



# Causes of Delay in Seeking Treatment in Iranian Patients with Breast Cancer Based on the Health Belief Model (HBM)

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## Abstract

**Background:** Breast cancer is the most common cancer among women worldwide.

**Objectives:** Regarding the effect of delay on survival in patients with breast cancer and the high incidence of delayed presentation in these patients in Iran, we decided to study the factors affecting delay in seeking treatment in patient with breast cancer in Kerman, South-east of Iran.

**Methods:** In this cross sectional study, 80 cases (with delay time less than 3 months) and 80 controls (patients with delay time more than 3 months) were enrolled. A questionnaire including demographic characteristics, knowledge, attitude, and Health belief model (HBM) subscales was used for data collection after reliability and validity assessment.

**Results:** The majority of the patients were housewives (73.2%) and most of the patients lived in urban areas (63.7%). The results of multivariate logistic regression showed that there was a significant relationship between the perceived barriers OR = 1.48 (CI 95% = 1.18 - 1.86), cues to action OR = 0.72 (CI 95% = 0.55 - 0.93), perceived susceptibility OR = 0.87 (CI 95% = 0.78 - 0.97), and the first symptom OR = 0.259 (CI 95% = 0.08 - 0.79) with delay in seeking treatment in patients with breast cancer.

**Conclusions:** According to the results, health belief and knowledge about breast cancer were two important factors affecting delay in treatment seeking in patients with breast cancer in Kerman, Iran. In order to reduce this delay, appropriate health education programs should be performed.

**Keywords:** Breast Cancer, Health Belief Model, HBM, Kerman, Iran

## 1. Background

The incidence of breast cancer is increasing around the world (1) and many environmental factors have been blamed for this increased incidence (2-4). Breast cancer makes 25% of all new cancer cases and 15% of all cancer deaths globally and is the most common cancer among women worldwide (5, 6). In 2014, cancer made 13% of all deaths for all causes and was the third leading cause of death in Iran (7). In Iran, breast cancer, as the most frequent cancer among the female population, has imposed a heavy burden and accounts for 24.4% of all malignancies with a crude incidence rate of 17.8 and an age-standardized rate (ASR) of 23.65 and the incidence of advanced stages are relatively high (8). Overall, the 5 year survival rate for breast cancer is 78% (in a range from 18% for advanced cancer cases to 93% for localized cancers) (9). Mortality from

breast cancer is related to stage at time of diagnosis (10). In terms of 5 year breast cancer survival rates, Iran has considerably poorer survival rates compared to European countries and the United States (11). Scientific evidence has confirmed that the main factor that affects the survival rate and incidence of secondary metastasis for breast cancer is the stage of breast cancer (10, 12).

The adverse impact of delayed presentation on survival is mainly attributable to an association between longer delays and more advanced stage. Patients who delay in seeking help less than 3 months, have longer survival than those who have more delay (10). According to some studies, up to 30% of women with breast cancer in London have more than 3 months delay in help-seeking for treatment after seeing the early signs of breast cancer (13). Unfortunately, about 50% of patients with cancer (and 70% of patients with breast cancer) in Iran visit their physicians for

the first time in advanced stages of disease (14). It has been shown in a study in Iran that 1 in 4 women with breast cancer shows up late (15) and in a study by Ghaem Maghami et al. in Tehran, Iran, the results showed that the most important cause of delay among women with breast cancer were lack of knowledge and access to health care services, fear, negligence, and poverty (16). Likewise, studies conducted in Iran about the factors related to delays before diagnosis, planning training programs to change the beliefs, and attitudes of women about breast cancer were stated to be necessary for reducing delay (17, 18). Alarming to say, knowledge about breast cancer has been reported to be relatively low among women in Iran (19), even among universities students (20).

Regarding the effect of delay on survival in patients with breast cancer and the high incidence of delayed presentation in patients with breast cancer in Iran and the relation between delay time with reduced survival and diminished quality of life as well as the lack of adequate research in this field, we decided to study the factors affecting delay in seeking treatment in patient with breast cancer in Kerman, Southeast of Iran.

