

RESEARCH ARTICLE

Investigating the predictors of breast cancer screening behaviors (breast self-examination, clinical examination or examination by physician/midwife and mammography) based on protection motivation theory (PMT) in women

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Keywords

Screening • Breast Cancer • Protection Motivation Theory • Behaviors

Summary

Background. Breast cancer is one of the most common health problems worldwide. The mortality rate of this disease is due to the lack of knowledge about screening methods and late diagnosis of cancer.

Objective. The purpose of this study is to determine the predictors of breast cancer screening behaviors using protection motivation theory.

Methods and materials. The conduction of study was cross-sectional and on 400 women aged 30-59 in Kashan. The data collection instrument was a researcher-made questionnaire based on protection motivation theory. Sampling was performed from all community health service centers in Kashan and the proportional to size sampling method was used as available sampling. The statistical tests were Pearson correlation and linear regression. The software used was version 22 SPSS and the significance level was 0.05.

Results. The results showed that the average age of women was 39.7 ± 7.9 years. There is a direct and statistically significant relationship between perceived breast cancer screening behaviors and perceived self-efficacy ($P < 0.05$) and there is an inverse statistically significant relationship between breast cancer screening behaviors and perceived cost ($P < 0.05$). There is also a direct and significant statistical relationship between motivation of protection and perceived sensitivity, intensity, self-efficacy, cost, and perceived response efficiency ($P < 0.05$). Perceived self-efficacy, cost, and response efficiency are the predictors of breast cancer screening behaviors. The perceived cost is the negative predictor.

Conclusion. Overall, health care providers can view PMT as a framework for developing educational interventions aimed at improving behaviors related to breast cancer screening of women.

Introduction

Breast cancer is the most common cancer in developed and developing countries. Breast cancer is one of the most important health problems in Iran [1, 2] and according to the latest national data base, the standard age for breast cancer is 33.21 per 100,000 [2]. A recent study on breast cancer reported that the average age of breast cancer in Iranian women was 5 years earlier than that in developed countries [3] and the National Cancer Registration Program reported an increase in the incidence rate. Also, breast cancer is the fifth leading cause of cancer death and is estimated to have 14.2% mortality [2].

Previous researches in Iran have shown that breast cancer has a significant impact on women's lives [4]. Lack of awareness of risk factors, breast cancer screening methods, cultural taboos, feelings of shame about talking about breast cancer, lead to late diagnosis and progression of breast cancer and death. Screening involves breast self-examination, examination by a physician, and mammography; self-examination is the easiest way for the initial diagnosis [5].

Among the methods of breast cancer screening, breast self-examination by women is a simple, effective and useful method for breast cancer screening that is suitable for all women and increases self-awareness [6]. Although there is no evidence of the effect of breast self-examination on early detection of breast cancer, according to the Kotka pilot project [7] breast self-examination among early detection methods leads to better diagnosis and reduction of mortality, but studies in Sweden, Russia and Shanghai show no progress in the reduction of mortality [8-10]. However, it has been shown that breast self-examination may be of particular importance in countries where breast cancer is on the rise, but mammography services are not much available [11].

Due to the lack of population-based mammography screening program in Iran, it appears that breast self-examination and subsequent examination by a physician may be appropriate methods in empowering women to diagnose breast cancer early. Breast self-examination and then a doctor's examination are helpful for women who do not have access to another screening method, such as a mammography. Despite the benefits of breast

self-examination, many women are inactive, and various studies have reported insufficient breast self-examination [12].

The Protection Motivation Theory (PMT) is a useful and social cognitive model for motivating the use of protective behaviors and is often used in breast cancer screening [13]. According to the PMT model, women who are more aware of the risk and are prone to breast cancer, and those who consider themselves at risk for serious illness, are more likely to affect the screening-related behaviors. Numerous studies have shown the effectiveness of PMT in breast cancer screening [14-18].

Although breast cancer is one of the few cancers identified in the early stages, this level is very low in Iran [19]. The aim of this study was to determine the predictors of breast cancer screening behaviors (breast self-examination, clinical examination or examination by physician /midwife and mammography) using the Protection Motivation Theory (PMT).

