

Predictive Factors for Diagnosis and Treatment Delay in Iranian Women with Breast Cancer

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Abstract

Background: The growing trend of breast cancer in Iran and the adverse consequences arising from the delay in diagnosis and treatment in females has been a challenge.

Objectives: This study was conducted to identify the predictors for diagnosis and treatment delay in females with breast cancer in the north of Iran.

Methods: This cross-sectional study was performed on 232 patients with a definite diagnosis of breast cancer at Razi Hospital, which is the main referral centre in Guilan Province, Iran, using sequential sampling methods. Data were collected using a six-section questionnaire through interviews and medical records of the patients. Data were analyzed using descriptive statistics, logistic regression and chi square test.

Results: Delays of more than one month was observed in 53% of patients and more than three months delay was observed in 31%. Of the patients with a definite diagnosis of breast cancer, 87% returned within seven days for treatment interventions. Three variables of: stage of disease (stage II: $P = 0.002$, $OR = 7.19$ and stage III: $P = 0.034$, $OR = 1.95$), lack of complementary insurance ($P = 0.007$, $OR = 2.26$) and primary insurance ($P = 0.067$, $OR = 3.52$) were important risk factors for patient delay. Knowledge and attitude regarding the symptoms of breast cancer ($P = 0.007$), the most important method for breast cancer diagnosis ($P = 0.004$), and the importance of self-examination was significantly different between patients with and without delay in the onset of treatment.

Conclusions: This study showed that about one-third of patients with breast cancer had a patient delay of more than three months. In addition, 16.8% and 13% of patients experienced system delay in diagnosis and treatment, respectively. The government is responsible to not only teach people on the signs of breast cancer, but also to establish a powerful screening system for breast cancer.

Keywords: Breast Neoplasm, Delay Treatment, Diagnosis, Iran, Female

1. Background

Breast cancer is the most common malignancy in females (1) and a concerning public health problem (2). In the United States (US), it is responsible for one out of every three diagnosed malignancies in females (3). Its incidence is also increasing in developing countries (4, 5) including Iran, so that about 5,000 new cases are diagnosed annually (6). Unfortunately most cases are detected at more advanced stages and at lower ages in comparison with western countries (7, 8). Some studies from Iran have attributed the problem to a lack of education and lack of a regular screening program and a delay in diagnosis and receiving medical treatment (9, 10).

Such a delay might be categorized to patient delay and healthcare provider (system) delay. The interval between detection of the first symptoms by the patient and the first physician visit is known as patient delay (11), however, the interval between the first visit and receiving treatment is regarded as the system delay (12). Any delay in diagnosis

and treatment can result in disease progression, increased mortality, and decreased survival rate (5, 13, 14)

Several studies are available on the reasons for patient delay and a number of factors such as patients' low knowledge and education, low socioeconomic status, and family history of breast cancer have been cited in this regard (15-18). However, sociocultural aspects of cancer treatment or cancer treatment seeking behaviors might be different in developing countries (13), and these two factors play an important role in timely diagnosis and treatment. One of the nurse's roles as educators of health behaviors should be to promote true beliefs and attitudes in relation to breast cancer and its treatment in the general population (19, 20).

Recently, Khakbazan et al. investigated the help seeking behaviors of females with self-discovered breast cancer symptoms in Iran (21). However, no comprehensive studies are available on sociocultural aspects of breast cancer treatment and the breast cancer patients' treatment seeking behaviors in Iran.

2. Objectives

This study was conducted on breast cancer patients referred to Razi educational and treatment center, north of Iran, to identify the causes of patient and system delay in diagnosis and the treatment of breast cancer.

3. Materials and Methods

3.1. Study Design

This cross-sectional study was performed from September to November 2013 on patients with a definite diagnosis of breast cancer, who had referred for check up, to the Razi hospital in Rasht city. This is the main referral and governmental center for cancer chemotherapy and radiotherapy in Guilan Province with coverage of all insurance companies.

3.2. Sampling

In a recent study, Harirchi et al. reported that 68% of Iranian breast cancer patients had a delay of more than one month (13). Then, with a type I error of 0.05, $P = 0.68$ and sampling error of 0.06, a total of 232 subjects were recruited in the study. A sequential sampling method was used to identify the samples. Inclusion criteria were a definite diagnosis of cancer within the last two years, and willingness to participate in the study.

