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Factors Related in Mammography Screening Adoption: an Application of Extended Parallel Process Model

Elaheh Vatannavaz[1], Parvaneh Taymoori[2*]

[1] Department of Public Health, School of Public Health, Hamadan University of Medical Sciences, Hamadan, Iran

[2] Department of Public Health, School of Health, Kurdistan University of Medical Sciences, Sanandaj, Iran

*correspondence should be addressed to Parvaneh Taymoori, Department of Public Health, School of Health, Kurdistan University of Medical Sciences, Sanandaj, Iran; Tell: +988717713446; Fax: +988717713446; Email: Parvaneh.tay@gmail.com.

ABSTRACT

It was estimated that one out of eight women would be diagnosed for having breast cancer. Furthermore, breast cancer seemed to affect Iranian women a decade sooner. Mammography behavior analysis is considered as a main method to control breast cancer. Present study aimed to determine effective factors on attending mammography sessions using expanded parallel process model. This descriptive-analytic study was conducted among 252 women aged above 40 years who attended mammography centers in Hamadan, Iran. Participants were selected randomly and a structured questionnaire was applied for collecting data than data was analyzed by SPSS version 21 and LISREL version 8.7. Our findings showed, self-efficacy had the highest correlation with accomplishing mammography behavior; regression coefficient analysis, also, showed that R^2 rates for variables such as self-efficacy, perceived control and attending regular mammography sessions were 0.85, 0.76 and 0.96, respectively. Based on our results, it seemed essential to put emphasis on perceived sensitivity in training programs through sending out messages to increase risk awareness and decrease the fear to make the early diagnose of breast cancer possible and prevent its secondary development.

Key words: Expanded Parallel Process Model, Mammography, Breast Cancer

1. INTRODUCTION

Breast cancer is a major mortality argument and the most important disturbing health factor among women around the world; one of the main mortality factors of breast cancer is the delayed diagnostic of the disease which results in lower chance of survival (1). Studies on the field showed that a year delay in early diagnose of breast cancer would decrease survival probability about 33% (2-6). A study in Iran reported that unfortunately most women with breast cancer reported their problem at advanced levels and most of them (70%) died in a short time. (7) In addition to the mortality of patients, there are other consequences of the disease including physical, psychological and social negative effects which result from the development of disease symptoms like tumor, swelling, transudation from nipples, nipple scabbing or deformation of breast. Major complexities related to that include, changes in social and matrimony relations, change of mental images, less sexual attraction, less independence, pain and suffer, anxiety, depression, fear of disease relapse, disability and financial problems should be considered accordingly (8, 9) secondary prevention through mammography could lead to lower levels of mortality as the result of breast cancer (2-6). Studies focusing on continuous mammography reported that most of eligible women did not attend regular mammography sessions; for example, a comprehensive study gathered data of women doing mammography over 10 years and showed that only 6% of women received regular cares (2). Several studies introduced reasons of avoiding mammography in screening behaviors relative to components such as risk perception, fear perception, perceived self-efficacy and perceived control (7-10). Analyzing screening behaviors of breast cancer, including mammography, among women is an essential issue in controlling the disease and recognizing its relative factors; in this regard, one of the most practical models to investigate the preventives to screening and explaining behavior was extended parallel process model (EPPM) (9, 10). This model was developed by Kim Witte in 1992, and aimed to predict human behavior using four key factors including self-efficacy, benefits, perceived susceptibility

and perceived severity (10). Results of a study experimentally supported this hypothesis and showed that fear was a determinant factor to do mammography (11). Other studies used EPPM model and represented that women with higher levels of self-efficacy, susceptibility and perceived severity followed more health care behavior than others (12). In addition, several studies reported that it was essential to focus on mental factors, as mediators and predictors of behavior, in comprehensive preventive programs in health education; on the other hand, health care providers should be aware of different effective factors on doing preventive and health improvement behaviors to be able to design and implement helpful programs in the field (13-16). The objective of this study was to determine factors related to mammography among Iranian women based on the extended parallel process model.

2. MATERIALS AND METHODS

This cross-sectional study was conducted on 252 sample of women over 40 years old who referred to two mammography centers (Mahdieh mammography center and Fatemiyeh hospital mammography center) in Hamadan province, the west of Iran, during 2013. Participants were selected randomly and were divided in two groups (126 samples for each) including women who regularly or irregularly did mammography. Inclusion criteria to the study for women were to be 40 years or older; they were rejected from the study if they reported breast cancer records. A questionnaire based on structures of EPPM model and demographic variables was used to collect data, which was completed as self-reports; also for volunteers who reported literate education information was collected from interview. All of the participants voluntarily agreed to participate in the study. Only the subjects aged over 40 years old who were voluntary agreed were eligible to participate in this study. Prior to conducting the main project, a pilot study was carried out. Initially the relevant questionnaires were administered to 30 participants who were similar to study population in order to estimate the duration of the study conduction and to evaluate the reliability of the questionnaire. Questionnaire included two sections that comprised of 38 questions: 9 questions for demographic factors, and 29 questions for EPPM variable.