Methods and materials

STUDY PLAN

This analytical research was performed as a cross-sectional study on 400 women aged 30-59 years referring to community health service centers and health centers in Kashan (Iran) from March 2019 to April 2020.

STUDY PARTICIPANTS AND SAMPLING ENVIRONMENT

This study was conducted in Kashan, in central Iran. The target population of the study was all women (single and married) aged 30-59 years, who were selected from 14 health centers and 14 community health centers in Kashan. The criteria for entering the study included: women aged 30-59, consent to participate in the study, lack of breast disease, having a health record in health centers and data bases, and lack of neurological and mental illness. Dependent variables included: protection motivation theory structure including perceived vulnerability, perceived severity, perceived self-efficacy, perceived response costs, perceived response efficiency, and breast cancer screening behaviors, and independent variables included: age, women's level of education, social and job positions.

SAMPLING

In this study, Cochran's formula was used to estimate the best sample size. In the present study, with $p = 0.05$ and the value of $q = 0.05$, the sample size was considered to be $n = 385$, which, taking into account the fall, the sample number of 400 people was selected. Sampling was done from all community health service centers and health centers in Kashan (14 centers + 14 bases) and the proportional to size sampling method was used (sample size of each center and base, based on the ratio of the population of women aged 30-59 in that center or base was determined). Then, from the women who referred to the relevant centers and bases, the information was collected

using the available (easy) data collection method until we reached the desired sample size.

QUESTIONNAIRE OR MEASUREMENT TOOL

The method of collecting information in this study was to present a questionnaire to the subjects in person and complete it in a report. In this study, two questionnaires were used to collect data: 1) demographic profile questionnaire with 18 options containing questions related to individual characteristics including: age, level of education, marital status, family history of cancer and household income; and 2) researcher-made questionnaire based on the protection motivation theory structure in breast cancer screening behaviors and women's knowledge in this field with 31 and 18 questions, respectively, due to the lack of a standard questionnaire in this field, it was codified using sources and reference books and the results of other studies [20, 21]. Questions related to theoretical structures separately included: 4 questions related to perceived vulnerability, 5 questions related to perceived intensity, 8 questions related to perceived self-efficacy, 7 questions related to perceived response costs, 4 questions related to perceived efficacy of the response and 3 questions about breast cancer screening behaviors (breast self-examination, clinical examination or examination by physician /midwife and mammography) and 18 knowledge questions related to women's information about breast cancer, its signs and symptoms and screening behaviors available in this regard. Each question of the protection motivation theory structure was scored using the Likert 5 scale, from a completely opposed option for some items to a completely agreed item for some items. For scoring questions related to behavior, yes and no, code 1 was given to answer yes and code 0 to answer no as their scores. To rate the knowledge questions, answer yes got code 1 and answer no and I don't know got code 0.

INVESTIGATING THE VALIDITY AND RELIABILITY OF THE QUESTIONNAIRE

After finalizing the initial draft of the researcher-made questionnaire, its face validity, content validity and structure validity were examined. To evaluate the content validity, the designed questionnaire was provided to 9 specialists and professors of education and health promotion and 2 experts of the non-communicable diseases unit of Kashan Health Department who work in the field of cancer. Experts were asked to evaluate the questionnaire in terms of difficulty level, ambiguity level, observance of Persian grammar, use of appropriate words and placement of words in their proper place. In the next step, to calculate the content validity ratio, they were asked to classify each of the questions based on the three-part Likert spectrum, "it is necessary," "it is useful but not necessary," and "it is not necessary." To calculate the content validity index, they were also asked to identify the relevance, simplicity and clarity of each item based on a 4-part Likert spectrum. By calculating this index, test items were retained in the test, which based on the minimum acceptable in this index, gave a score above 79%. Accordingly, the ratio of content validity for knowledge, perceived vulnerability, perceived intensity, perceived self-efficacy, perceived response