3.3. Measurement and Data Collection

Using the Harirchi et al. questionnaire (13) a six-section instrument was developed. The first part comprised of eight questions on patients' age, place of residence, education level, marital status, average monthly income, number of children, and the status of primary and complementary insurance. The second part included eight questions related to family history of breast cancer, type of family relationship between the patient and the family member with a history of breast cancer, history of performing mammography before the onset of illness, number of mammography examinations (once a year, every six months), attending regular physician visits, the first symptom of the tumor, the interval between the first suspicious symptom and the first medical consultation, and the first person the patient was referred to. The third part consisted of three items on patients' knowledge and four items on her attitude toward breast problems. These items are scored based on their frequencies. The fourth section was a checklist on disease stage, tumor size, and treatment status, which were derived from the patients' records. The fifth part consisted of 10 questions for assessing the causes of patient delay and the sixth section consisted of three questions on

the causes of system delay. An interval of more than one month between detection of the first symptoms by the patient and the first medical consultation was regarded as patient delay. Moreover, the time between the first consultation with a physician and the start of treatment was regarded as the provider/system delay.

To determine the validity of the questionnaire, it was evaluated by ten experts in this field. Test-retest method with a two-week interval was also conducted for 30 patients to evaluate the reliability of the questionnaire ($r = 0.91$). Questionnaires were completed through face-to-face interviews when the patients attended the oncology and radiotherapy clinic of Razi hospital for check up.

3.4. Ethical Considerations

This study was approved by the Ethics Committee of Research Deputy, of Guilan University of Medical Sciences (grant number = 481). Written informed consent was obtained from all participants at the beginning of the study. All participants were informed of the voluntary nature of participation and were assured about the confidentiality of their personal information.

3.5. Data Analysis

SPSS-13 software (Spss Inc, Chicago, IL, USA) was used for data analysis. First, data was analyzed descriptively using frequency, mean and standard deviation indices. Factors affecting patient delay were also studied through univariate logistic regression, and odds ratio was determined. Having a delay was considered as a dependent variable and other variables were considered as factors (i.e. age, (< 40 years, 40 - 50 and > 50 years) including, status of residence (urban, village), education (illiterate, primary education, high school diploma and academic degrees), marital status (single, married and widowed/divorced), number of children (0, 1 - 3 and 4 <), monthly incomes, having an active insurance (yes, no), having complementary insurance (yes, no), family history of breast cancer (yes, no), history of performing a mammography (yes, no) and stage of disease (I, II and III). Variable with P values of ≤ 0.2 were entered in the multivariate logistic regression model (i.e. education, having an insurance, having complementary insurance, family history of breast cancer, history of mammography and stage of disease). Chi-square was also used to evaluate the relationship between delay and patients' knowledge and attitude. P values of less than 0.05 were considered statistically significant.

4. Results

In this study, 113 patients (48.7%) were above 50 years of age. The mean age was 49.82 ± 10.23 years. They were

mostly (85.5%) married and had elementary school education (3707%). In logistic regression, only having an active insurance, having complementary insurance and history of performing mammography, were predictive (preventive factor) for patient delay. Moreover, a significant relationship was observed between the disease stage and the delay (Table 1).

Sixty percent (n = 129) of the patients had a tumor larger than 5 cm and 46% had lymph node involvement at the time of diagnosis.

The disease was detected through breast self-examination (BSE) in 211 patients (91%) and finding a lump was the first symptom for visiting the physician in 66% of the patients. Pain (19.8%), ulceration (1.3%), nipple discharge and bleeding (2.6%) and asymmetric breasts (4.7%) were other symptoms that resulted in a diagnosis of cancer in the rest of the patients. Moreover, 44.8% and 37.1% of the patients visited a general surgeon and a gynecologist on their first visit, respectively. In total, 123 patients (53%) had a delay of more than one month and 31% had a delay of more than three months in their first visits. The mean patient delay was 117.53 ± 238.82 days with a median of 21 days.

In multivariate logistic regression, two variables of complementary insurance ($P = 0.007$, $OR = 2.260$) and primary insurance coverage ($P = 0.06$, $OR = 3.521$) were important preventive factors for patient delay, so that patient delay was lower in those with complementary and primary insurance coverage. In addition, the ratio of delay was 7.188 and 1.948 times more in the second and third stages of the disease in comparison with patients in the first (Table 2).

Moreover, significant differences were observed between patients with and without delay in terms of knowledge of the signs of breast cancer ($P = 0.007$), the most common cancers in women ($P = 0.004$), the most important methods for the diagnosis of breast cancer ($P = 0.004$), attitude towards breast cancer ($P = 0.009$), importance of BSE ($P = 0.03$) and familiarity with the techniques of BSE ($P = 0.04$) (Table 3).