## 2. Methods

This cross sectional study was performed between 2011 and 2012. As this subject had not been thoroughly studied before at that time in Iran, we initially conducted qualitative research techniques in order to thoroughly describe and understand the causes of delay in seeking help for treatment in women with breast cancer (21). We used the results of this content analysis study (21) to construct the health belief model (HBM). In order to investigate the cause of delay among women with breast cancer, this model was used in a questionnaire to study and compare factors among women with and without delay in seeking treatment.

### 2.1. Study Population and Data Collection

In this study, according to calculations, 80 patients with breast cancer with delay time less than 3 months and 80 patients with breast cancer with delay time more than 3 months, after verification and diagnosis by a pathologist and patient's consent, were enrolled.

Sample size was calculated based on the results of Harirchi et al.'s study (22), which estimated the difference in knowledge and attitude among patients with breast cancer with and without delay. The biggest sample size calculated was 60 people in each group. In this study, we included 80 people in each group to increase power.

Inclusion criteria consisted of being female and living in Kerman. These patients were randomly chosen from patients with breast cancer visiting a major oncology clinic. The instrument used to collect data was a four-part questionnaire (demographic characteristics, knowledge, attitude, and performance assessment) that was completed by the researcher after confirming reliability and validity.

As it is very difficult to find out about people's income and there is always a possibility of false answers, in this study, authors preferred not to ask about the income in number and just asked the patient if she thinks her was income or sufficient or not.

According to the previous studies (10, 21), delay in seeking treatment for breast cancer was considered as not visiting a physician or clinic for more than 3 months after realizing the suspicious symptom.

### 2.2. Instruments, Scores, and Statistical Analysis

Face and content validity and reliability of the questionnaire were approved by several experts. The Cronbach's alpha coefficient was calculated for each domain. The overall Cronbach's alpha coefficient for all domains of the questionnaire was 0.73. In order to measure the health belief model components (perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy), some questions were framed on the Likert scale (except for help operation) and a score from 1 to 5 was assigned to each question.

In perceived susceptibility, 6 questions were raised and the overall score was 30; in perceived severity, 6 questions (total 30 scores) were used as well. In order to evaluate the perceived benefits, perceived barriers, and self-efficacy, 3 questions (15 scores), 6 questions (30 scores), and 3 questions (15 scores) were used, respectively. For measuring and comparing "the cues to action", 12 questions (with response yes/no) were used and to any positive response, one score was assigned. Finally, for attitude and knowledge measurement, in the field of early detection of breast cancer, 5 and 11 questions were raised and the overall score were 5 and 31, respectively.

Data analysis was performed, using SPSS 18. Descriptive analysis, t test, Chi-square, and forward multivariate logistic regression were performed.

This project was approved by the ethics committee of Kerman University of Medical Sciences. Ethics Code: IR.kmu.REC.1396.24. All participants consented to participate in the study.

### 3. Results

#### 3.1. Demographic Characteristics of Participants

According to the results of this study, the mean age of the all participants was 47.5 and the age of the patients in the delayed group was ( $48.41 \pm 11.54$ ) more than the group without delay ( $46.6 \pm 11.16$ ), but the difference was not statistically significant ( $P = 0.41$ ). In terms of marital status, the majority of subjects (76%) were married. Married women had a higher percent in the group without delay (81.7% versus 71.4%), while a higher percentage of patients with delays (19%) compared to the those without delay (12.7%) were widowed or divorced, but the difference between the two groups in terms of marital status was not statistically significant ( $P = 0.44$ ) (Table 1).

The majority of participants were housewives. Employment status was not statistically significant between the two groups ( $P = 0.98$ ). A higher percent of those without delays (74.6%) were living in urban areas compared to the delayed group (52.4%), and their difference was statistically significant ( $P = 0.015$ ) (Table 1).

In both groups, most individuals had insufficient income, but the percentage of these individuals in the group with delay (69%) was slightly higher than the group without delay (66.2%); however, the difference was not statistically significant ( $P = 0.75$ ). In the group without delay, a large number of patients (26.8%) compared to the delayed group (19.0%) had a family history of breast cancer, but their difference was not statistically significant either ( $P = 0.35$ ). The number of patients who were familiar with a patient with a history of breast cancer in the without delay group patients (56.3%), were more than the delayed group (43%), but this difference was not statistically significant ( $P = 0.16$ ) either (Table 1).

