

Perceived stress and its socio-demographic predictors in Iranian women receiving treatment for breast cancer

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A – Study Design, B – Data Collection, C – Statistical Analysis, D – Data Interpretation, E – Manuscript Preparation, F – Literature Search, G – Funds Collection

Summary Background. Due to pathological differences with other chronic diseases, breast cancer causes psychological and emotional problems, such as negative feelings, anxiety and stress.

Objectives. The present study aimed to measure the perceived level of stress and its socio-demographic predictors among women with breast cancer.

Material and methods. This cross-sectional study was conducted on 166 women receiving treatment for breast cancer in Ghazi Tabatabaie, Al-Zahra, Vali-Asr and Shams hospitals of Tabriz-Iran in 2017. A convenience sampling method was employed to select the participants. The required data was gathered using Cohen's Perceived Stress Scale (PSS) and then statistically analysed using the independent *t*-Test, one-way ANOVA, the Pearson correlation coefficient and multivariate linear regression analysis.

Results. The mean (standard deviation) score of perceived stress was 32.9 (5.2) out of 56. The multivariate linear regression analysis showed that income, education of the mother and marital satisfaction were predictors of perceived stress. These variables predicted 21.5% of the observed variance in the total score of perceived stress.

Conclusions. The results indicated that the mean score of perceived stress was higher than average in women receiving treatment for breast cancer. Therefore, it is necessary to develop and execute strategies to reduce stress in such patients, especially those with a family history of breast cancer.

Key words: breast neoplasms, psychological stress, women.

Amirzehni J, Zareipour MA, Mirghafourvand M. Perceived stress and its socio-demographic predictors in Iranian women receiving treatment for breast cancer. *Fam Med Prim Care Rev* 2023; 25(4): 387–392, doi: <https://doi.org/10.5114/fmpcr.2023.132611>.

Background

Today, cancer is one of the main causes of mortality and a major health issue worldwide [1]. Breast cancer is the second leading cancer and the most prevalent malignancy among women [2–4], affecting more than 1.67 million women worldwide [5]. The incidence of breast cancer is rapidly increasing in Asian countries [6]. Cancers are among the most important non-communicable diseases in Iran, as well as the third leading cause of death in this country after cardiovascular diseases and traffic accidents. It is one of the most common cancers in Iran [7] that imposes a huge financial burden on the health system [8, 9].

Breast cancer has been one of the most prevalent malignant diseases among Iranian women over the past four decades. Unfortunately, due to the current growing prevalence rate of this disease, the relevant annual costs incurred by the Iranian health system are increasing as well. This clarifies why numerous studies have been conducted on this disease in recent years. The incidence of breast cancer and mortality rates in Iran have been estimated at 28.8 and 4.33 per 100,000 women, respectively [10]. The epidemiological pattern of breast cancer in Iran is different from the rest of the world, and the mean age of patients in Iran is lower than the global average, and most are diagnosed at the advanced stage of breast cancer. The increasing number of cancer patients in Iran requires further speculation. Changes in lifestyles, diets, eating habits and the industrialisation of societies are major factors that may contribute to this increasing

trend. In general, breast cancer can be considered the most prevalent malignant disease among Iranian women, which affects their lives at least one decade earlier than those living in other countries, including developed countries [7, 11, 12].

Being diagnosed with cancer may cause the patients and their families to face major emotional problems, such as stress, anxiety and depression [13, 14]. Patients receiving cancer treatment may undergo some short- and long-term physical and mental complications including anxiety, depression, stress and fear of relapse and death [15]. Approximately one-third of women with breast cancer report a major mental disorder over time [16].

Stress is a psychological factor associated with the incidence or progression of cancer. As a variable related to all psychological factors, stress is the result of excessive pressure on a person in dealing with daily needs [17]. Stress increases the incidence of depression, anxiety, worry and other forms of psychological discomforts in cancer patients. Stress and anxiety can affect physiological function of the immune system and predispose patients to a variety of physical and mental disorders by reducing disease-bearing capacity [18, 19]. Race, ethnicity and income have considerable impacts on the perception of stress [20]. Women with breast cancer face multiple episodes of stress, such as fear of possible death, fear of family disintegration and side effects of treatment and other relevant stimuli [21]. Stress stimulates tumour growth by affecting the immune system. In addition, stress increases alcohol, tobacco and drug craving, causes poor diet, poor-quality sleep and lower physi-



cal activity. Finally, women who experience stress as a result of breast cancer are less likely to follow physician's orders [22].