In the provider/system delay part, 16.8% of cases (n = 39) had a delay between the diagnosis and biopsy examination with a mean of 160.02 ± 192.40 days and 13.0% (n = 30) had a delay between biopsy examination and treatment with a mean of 114.81 ± 240.08 days (Table 4).

According to the patients, the most important reasons for a patient delay of more than one month were feeling no urgency to see a physician (32.7%), fear of the disease and diagnosis (17.2%), and financial problems (18.4%).

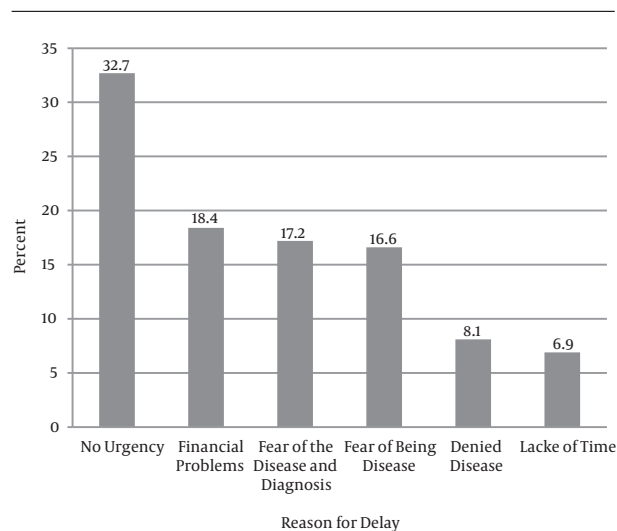


Figure 1. Reasons for the Patient Delay

5. Discussion

In the present study, 53% and 31% of the patients with breast cancer reported a patient delay of less than one month and more than three months, respectively. The rate of delay in the present study was somewhat less than what was reported by a previous study in Iran (22). However, patient delay was more in our study when compared with other countries such as Thailand (17.0%) (23), Colombia (20.3%) (2) and the United States (17.0%) (24).

Based on the results of the present study, lack of insurance, specially lacking a complementary insurance was an important risk factor for patient delay particularly in low-income patients. Therefore, it is necessary for health insurance programs to cover the cancer diagnostic examinations and treatment procedures. Moreover, similar to other studies (23, 25, 26), low education level and low income were risk factors for patient delay. So that more low-income patients referred to physicians in stage III. These findings were consistent with previous studies (3, 27, 28).

In the present study, 60% of patients had a tumor larger than 5 cm and 46% had lymph node involvement at the time of diagnosis, which apparently showed the delay. Moreover, only a few patients had a previous history of mammography screening while the risk of delay was lower in patients with a history of mammography, which indicates the role of mammography in early diagnosis and treatment of breast cancer. In addition, only 41.4% of our patients were familiar with BSE. All these findings not only confirmed the females' low knowledge on the importance of BSE and screening tests but also showed the weak performance of the healthcare system in community educa-

Table 1. The Result of Univariate Logistic Regression Analysis on Patient Delay^a