costs, and perceived response efficiency, was respectively; 0.91, 0.9, 0.85, 0.95, 0.95 and 0.95. Content validity index for knowledge, perceived vulnerability, perceived intensity, perceived self-efficacy, perceived response costs, and perceived response efficiency was respectively; 0.92, 0.91, 0.91, 0.95, 0.92 and 0.91. The reliability of the questionnaire was assessed by internal consistency method and Cronbach's alpha coefficient and values equal to or higher than 0.7 were considered acceptable. For this purpose, questionnaires were distributed during the pilot study among 30 women who met the same entry criteria as the present study. Cronbach's alpha value for knowledge, perceived vulnerability, perceived intensity, perceived self-efficacy, perceived response costs, and perceived response efficiency, was obtained 0.7, 0.74, 0.72, 0.82, 0.7, 0.82 respectively. After reviewing the validity and reliability, the questionnaire was explained to 400 women in the target group according to the sampling method and was assigned according to the criteria for entering the study. The questionnaire was completed by the samples with the guidance of health care providers in centers and bases.

ANALYSIS OF RESULTS

The collected data was encoded and entered into (IBM SPSS version 22). A statistically significant level of less than 0.05 and equal to it was considered. Data analysis was performed using Pearson T independent correlation coefficient and linear regression.

Results

400 participants answered the questions in this study (answering percentage 97.5%), ten questionnaires were removed (four questionnaires due to non-participation, three questionnaires due to disease, three questionnaires due to breast problems). Average age of women was 39.7 ± 7.9 years. Most of the women surveyed were married (92.1%), housewives (65.4%) and had secondary education (47.4%) (Tab. I).

The knowledge score of the subjects was 9.2 ± 2.5 out of 18, which was at an average level.

45.6% of people had poor knowledge about breast cancer and half of the people performed breast self-examination. There is a direct and statistically significant relationship between the breast cancer screening behaviors (breast self-examination, clinical examination or examination by physician/midwife and mammography) and perceived self-efficacy, efficiency of perceived response ($P < 0.05$) and there is an inverse and significant relationship between breast cancer screening behaviors (breast self-examination, clinical examination or examination by physician/midwife and mammography) and the perceived cost ($P < 0.05$).

There is also a direct and significant statistical relationship between perceived motivation and perceived sensitivity, perceived intensity, perceived self-efficacy, perceived cost, and perceived response efficiency ($P < 0.05$).

Perceived self-efficacy, perceived cost, and perceived response efficiency are predictors of breast cancer screening behaviors (breast self-examination, clinical

examination or examination by physician /midwife and mammography). Perceived cost is a negative predictor of these behaviors. According to Table II, there is a direct and statistically significant relationship between people's knowledge about breast cancer and protection motivation theory structures ($P < 0.05$). (Tab. II).

According to Table III, the mean score of perceived self-efficacy and perceived cost was significantly different between the group performing breast screening behaviors (breast self-examination, clinical examination or examination by physician /midwife and mammography) and the group not who did not. ($P < 0.05$). (Tab. III).

Tab. I. Demographic characteristics of women.

Variables		Mean \pm SD or N (%)
Age		39.7 ± 7.9
Marital status	Married	359 (92.1%)
	Single	16 (4.4%)
	Widow	8 (2.2%)
	Divorced	7 (1.3%)
Women occupation	Housewives	255 (65.4%)
	Working	135 (34.6%)
Education level	Primary	74 (19%)
	Secondary	185 (47.4%)
	More than high school	131 (33.6%)

Tab. II. Correlation between knowledge about breast cancer and sub-scale of PMT.

Scale	Knowledge on breast cancer	
	r	P-value
Perceived vulnerability	0.35	< 0.001
Perceived severity	0.15	0.004
Perceived self-efficacy	0.24	< 0.001
Perceived cost	-0.28	< 0.001
Perceived response efficacy	-0.22	< 0.001
Response efficacy	0.22	< 0.001
Protection motivation	0.16	0.006

PMT: Protection Motivation Theory.

Tab.III. The mean of the PMT subscale on screening practice.