In response to the question “what was the first sign that you had?”, the majority of patients mentioned a mass. Twenty-one patients had not disclosed their symptoms to their close relatives and these people were non-significantly higher in the group with delayed presentation (26.2%) compared to the other group (9.9%) (Table 1).

Among those who had disclosed their symptoms to others, in total, patients that stated they were encouraged to ignore the issue and that these symptoms were not indicative of risk were more in the group with delay, but this difference was not statistically significant ( $P = 0.25$ ). A total of 14 patients stated that in the initial visit, the doctor had given them false confidence that the symptoms are not serious and they do not require further follow-up. The percent of these patients in the group with delay was slightly higher than the group without delay, but this difference was not statistically significant ( $P = 0.63$ ) either.

In response to the question “how serious were the primary symptoms in your own opinion?”, more women in the without delay group thought their symptoms were serious than the group with delay and this difference was statistically significant ( $P = 0.019$ ) (Table 2).

The mean knowledge score of the participants was 13.12 (from 31) and the score in the group without delay was slightly higher than the group with delay, but this difference was not statistically significant ( $P = 0.29$ ) (Table 3).

The mean score of perceived susceptibility in the group without delay was higher than the delayed group and the difference was statistically significant ( $P < 0.001$ ). Unlike the mean score of perceived sensitivity, the mean score of perceived severity in the group with delay was slightly higher than the patients without delay, but this difference was not statistically significant ( $P = 0.47$ ) (Table 3).

The mean score of perceived barriers in the group without delay was lower than the group with delay and the difference was statistically significant ( $P < 0.001$ ). Unlike perceived barriers, the mean score of benefits in the delayed group was less than the group without delay, but this difference was not statistically significant ( $P = 0.64$ ) (Table 3).

The mean score of self-efficacy in the group without delay was slightly higher than the group with delay, but this difference was not statistically significant ( $P = 0.23$ ). The mean score of cues to action in the group without delay was more than the group with delay and the difference between the two groups was statistically significant ( $P < 0.001$ ) (Table 3).

A total of 41 patients (25.2%) did breast self-examinations regularly and monthly or at least every 2 months once, and 119 (74.8%) of these participants had never done these examinations before. In the group with delayed presentation, the percent of women who performed these examinations monthly (19.0%) were less than the group without delay (32.4%).

The causes of failure to perform breast self-examination in patients who did not perform the examinations in most participants were lack of information about the necessity of monthly examinations. In addition, only 14 patients (8.7%) of all participants in this study had undergone mammography for early detection of breast cancer and 146 other patients (91.3%) had never done a mammography before. The percentage of patients who had undergone mammography for this purpose in the group without delay (9.9%) was only a little higher than the group with delay (7.1%) (Table 4).

The sources of information about breast cancer mentioned by the patients have been shown in Table 5.

**Table 1.** Demographic Characteristics of Patients (N = 80)<sup>a</sup>

Variable	Total	Delayed Group	Without Delay Group	P Value
<b>Age</b>	47.5	46.5	48.5	0.41
<b>Marital status</b>				0.44
Single	13 (8.1)	8 (9.5)	5 (5.6)	
Married	122 (76.3)	57 (71.4)	65 (81.7)	
Widowed or divorced	25 (15.6)	15 (19.0)	10 (12.7)	
<b>Location</b>				0.015
Urban area	102 (63.7)	42 (52.4)	60 (74.6)	
Rural area	58 (36.3)	38 (47.6)	20 (25.4)	
<b>Occupation status</b>				0.98
Housewife	117 (73.2)	59 (73.8)	58 (73.2)	
Employee	16 (10.0)	6 (7.1)	10 (11.3)	
Student	2 (1.2)	2 (2.3)	0 (0.0)	
Retired	23 (14.4)	11 (14.3)	12 (15.5)	
Self-employed	2 (1.2)	2 (2.4)	0 (0.0)	
<b>Education</b>				0.70
Illiterate or elementary education	57 (35.5)	27 (33.3)	30 (38.0)	
Junior high school or high school education	58 (36.3)	28 (35.7)	30 (38.0)	
University education	45 (28.2)	25 (31.0)	20 (24.0)	
<b>Income</b>				0.75
Insufficient	108 (67.5)	55 (69.0)	53 (66.2)	
Sufficient	52 (32.5)	25 (31.0)	27 (33.8)	
<b>The first sign</b>				< 0.001
Mass	80 (50.0)	28 (35.7)	52 (63.85)	
Swelling of axillary nodes	31 (19.3)	20 (23.85)	11 (14.1)	
Inverted nipple	35 (22.0)	28 (35.7)	7 (8.55)	
Peau d' orange or orange peel skin	9 (5.65)	0 (0.0)	9 (11.3)	
<b>Family history of breast cancer</b>				0.35
Yes	36 (22.5)	15 (19.0)	21 (26.8)	
No	124 (77.5)	65 (81.0)	59 (73.2)	
<b>Familiar with the breast patients</b>				0.16
Yes	79 (49.4)	34 (42.9)	45 (56.3)	
No	81 (50.6)	46 (57.1)	35 (33.7)	