Predictive Variable	Delay		Univariate Analysis	
	Yes	No	OR (95% CI)	P Value
Age, y				
< 40	17 (13.8)	14 (12.8)	1 (Baseline)	
40 - 50	43 (35.0)	45 (41.3)	1.27 (0.56 - 2.89)	0.568
> 50	63 (51.2)	50 (45.9)	0.96 (0.43 - 2.14)	0.928
Place of residence				
Urban	77 (62.6)	75 (68.8)	1 (Baseline)	
Village	46 (37.4)	34 (31.2)	1.32 (0.76 - 2.27)	0.321
Education level				
Illiterate	35 (28.5)	15 (13.8)	0.34 (0.11 - 1.04)	0.059
Primary education	44 (35.8)	42 (38.5)	0.76 (0.27 - 2.12)	0.605
High school diploma	36 (29.2)	42 (38.5)	0.93 (0.33 - 2.61)	0.896
Academic Degrees	8 (6.5)	10 (9.2)	1 (Baseline)	
Marital status				
Single	7 (5.7)	5 (4.6)	1 (Baseline)	0.966
Married	103 (83.7)	95 (87.2)	1.03 (0.25 - 4.31)	0.530
Widowed/divorced	13 (10.6)	9 (8.3)	1.33 (0.25 - 3.26)	
Number of Children				
No children	10 (8.1)	9 (8.3)	1 (Baseline)	0.935
1 - 3	79 (64.2)	74 (67.9)	1.04 (0.40 - 2.71)	0.758
4 <	34 (27.6)	26 (23.9)	0.85 (0.30 - 2.39)	
Monthly income (Rls)				
< 5,000,000	75 (61.0)	45 (41.3)	0.60 (0.12 - 3.10)	0.542
5,000,000 - 7,500,000	38 (30.9)	47 (43.1)	1.24 (0.24 - 6.48)	0.801
7,500,000 - 10,000,000	7 (5.7)	14 (12.8)	2.00 (0.32 - 12.59)	0.460
10,000,000 <	3 (2.4)	3 (2.8)	1 (Baseline)	
Having an insurance coverage				
Yes	110 (89.4)	106 (97.2)	1 (Baseline)	0.029
No	13 (10.6)	3 (2.8)	4.17 (1.16 - 15.07)	
Having complementary insurance				
Yes	38 (30.9)	53 (48.6)	1 (Baseline)	0.006
No	85 (69.1)	56 (51.4)	2.18 (1.24 - 3.62)	
Family history of breast cancer				
Yes	24 (19.5)	33 (30.3)	1.79 (0.98 - 3.28)	0.059
No	99 (80.5)	76 (69.7)	1 (Baseline)	
History of mammography				
Yes	10 (8.1)	22 (20.2)	0.35 (0.16 - 0.78)	0.01
No	113 (91.9)	87 (79.8)	1 (Baseline)	
Stage of disease				
I	4 (3.3)	14 (12.8)	1 (Baseline)	
II	69 (56)	67 (61.5)	6.25 (1.87 - 20.83)	0.003
III	50 (40.7)	28 (25.7)	1.73 (0.98 - 3.07)	0.059

^a Values are expressed as No. (%).

Table 2. The Result of Multivariate Logistic Regression Analysis on Patient Delay

Predictive Variable	S.E.	Wald	P Value	OR (95% CI)
Primary insurance (No)	0.69	3.35	0.067	3.52 (0.91 - 13.46)
Complementary insurance (No)	0.30	7.40	0.007	2.26 (1.25 - 4.05)
Family history of breast cancer (No)	0.33	2.79	0.095	1.74 (1.09 - 3.32)
History of mammography (No)	0.44	2.96	0.085	2.11 (0.88 - 5.00)
Stage of disease				
Stage I (Baseline)		10.58	0.005	-
Stage II	0.65	9.24	0.002	7.19 (2.01 - 25.80)
Stage III	0.31	4.51	0.034	1.95 (1.06 - 3.56)

Table 3. Knowledge and Attitude Towards Breast Cancer^a

Phrases	Delay		P Value
	No	Yes	
Knowledge of Breast Cancer Symptoms			0.007
Breast and axillary lump	42 (38)	38 (31)	
Lump and other symptoms	24 (22)	13 (11)	
I do not know	43 (40)	72 (58)	
Knowledge of most common cancers in women			0.004
Breast cancer is the most prevalent cancer in females	72 (66)	55 (45)	
Another cancer except Breast cancer, is the most prevalent cancer	2 (2)	6 (5)	
I don't have any information	35 (32)	62 (50)	
The most important method for the diagnosis of breast cancer			0.004
Breast self-examination	42 (38)	29 (23)	
Physician	38 (35)	58 (48)	
Mammography	24 (22)	21 (17)	
Blood tests	4 (4)	3 (2)	
I do not know	1 (1)	12 (10)	
Attitude towards breast cancer			0.009
Breast cancer is curable	82 (75)	67 (54)	
Breast cancer is fatal	4 (4)	8 (7)	
It depends on individual's fate	15 (14)	36 (29)	
I don't have any information	8 (7)	12 (10)	
Importance of self-examination			0.03
Breast self-examination is important	62 (57)	53 (43)	
Breast self-examination is unimportant	47 (43)	70 (57)	
Familiarity with self-examination			0.04
Yes	52 (47)	44 (36)	
No	57 (53)	79 (64)	
Total	109 (100)	123 (100)	

^aValues are expressed as No. (%).**Table 4.** The Reasons for Delay in Treatment and Diagnostic Procedure After Visiting the Physician