2.1. Demographics

The demographic variables assessed in this study included: age, education level, marital status, number of children, number of pregnancy, menopause condition, habitation, occupation, income rate, insurance, breast cancer history in family, reporting symptoms of breast problems and records of doing mammography regularly or irregularly.

2.2. EPPM variables:

EPPM scale was designed based on standard questionnaires (17-19), and included self-efficacy (10 items), fear (8 items), perceived susceptibility (3 items), perceived severity (7 items) and perceived control (1 item). A five-item Likert scale was used for responding (ranging from 1=strongly agree to 5=strongly disagree). SPSS software version 15 was used in descriptive and correlation statistics. Average demographic features and study structures were calculated. In addition, LISREL software version 8.7 (20) was used to analyze data. Direct and indirect route analysis were estimated by equation modeling techniques to calculate and proportion of model was studied using x2, RMSEA and CFI tests. If AGFI > 0.8, RMSEA <0.08 and GFI and NFI indexes are larger than 0.9 perceived in present study, then it would be considered as a congruent model.

3. RESULTS AND DISCUSSION

Samples ranged from 40 to 80 years old and their average age was 51.55 and SD=8.66.

Table 1 shows frequency of demographic variables and their relation to mammography behavior.

Table 1 . Relationship between demographic variables and mammography behavior

Variables		Total		Mammography Behavior				P-Value
				Regular		Irregular		
		N	%	N	%	N	%	
Age Group (Year)	40 To 45	71	28.2	28	22.22	41	32.53	0.322
	46 To 50	61	24.2	34	26.98	28	22.22	
	51 To 55	51	20.2	30	23.80	22	17.46	
	56 To 60	35	13.9	20	15.57	15	11.90	
	60 To 70	24	9.5	10	7.93	14	11.11	
	71 To 80	10	4	4	3.17	6	4.76	
Marital Status	Married	203	80.5	112	88.88	91	72.22	0.001
	Single	2	0.8	1	0.79	1	0.79	

	Widow	47	18.7	13	10.31	34	26.98	
Education Level	Illiterate	29	11.5	18	14.28	11	8.73	0.046
	Elementary	17	6.7	11	8.73	6	4.76	
	Secondary School	28	11.2	17	13.49	11	8.73	
	High School	93	36.9	37	29.36	56	44.44	
	Academic	85	33.7	43	34.12	42	33.33	
Occupation	Housewife	27	10.7	14	11.12	13	10.32	0.500
	Working	225	89.3	112	88.88	113	89.68	
Insurance	Yes	221	87.7	120	95.24	101	80.15	0.001
	No	31	12.3	6	4.76	25	19.85	
Number of Children	0	3	1.2	2	1.58	1	0.79	0.223
	1 To 2	57	22.6	29	23.01	28	22.22	
	3 To 5	127	50.5	62	49.20	65	51.58	
	6 To 9	65	25.7	33	26.19	32	25.39	
Menopause	Yes	105	41.7	68	53.96	79	62.69	0.332
	No	147	58.3	58	46.03	47	37.30	
Positive Family History of Breast Cancer	Yes	3	1.2	3	1.58	0	0	0.124
	No	249	98.8	123	97.61	126	100	

Table 2 shows the relation between mammography behavior and developed model structure of parallel steps and, as seen, all model structures showed meaningful relationship with doing mammography behavior.

Table 2 . Association between EPPM Variables and Mammography Behavior

variable	P-value	*β*
Perceived susceptibility	< 0.001	1.15
Perceived severity	< 0.001	1.47
Perceived self-efficacy	< 0.001	0.38
Perceived fear	< 0.001	-0.70
Perceived control	< 0.001	4.58

Table 3 presents the relationship between perceived danger and self-efficacy as predicator of mammography behavior and, also, perceived fear and self-efficacy as the Predictor of mammography behavior. Considering the results, self-efficacy and perceived danger had meaningful effect on mammography behavior as the higher the self-efficacy, the higher the understanding of danger. It increased the probability of accomplishing mammography behavior. Self-efficacy and perceived fear, also, had a meaningful effect on mammography behavior as increasing self-efficacy led to lower levels of perceived fear and resulted in more commitment of mammography behavior.

Table 3 . Perceived Danger and Self-Efficacy as Predicators of Mammography Behavior

Variables	P-value	*β*
Perceived Danger and Self-Efficacy as Predicator of Mammography Behavior		
Perceived Danger	< 0.001	1.17
Self-Efficacy	< 0.001	0.38
Perceived Fear and Self-Efficacy as Predicator of Mammography Behavior		
Perceived Fear	< 0.001	-0.35
Self-Efficacy	0.003	0.38

In addition, in Table 4 shows the Zero-order correlations. Significance levels at 0.01 was the criteria for the analysis. The bivariate assessment of variables revealed that there were signs of multi collinearity among EPPM variables.