<sup>a</sup>Values are expressed as No. (%).

**Table 2.** The Seriousness of the Symptoms from Different Viewpoints in the Two Groups (N = 80)<sup>a</sup>

Variables	Total	Delayed Group	Without Delay Group	P Value
<b>The physician suggested more investigation</b>				0.63
Yes	146 (91.3)	72 (90.5)	74 (93.0)	
No	14 (8.7)	8 (9.5)	6 (7.3)	
<b>Friends and relatives suggested symptoms are serious</b>				0.25
Yes	131 (81.9)	59 (73.8)	72 (90.1)	
No	8 (5.0)	6 (7.2)	2 (2.9)	
Patient did not disclose her symptoms to others	21 (13.1)	15 (19.0)	6 (7.0)	
<b>The patient herself thought the symptoms are important</b>				0.019
Yes	112 (70.0)	48 (59.5)	64 (80.3)	
No	48 (30.0)	32 (40.5)	16 (19.7)	

<sup>a</sup>Values are expressed as No. (%).

3.2. Univariate and Multivariate Results of Logistic Regression

All variables were separately entered in the univariate logistic model and the crude odds ratio of each was ob-

tained. A total of 6 (out of 12) variables had P values less

**Table 3.** The Scores of Knowledge, Attitude, and Different HBM Variables in Both Groups (N = 80)

Variables	Total Score	Without Delay Group	Delayed Group	P Value
Knowledge	31	13.69	12.55	0.29
Attitude	5	1.18	0.55	0.005
Perceived susceptibility	30	19.89	15.62	< 0.001
Perceived severity	30	19.21	19.76	0.47
Benefits	15	12.06	11.81	0.64
Barriers	30	11.82	16.21	< 0.001
Self-efficacy	15	9.90	9.31	0.23
Cues to action	12	6.94	4.57	< 0.001

**Table 4.** Reasons for Not Performing Monthly Breast Examinations and Mammography<sup>a</sup>

Variables	Total Number (N = 160)	Delayed Group (N = 80)	Without Delay Group (N = 80)	P Value
<b>Breast self-examinations (BSE)</b>				
Lack of information about the necessity	90 (56.3)	42 (52.4)	48 (59.2)	0.338
Lack of information about how to perform	9 (5.6)	6 (7.1)	3 (4.2)	0.248
Forgetting to do	2 (1.2)	0 (0)	2 (2.8)	0.248
Fear of finding a mass	14 (8.7)	13 (16.7)	1 (1.4)	0.001
Lack of time	4 (3.0)	4 (4)	0 (0)	0.060
Did do self-examination regularly	41 (25.2)	15 (19.0)	26 (32.4)	0.046
<b>Mammography</b>				
Lack of information about the necessity	115 (71.8)	55 (59.0)	60 (74.6)	0.379
It was not recommended by a physician	5 (3.1)	4 (4.8)	1 (1.4)	0.184
high cost and lack of mammography coverage by insurance companies	18 (11.5)	7 (9.5)	11 (14.1)	0.317
disregard	2 (1.2)	2 (2.4)	0 (0)	0.248
Fear of cancer diagnosis	6 (3.7)	6 (7.1)	0 (0)	0.014
Did do mammography	14 (8.7)	6 (7.1)	8 (9.9)	0.576