Variable of Provider/System Delay	No. (%)
Diagnostic procedures 7 days after visiting the physician	
Yes	194 (83.2)
No	39 (16.8)
Reasons for not doing the diagnostic procedures	
Lack of access to mammography / sonography	2 (0.9)
Assurance of the physician that the symptoms were not important	32 (13.8)
Waiting on the list for specialist physicians	5 (2.2)
Treatment within 7 days of definite diagnosis	
Yes	202 (87)
No	30 (13)
Reasons for not doing treatment procedures	
Lack of access to chemotherapy and radiotherapy	2 (1)
Costs of treatment	10 (4.5)
Loss of time for the patient insurance	1 (0.5)
Waiting on the list for treatment	17 (7)

tion and in disease screening. Previous studies in Iran have shown that the rate of BSE is as low as 6% - 17% (8, 29, 30). Consistently, a study in Colombia reported that 24.5% of the women in the age group 18 - 69 years performed BSE

regularly (2). However, this rate is 75% among US women (31), which is clearly different from developing countries. Although the patients related factors such as low socioeconomic status, low education level, and lack of knowledge regarding breast cancer and BSE are usually cited as the most important reasons for female's weak practice in BSE, however, the weak performance of the governmental healthcare systems should not be overlooked.

In this study, the majority of patients (58% and 40% of the patients with and without delay) had no information about the symptoms of cancer. Moreover, 43% and 57% of the patients with and without delay were not aware of the importance of self-assessment. Moreover, only a few patients were aware of the role of mammography in screening for breast cancer. These findings are in line with the results of the previous studies in Iran (8, 32) and in other developing countries (2, 33, 34). A previous study emphasized on the role of the media (8) and education systems in making people, and especially all women above 20 years of age, familiar with the symptoms of breast cancer and BSE (35). However, despite the striking fact of Iran's rank in breast cancer, there is still no organized screening program for breast cancer in Iran.

The present study showed a significant relationship between patient delay and disease stage at the time of diagnosis so that patients with delay were mostly at advanced stages at the time of diagnosis. This finding was consistent with what was reported by previous studies (2, 12).

In the present study, the most important reasons for patient delay were feeling no urgency to see the physician, minimizing and trivializing the symptoms of the disease, financial concerns, and fear of incurability. Other studies from Iran (22, 36) and other developing countries (2, 33) have also reported similar findings. Moreover, the results of studies on patients with various cancers showed that incorrect interpretation and trivializing the symptoms and fear of visiting a physician were important reasons for patient delay (37, 38). These findings again confirm the patients' low knowledge about the symptoms of breast cancer and its effect of their treatment seeking behavior. Fear of incurability may not only keep patients from seeking medical treatment despite certain changes in their body, but also may keep them from searching for information (20, 39).

System delay comprised a great proportion of delays in the present study, so that assurance of the physician that the symptoms were not important was the reason for detecting breast cancer at more advanced stages in 13.8% of the cases. Moreover, waiting on the list for chemotherapy and radiotherapy comprised 7% of the reasons for delay. The reason could be that there is only one governmental center with chemotherapy facilities in Guilan Province,

north of Iran. Bilimoria et al. also reported an increase in the interval between the diagnosis and treatment of cancers due to the increase in the load of cancers (40).

One of the limitations of this research that can be noted is gathering samples at a governmental center. Also, evaluation of system delay through assessing only three variables can be considered as a research limitation.

Further multicenter studies with larger sample sizes and inclusion of patients referring to the private system are suggested. Moreover, designing improved instruments for assessing knowledge and attitude of patients and also considering the time period during which patients have refused treatment initiation, as part of the reason of system delay is recommended.

In conclusion, this study showed that about one-third of patients with breast cancer had a patient delay of more than three months. In addition 16.8% and 13% of patients experienced system delay in diagnosis and treatment, respectively. Amongst the investigated factors, lack of insurance coverage and specially lacking a complementary insurance, low education level and low income were risk factors for patient delay. Considering the results of the present study, the government is responsible to establish an organized screening program for breast cancer nationwide. The government and also all education systems are also responsible to not only teach people about the signs of breast cancer, but also to establish a continues public training system to educate all girls and women on the importance and methods of regular screening of breast cancer such as BSE and mammography. Moreover, the government is responsible to provide insurance for all people and also it is necessary for health insurance programs to cover cancer diagnostic examinations and treatment procedures.

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Footnotes

Authors' Contribution: All authors contributed to the study conception. Nastaran Mirfarhadi and Abbas Rahimi contributed to the process of data collection. Atefeh Ghanbari and Malahat Khalili contributed to the study design, the data analysis. Nastaran Mirfarhadi wrote the first draft

of the paper. Nastaran Mirfarhadi, Atefeh Ghanbari and Malahat Khalili contributed to write the final draft of the paper.

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