Scale	Mean \pm SD		P-value
	Screening practice (100)	Non screening practice (290)	
Perceived vulnerability	21.9 ± 2.7	21.4 ± 3.1	0.61
Perceived severity	21.9 ± 2.7	21.4 ± 3.1	0.08
Perceived self-efficacy	36.4 ± 3.7	35.1 ± 3.9	0.004
Perceived cost	15.4 ± 5.5	17.2 ± 6.1	0.01
Perceived response efficacy	18.4 ± 2.1	18 ± 2.1	0.2
Protection motivation	108.7 ± 8.9	108.4 ± 9.7	0.79

PMT: Protection Motivation Theory.

Discussion

In Kashan, breast cancer is on the rise and is the most common cancer in women, occurring mainly in the 4th and 5th decades of life, so there is a need to implement prevention and screening programs in high-risk populations [22]. The present study is one of the studies conducted on the application of the protection motivation theory to predict the performance of breast cancer screening behaviors by women. The findings of this study regarding the protection motivation theory structures can predict the conduct of breast cancer screening behaviors. The main aim of the present study was to determine the predictive behaviors of breast screening (breast self-examination, clinical examination or examination by physician /midwife and mammography) using PMT theory. In our example, women's knowledge of breast cancer was low, leading to late visits to health centers. In our study, 45.6% of people had poor knowledge about breast cancer and half of the people performed breast self-examination, which is consistent with the study of Ghofranipour et al. [19]. According to the World Health Organization, 55.7% of women worldwide have poor knowledge about breast cancer [23].

In many studies, a significant relationship has been found between breast self-examination and women's knowledge of diagnostic methods for this cancer [24-27]. Our study also found a significant relationship between women's knowledge about breast cancer and the behavior of breast self-examination. Given that breast cancer occurs earlier in Iranian women [28], increasing awareness about breast cancer screening can reduce mortality from the disease. In this study, the most important source of information about breast cancer screening was health staff, because the scope of primary health services and the completeness and comprehensiveness of primary health care, including health education, which is consistent with the study of Ghofranipour et al. [19]. This study, approximately 25% of people performed behaviors related to breast cancer screening (breast self-examination, clinical examination or examination by physician/midwife and mammography), which is consistent with a study by Ghofranipour et al. [16] and the study by Ager B et al. [29]. In this study, the perceived sensitivity and severity in explaining the function of breast cancer screening behaviors on a regular basis were not significant, but increased self-efficacy and reduced cost were accompanied by the behaviors associated with breast cancer screening. This result is in line with the results of the study by Ghofranifard et al. and other studies conducted in this field [19].

In our study, self-efficacy was an important factor in performing breast cancer screening behaviors (women who had regular breast self-examinations, if necessary, went to a doctor for a breast examination or had mammography test, if prescribed by the doctor). Their basic level of self-efficacy was higher than other people. Other studies have linked varying degrees of self-efficacy and breast cancer screening behaviors [30-38].

Conclusions

In general, the findings of our study show that health care providers should use PMT as a program to create educational interventions aimed at improving behaviors related to breast cancer screening in women.

The strengths

This research is a theoretical study that examines breast cancer and its screening behaviors. Our findings provide evidence of the use of PMT as a framework for educational interventions in breast cancer and screening behaviors in breast cancer.

The limitations

This study had many limitations. First, it was a cross-sectional study, so no causal conclusion can be drawn. The example of this research was middle-aged women in a region in the city of Kashan, which does not necessarily indicate what is happening among women in rural areas. Therefore, the results of this study cannot be generalized to a larger population in Iran. In addition, the data were collected by a self-report questionnaire, which may have biases. Further studies are recommended including sufficient confirmation of the information reported in the researches.

Research involving human participants

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent

Informed consent was obtained from all individual participants included in the study.

Ethics approval

Ethics approval for the study was received from the Ethics Committee, Shiraz University of Medical Sciences with Ethic code IR.SUMS.REC.1398.1207.

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Conflict of interest statement

The authors declare no conflict of interest.

Authors' contributions

MN: Article writing and tool making (questionnaire).
FMG: Article writing, tool making (questionnaire), Collecting data, data analysis.
MHK: Article editing and tool making (questionnaire).
MK: Article editing and tool making (questionnaire).
LG: Article writing and tool making (questionnaire).

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