<sup>a</sup>Values are expressed as No. (%).

than 0.05. One of these variables was place of residence; the odds of delay in rural areas was 2.67 times more than the urban area. Women who did not have a mass as the first symptom had a higher chance of delay than those who had it as the initial symptom (P = 0.003). Those who did not consider these symptoms as serious signs, had more chances of delay (P = 0.019). With increase in performance, the chance of delay significantly decreased (P = 0.014). Also with each unit increase in perceived sensitivity and perceived barrier, the chance of delay decreased (P < 0.001). Increased cues for action were related to decrease in delay. (Tables 6 and 7)

Forward multivariate logistic regression was done. Only variables with P values < 0.2 entered the adjusted model.

Table 7 shows univariate and multivariate logistic regression for the health belief model.

#### 4. Discussion

In the present study, the perceived barriers, cues to action, perceived susceptibility, and first signs were significantly associated with delay in seeking treatment in patients with breast cancer.

Studies have assessed the impact of social-demographic factors on delay in presentation in women with breast cancer. Initial studies showed that marital status is an important determining factor for delay in presentation and this issue was also confirmed in latter studies (23-25). In this study, divorced, widowed, and unmarried women compared to married women had higher chance of delay. This might be due to the fact that divorced and widowed women do not have enough incentive about taking care of themselves, as well as they do not have their husband's support (26). However, other evidences show that marital status of patients is not associated with delay in presentation (27).

**Table 5.** Sources of Information About Breast Cancer<sup>a</sup>

Source	Total (N = 160)	Delayed Group (N = 80)	Without Delay Group (N = 80)
<b>Television</b>			
Yes	95 (59.4)	50 (61.9)	45 (56.3)
No	65 (40.6)	30 (38.1)	35 (43.7)
<b>Radio</b>			
Yes	39 (24.4)	15 (19.0)	24 (29.6)
No	121 (75.6)	65 (81.0)	56 (70.4)
<b>Newspapers and magazines</b>			
Yes	42 (26.3)	19 (23.8)	23 (28.2)
No	118 (73.7)	61 (76.2)	57 (71.85)
<b>University or school programs</b>			
Yes	15 (9.4)	8 (9.5)	7 (8.5)
No	145 (90.6)	72 (90.5)	73 (91.5)
<b>Posters and papers</b>			
Yes	49 (30.6)	25 (31.0)	24 (29.6)
No	111 (69.4)	55 (69.0)	56 (70.4)
<b>Books</b>			
Yes	30 (18.7)	11 (14.3)	19 (23.9)
No	130 (81.3)	69 (85.7)	61 (76.1)

<sup>a</sup>Values are expressed as No. (%).

According to the results of this study, unlike the result of other studies (15, 28), family history of breast cancer seems to reduce the risk of delay in presentation. Probably a family history of breast cancer results in patients' familiarity with symptoms and consequences of delayed treatment and, thus, reduces delayed presentation. But, this association was not statistically significant and requires further investigation.

Low educational level was associated with the increased chances of delayed presentation, but this association was not statistically significant in our study. The role of education in reducing delay in presentation has been confirmed in other studies (29, 30). The results of this qualitative study and other studies (15, 21, 22) indicate that the lack of knowledge about breast cancer is an important factor for delayed presentation in Iran and there is a necessity for public education programs, especially for women who are less educated. A study conducted in Iran showed that the knowledge and attitude about breast self-examination (BSE) is less than satisfactory even among university students (20).

In this study, we assessed the patients' awareness about breast cancer risk factors, symptoms, and early detection ways such as mammography and self-examination. The mean of knowledge score in both groups was less than half of the overall knowledge score and it showed the low awareness of participants about breast cancer. Education through media (TV, radio, etc.) as well as at health centers (through face to face training by general practitioners

and nurses, training classes, educational posters, and pamphlets) provides an opportunity for increasing the health literacy of women in relation to breast cancer and will probably reduce delay in presentation and, thus, increase survival and improve the quality of life.