Considering the very high prevalence of cancers, especially breast cancer, and their adverse effects, such as stress on our life, the present study aimed to measure the perceived stress and its predictors in women with breast cancer. Understanding these factors helps medical staff to improve the health and reduce the stress of such patients.

Materials and methods

Study design and participants

The present study is a descriptive-analytical cross-sectional study that was conducted on 166 women receiving treatment for breast cancer in Ghazi Tabatabaie, Al-Zahra, Vali-Asr and Shams hospitals of Tabriz-Iran in 2017. The inclusion criteria were stage I, II or III breast cancer or ductal carcinoma in situ provided in the medical records of the patients, consent for participation and having at least elementary education. The exclusion criteria included taking psychiatric drugs, having a history of a major physical or psychological underlying disease that confounded the research process, having other malignancies, having a stressful experience in the last month and being in stage IV or end-stage breast cancer.

Sample size

Based on Hashemi and Paymannia's study [23] regarding perceived stress, a standard deviation of 4.01, $\alpha = 0.05$ and $d = 0.05$ around the mean ($X = 29.13$), the sample size was estimated at 166.

Sampling

In this study, samples were selected using the convenience sampling method. After obtaining ethical approval from the Deputy of Research and Technology of Tabriz University of Medical Sciences (IR.TBZMED.REC.1395.10), the authors attended hospitals to introduce themselves, explain the research objectives to the patients, ensure them about confidentiality and select eligible participants. After obtaining the written informed consent of eligible patients, in the case of meeting the inclusion criteria and inclination to participate in the research, the socio-demographic and obstetrics characteristic questionnaire and Cohen's Perceived Stress Scale (PSS) were administered and filled out through in-person interviews. Beforehand, all participants were assured of the confidentiality of data and the right of immediate withdrawal.

Data collection tools

Data collection was done using the socio-demographic and obstetrics characteristic questionnaire and Cohen's Perceived Stress Scale. The PSS, in 14, 10 and 4-item versions, is a psychological instrument for measuring the perception of general stress over the past month. It is designed to measure how stressful, uncontrollable and overloaded an event is perceived. The scale also investigates risk factors of behavioural disorders and the mechanism of stressful relationships. In this study, the 14-item version of the PSS was used for data collection. Seven positive items of the scale are scored inversely (4, 5, 6, 7, 9, 10, and 13). All items are scored on a 5-point Likert scale (0: never, 1: low, 2: moderate, 3: high, 4: very high). The scale scores range between 1 and 56. The validity and reliability of PSS were assessed by Maroufizadeh et al. [24] in Iran, and its Cronbach's alpha was reported as 0.90, 0.90 and 0.77 for 14-item, 10-item and 4-item versions, respectively.

In the present study, content and face validities were employed for assessing the validity of the socio-demographic and

obstetrics characteristic questionnaire. In addition, a test-pre-test was conducted on 30 patients with a two-week interval to assess the reliability of the PSS in terms of intra-class correlation coefficient (ICC) and internal consistency (Cronbach's alpha). Cronbach's alpha and ICC were 0.72 and 0.79, respectively.

Data analysis

The obtained data was statistically analysed in SPSS-21. Descriptive statistics (frequency, percentage, mean and standard deviation) were employed to describe socio-demographic information and perceived stress. To determine the relationship between some socio-demographic information and perceived stress, one-way ANOVA and the independent *t*-Test were employed. To adjust confounding variables and determine the coefficient of variance, those independent variables (socio-demographics) correlated with perceived stress with $p < 0.2$ were then entered into the multivariate linear regression with backward strategy.

Results

The mean age of participants was 50.0 ± 11.4 years, and the highest and lowest frequencies were in the age groups over 51 years (41%) and under 40 years (24.7%), respectively. In terms of educational attainment, 41% of patients and their husbands had an elementary-secondary school degree, and 27.1% of them had a high school degree or diploma. Most of the patients (80.1%) were living in urban areas. The maximum and minimum duration of illness was 1 year (60.8%) and 3 years (8.4%), respectively. Most of the participants (72.3%) were housewives, and about half of them (47.6%) had one or two children. More than half of the participants reported insufficient household income (54.2%). Most patients (49.4%) were stage II, and more than three-quarters of them (79.5%) were married. About one fourth of husbands (27.1%) were self-employed. The majority of patients (86.7%) were living with their families, and about half of them (47.6%) reported a moderate level of marital satisfaction with their marital life. Most participants (89.2%) had no history of cancer in any first-degree relatives. The malignancy prevalence was equal among the mothers and sisters (5.4%) of the participants with a family history of cancer. The majority of patients (92.2%) were receiving polytherapy. To most of the participants (94.6%), their caregivers had fair general health. According to the results, husbands accounted for the majority of caregivers (34.9%), whereas mothers and sisters accounted for the minority of caregivers (16.9%). Based on the independent *t*-Test and one-way ANOVA results, perceived stress had a significant relationship with monthly income, disease stage, educational attainment of spouse, marital satisfaction and history of cancer in first-degree relatives ($p < 0.05$) (Table 1).