Table 4. Correlation between different components of EPPM

	Susceptibility	Severity	Fear	Self-Efficacy
Susceptibility	1			
Severity	0.699	1		
Fear	0.644	-0.767	1	
Self-Efficacy	0.739	0.876	-0.842	1
Control	0.670	0.744	-0.854	0.875

Finally, based on LISREL software the effects of independent variables of present study (perceived danger and Perceived fear) on mediating variables (self-efficacy and perceived control) and dependent variable (regular mammography) was investigated (Figure 1). Findings showed, GFI, AGFI and NFI were 0.84, 0.81 and 0.92, respectively, which showed the appropriateness of the model. Regression coefficient analysis showed that R^2 mount was 0.85, 0.76 and 0.96 for self-efficacy, perceived control and regular mammography, respectively.

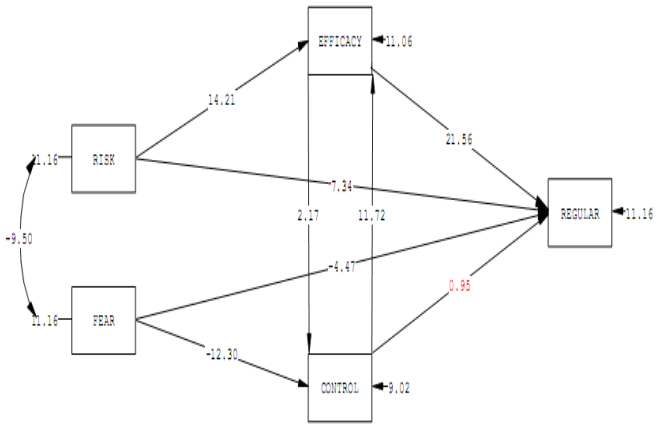

Figure 1. model in meaningful coefficient case

Normed Fit Index (NFI) = 0.92
Non-Normed Fit Index (NNFI) = 0.94
Parsimony Normed Fit Index (PNFI) = 0.83
Comparative Fit Index (CFI) = 0.95
Incremental Fit Index (IFI) = *0.95*
Relative Fit Index (RFI) = 0.91
Goodness of Fit Index (GFI) = 0.84
Adjusted Goodness of Fit Index (AGFI) = 0.81

As the result showed, women who regularly accomplished mammography and the group who did not gained 53.6 and 23.7 percent of maximum score of perceived susceptibility, respectively. Generally, perceived susceptibility was higher among women who regularly did mammography. Results showed that there was more probability with participants who believed to be susceptible to breast cancer to accomplish mammography regularly and on schedule. Allaverdipour *et al*. reported that there was a meaningful relationship between doing mammography and perceived susceptibility of breast cancer among women (22). A similar study, also, showed that perceived susceptibility among women was the main reason of doing or avoiding mammography behavior (21). The present study reported a meaningful relationship between perceived severity and doing mammography behavior in both groups. Results

from present study corresponded to results by Allaverdipour *et al* and Moedi *et al* (21, 22). Furthermore, Jalilian *et al* in their study reported perceived severity as one of the most effective factors on accomplishing preventive behaviors (23). Perceived severity resulted from understanding of severity and impressments of the illness; it could be concluded that, fundamentally, those women who deeply understood complications and consequences of cancer would follow mammography regularly and on schedule. Results from tables 3 to 5 showed that self-efficacy and perceived danger could predict mammography behavior, as increasing self-efficacy would increase danger perception and lead to accomplishing mammography behavior. In addition, self-efficacy and perceived fear had meaningful effect on mammography behavior so that the higher the self-efficacy, the lower the perceived fear, which resulted in better mammography behavior. Results from present study, gained through using LISREL software to regularly analyze the effect of perceived danger, perceived fear, self-efficacy and perceived control on mammography, showed that perceived danger, perceived fear and self-efficacy had meaningful effect on doing or avoiding regular mammography; however, perceived control did not. It could be concluded that when people notice the importance and severity of the subject and recognize that they are able to decrease the danger through following a behavior (regular mammography in this case), they start to control the danger in themselves. If people perceive their abilities weak to control the danger, even if they understand the importance and severity of the subject, they face fear and horror phase and are driven to fear management. Similar result was reported in Mils study, too (24). Among the studies on cancer preventive behaviors among women, Mirzaee *et al*, Jalilian *et al*, and Shamohamadi *et al*., investigating women living in west of Iran, reported that perceived behavior control could not predict trying pap smear tests, which corresponded to results from the present study (25-27). Other studies, also, showed the relationship between high self-efficacy and committing health related behaviors (28). In other words, people understanding from breast cancer and its danger could directly lead to doing or avoiding mammography behavior; though, if they perceived high ability (high self-efficacy) and low fear to protect them against the danger, there would be higher

chances to commit regular mammography. On the other hand, if self-efficacy and fear were low and high, respectively, there would fewer tendencies to follow regular mammography behavior.

4. CONCLUSION

Based on the results from present study, it may be concluded that more focus on perceived susceptibility in training programs and production of continuous messages to increase danger perception and decrease fear would facilitate earlier diagnose and secondary prevention of breast cancer; it also seemed that improving self-efficacy among women could have an effective role on increasing mammography behavior.

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AUTHORS CONTRIBUTION

This work was carried out in collaboration between all authors.

CONFLICT OF INTEREST

The authors declared no potential conflicts of interests with respect to the authorship and/or publication of this article.

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