The current study did not show an association between age and delayed presentation. Other studies have shown that older age is an independent predictor for delay in presentation (27, 30, 31). In another study on knowledge and attitudes toward breast cancer, authors have concluded that because older age is a risk factor for both breast cancer and delay in presentation, intervention plans should be specifically targeted to older women (32). In contrast, some studies have shown that patients younger than 50 years old with breast cancer compared with older patients, show a longer delay (33). These findings were explained by the fact that suspicion of breast cancer for older women is more than younger women. However, this explanation cannot be applied in the case of Iranian patients with breast cancer because these patients, in comparison to their Western counterparts, are about 10 years younger (34).

In this study, the nature of the first observed symptoms was associated with delayed presentation. Patients, who had not delayed, often mentioned mass as the first symptom. The discovery of a lump in the breast may reduce patients' delay and some studies have confirmed this (27). In contrast, some other studies have not confirmed this and explained their findings by the fact that fear of cancer, when a woman feels a mass in her breast, or lack of

**Table 6.** Univariate and Multivariate Logistic Regression for Demographic Characteristics, Knowledge, and Attitude

Variable	Crude Odds Ratio	CI 95%	P Value	Adjusted Odds Ratio	CI 95%	P Value
<b>Age</b>	0.98	0.95 - 1.02	0.41			
<b>Education</b>						
University education	1	-	-			
Junior high school or high school Education	1.47	0.56 - 3.90	0.53			
Illiterate or elementary education	1.07	0.43 - 2.64	0.88			
<b>Marital status</b>						
Married	1	-	-			
Single	1.93	0.45 - 8.27	0.37			
Widowed or divorced	1.71	0.60 - 4.90	0.31			
<b>Occupational status</b>						
Housewife	1	-	-			
Employee	0.95	0.28 - 3.17	0.94			
Retired	0.87	0.19 - 3.80	0.87			
<b>Income</b>						
Insufficient	1	-				0.75
Sufficient	1.13	0.50 - 2.60				
<b>Location</b>						
Urban area	1	-				0.017*
Rural area	2.67	1.19 - 6.0				
<b>The first symptom (Mass)</b>						
Yes	1	-		1	-	0.003*
No	0.30	0.13 - 0.67		0.259	0.08 - 0.79	0.018
<b>Consider early symptoms as serious symptoms</b>						
Yes	1	-				0.019*
No	2.76	1.18 - 6.47				
<b>Disclose signs to others</b>						
Yes	1	-				0.062*
No	3.10	0.94 - 10.22				
<b>Prior familiarity with the patient with breast cancer</b>						
Yes	1	-				0.16*
No	1.72	0.79 - 3.70				
<b>Knowledge about breast cancer</b>						
	0.95	0.88 - 1.03	0.25			
<b>Attitude about breast cancer diagnosis</b>						
	0.63	0.44 - 0.91	0.014*			

**Table 7.** Univariate and Multivariate Logistic Regression for HBM

Variable	Crude Odds Ratio	CI 95%	P Value	Adjusted Odds Ratio	CI 95%	P Value
<b>Perceived susceptibility<sup>a</sup></b>	0.83	0.75 - 0.91	<0.001	0.87	0.78 - 0.97	0.017
<b>Perceived barriers<sup>a</sup></b>	1.76	1.35 - 2.06	< 0.001	1.48	1.18 - 1.86	0.01
<b>Self-efficacy<sup>a</sup></b>	0.91	0.78 - 1.06	0.08			
<b>Cue for action<sup>a</sup></b>	0.61	0.49 - 0.75	< 0.001	0.72	0.55 - 0.93	0.015
<b>Perceived severity</b>	1.03	0.94 - 1.14	0.47			
<b>Perceived benefits</b>	0.96	0.83 - 1.11	0.63			

Abbreviation: HBM, Health belief mode.

<sup>a</sup>OR for each unit increase in variable score.

knowledge about the most common symptoms of breast cancer can increase possible delayed presentation (15, 22). The findings of the present research suggest that women need to be educated about the different types of breast cancer symptoms, particularly the symptoms that are less per-

ceived as cancer symptoms by women, such as inverted nipples or swelling in the arm pit lymph nodes. A qualitative study of delay among women with breast cancer also emphasizes the fact that women need more information about breast cancer symptoms and should be encouraged

to see a doctor if they get suspicious (21).

