigeria reported low level of women's performance, which is consistent with the findings of the present study (32). Considering low level of women's knowledge in the field of breast cancer, their low performance was an expected outcome, which requires more attention by health authorities.

This study showed that there is a positive correlation between knowledge, perceived sensitivity, perceived severity, self-efficacy, and cues to action and individuals' performance. In the study done by Hasani et al. a significant relationship was found between 3 constructs of perceived barriers, perceived benefits, self-efficacy, and performance (33). Another study's findings showed that the correlation between knowledge and variables of perceived sensitivity, perceived intensity, and perceived benefits is significant. However, increase in perceived barriers is inversely related to practicing breast cancer behaviors (11). In all these studies, the results are consistent with the findings of the present study.

In this study, no significant relationship was found between perceived intensity and women's performance. In Canbulat and Uzun study, the only construct that did not yield a significant relationship with performance was perceived intensity (34), which is in accordance with the results of the current study. In some studies, in contrast to our study the relationship between perceived intensity and women's performance was significant, which may be due to poor knowledge of women participated in our study.

The results of the present study regarding the predictive rate of HBM constructs on breast cancer screening behaviors showed that self-efficacy and perceived sensitivity have the power to predict breast cancer screening behaviors and self-efficacy had the highest strength in predicting behavior. In the study of Canbulat and Uzun, perceived susceptibility, self-efficacy and perceived barriers were the predictors of breast cancer screening behaviors, and other HBM constructs were not (34). In Hasani

et al. study, the self-efficacy was the strongest predictor of breast cancer screening behavior (33).

According to the results of this study and other studies, self-efficacy is the most important predictor of breast cancer screening. Therefore, in health education programs, special attention should be paid to improve self-efficacy in women regarding breast cancer screening. On the other hand, high level of perceived sensitivity to breast cancer can also play an important role in participating in breast cancer screenings. As the perceived sensitivity motivates a person to take preventive measures, more emphasis should be put on increasing women's breast cancer sensitivity.

According to the study findings, increasing perceived barriers, such as feeling embarrassment, time consuming, forgetting, lack of privacy, and difficult breast cancer screening behaviors has inverse relationship with breast cancer screening behavior. In other words, by increasing perceived barriers, breast cancer screening behaviors decrease.

The study shows that despite the high breast cancer incidence in Iran, public awareness of breast cancer is still very poor and screening in women is not satisfactory, which requires further attention in this field. Since self-efficacy and perceived sensitivity components were predictors of breast cancer preventive behaviors, designing and implementing prevention measures with an emphasis on women's increased sensitivity and promoting their skills to improve preventive behaviors is recommended.

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Authors' Contributions

Leila Masoudiyekta, Bahman Dashtbozorgi, Mahin Gheibizadeh, Mehrnaz Moradi, and Amal Saki Malehi were responsible for the study conception and design, performing data analysis, and drafting the manuscript. Amal Saki Malehi was responsible for the statistical analysis. Data collection was conducted by Leila Masoudiyekta. All the authors approved the final manuscript.

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