Similar to findings of this study, some initial findings suggested that interventions such as increasing women's awareness of various symptoms of breast cancer as well as providing advice on the necessary steps after discovering early signs of breast cancer should be used in order to reduce delay in presentation (35). Education about identifying the early signs will be useless, if people do not effectively respond to the discovered signs (36).

In this study and our qualitative study (21) and also some other studies, doctors have been blamed for the delayed treatment of some patients. In other words, in addition to patient delay, delayed medical attention for breast cancer in women is also an important issue and more studies are needed in this area.

In this study, a higher percentage of patients without delay were employed, but this difference was not statistically significant. Employment may reduce the odds of delay in presentation because these individuals have better communication with the society and access to information and health-related services (37).

Also, more than half of the patients in this study had insufficient income (almost to the same size in both study groups) and the difference between the two groups was not statistically significant. However, a significant relationship between better economic situation and less delay was found in some studies (22, 37).

In the present research, a significant relationship was found between the incorrect interpretation of symptoms (symptoms not taken seriously) and delayed presentation in univariate statistical tests; however, this variable was removed later as a non-significant variable in the multivariate logistic model. The relationship between perceived risks with delay in presentation of patients with breast cancer has been confirmed in many studies (13, 38) and, in contrast, it has not been found in the some others studies (39). Perhaps, the symptoms are not taken seriously by some patients due to their lack of awareness of the symptoms and consequences of delayed presentation. Therefore, health education programs regarding breast cancer certainly affect the correct interpretation of symptoms and can reduce the patients' delay time.

According to the results, women living in rural areas appear to be at higher risk for delay in presentation. Although this association was not significant in the multivariate model, in some other studies, living in rural areas has been significantly associated with delayed presentation (22, 37, 40). In Kerman province, Iran, some rural residents have to travel longer distances to receive care or to access a range of medical, dental, and mental health specialty services. In addition, due to the lack of access to health care services, rural communities are less educated and more

likely to be poor. Therefore, women in these areas may be at increased risk for delayed presentation and there is more necessity for health education programs in these communities than other communities. A study showed that self-empowerment is low, especially among women who live in rural areas in Kerman province and there is a necessity for continued education of self-efficacy (18). Likewise, the results of the studies in Kerman emphasize the necessity of educational programs to increase women's knowledge about breast cancer (41).

In the univariate model, there was a significant association between not disclosing the discovery of breasts symptom to others and delay in presentation, but this association was not significant in the multivariate model. This association can show that women's health-related behavior is influenced by the society and people around them. Some other studies also suggested that the expectations and influence of important people (e.g., spouse, siblings, or children) can be determinants of health behavior in relation to not only the symptoms of cancer (26, 42), but also other diseases (43, 44).

A limitation of this study might be response bias and the unwillingness or incapability of the patients to answer all questions correctly.

#### 4.1. Conclusions

According to the results of this study, delay in seeking medical care for early signs of breast cancer can be reduced by increasing some components of the health belief model, namely perceived susceptibility of developing an illness, perceived severity of illness, perceived benefits of seeking prompt medical care for breast symptoms, self-efficacy and cues to action and in contrast it will be increased by increasing perceived barriers to seek prompt medical care for breast symptoms.

In conclusion, health belief and knowledge about breast cancer were two important factors affecting delay in treatment seeking in patients with breast cancer in Kerman, Iran. In order to reduce this delay, appropriate health education programs should be performed.

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#### Footnotes

**Authors' Contribution:** Narges Khanjani suggested the topic, helped in conception and design of the study, supervised data collection, supervised data analysis, helped



in interpreting the data and writing the final draft, edited, and commented on the final text. Hadis Rastad helped in writing the proposal, gathered the data, did the data analysis, and helped in writing the final draft. Maryam Saber helped in writing the proposal, cooperated and supervised in the construction of the questionnaires, helped in interpreting the data, and edited the final text. Behjat Kalantari Khandani helped in writing the proposal, helped in recruiting patients from the oncology clinic, helped in data collection and interpreting the data, and edited the final text. Leila Tavakkoli helped in organizing and interpreting the data and writing and editing the final draft.

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