The mean score of the perceived stress in patients receiving treatment was 32.9 ± 5.2 out of 56 (Table 2). Based on the results of the independent *t*-Test and one-way ANOVA, the variables of job, monthly income, disease stage, educational attainment of spouse, job of spouse, marital satisfaction and history of breast cancer in first-degree relatives and caregivers were correlated with perceived stress with $p < 0.02$ were entered into the multivariate linear regression model with backward strategy. Finally, income, education of mother and marital satisfaction were predictors of perceived stress. Patients whose income was not sufficient for their daily expenses had higher stress than those with sufficient income. Patients with high school or high school diploma education had higher stress than those who had elementary or secondary educational degrees. Patients with moderate marital satisfaction had a lower stress level than those with low marital satisfaction. These variables could predict 21.5% of the observed variance in the total score of perceived stress (Table 3).

Table 1. Relationship between socio-demographics and perceived stress in women under treatment for breast cancer (n = 166)

Variable	Number	Mean ± SD	p	Variable	Number	Mean (SD)	p
Age (Year)		50.0 (11.4)	0.707*	Education of spouse			0.022 [†]
40 and below	41	32.5 ± 6.8		Elementary – secondary	37	31.6 ± 6.5	
41–50	57	32.7 ± 5.1		High school – diploma	57	31.6 ± 4.7	
Above 50	68	33.3 ± 4.1		University	38	34.5 ± 4.0	
Education			0.586 [†]	Occupation of spouse			0.151 [†]
Elementary – secondary	68	32.8 ± 5.8		Employee	38	33.8 ± 4.7	
High school – diploma	63	32.5 ± 5.0		Self-employed	45	32.2 ± 5.5	
University	35	33.7 ± 4.6		Retired	24	33.7 ± 3.8	
Residence			0.302 [‡]	Rancher, farmer, others	25	31.1 ± 6.5	
City	133	33.1 ± 5.1		Lifestyle			0.926 [‡]
Village	33	32.1 ± 5.6		My family	144	32.9 ± 5.2	
Duration of sickness			0.506 [†]	Others	22	33.0 ± 5.7	
1 year	101	32.7 ± 5.2		Marital satisfaction			0.001 [†]
2 years	33	33.4 ± 4.5		Low	17	35.1 ± 5.0	
3 years	14	34.3 ± 5.3		Moderate	79	33.4 ± 4.1	
More than 3 years	18	31.8 ± 6.7		High	40	30.2 ± 6.5	
Occupation			0.141 [‡]	Family history of the disease			0.304 [‡]
Housewife	120	32.5 ± 5.5		None	148	32.9 ± 5.4	
Have a job	46	33.9 ± 4.3		Sister	9	34.5 ± 1.9	
Number of children			0.899 [†]	Mother	9	30.8 ± 4.0	
No children	24	32.7 ± 5.6		Health of caregiver			0.519 [‡]
1–2	79	32.8 ± 5.1		Yes	157	32.8 ± 5.3	
3 or more	63	33.1 ± 5.3		No	9	34.0 ± 4.2	
Caregiver			0.052 [‡]	Income status			0.001 [†]
Spouse	58	31.9 ± 5.0		Enough	16	29.2 ± 7.1	
Mother and sister	28	31.8 ± 6.9		Not enough	90	34.0 ± 4.4	
Spouse and others	31	33.4 ± 4.3		To some extent enough	60	32.2 ± 5.3	
Others	49	34.4 ± 4.5		Marital status			0.670 [†]
Stage of disease			0.012 [†]	Single	14	33.5 ± 6.7	
I	61	31.3 ± 5.9		Married	132	32.7 ± 5.3	
II	82	33.9 ± 3.9		Divorced or widowed	20	33.7 ± 3.0	
III	23	33.5 ± 6.5					
Treatment			0.417 [‡]				
Chemotherapy	13	31.8 ± 2.4					
Combination therapy	153	33.0 ± 5.4					

The variables of education of spouse, occupation of spouse and marital satisfaction contain unanswered data. Pearson correlation test; [†]One way ANOVA; [‡]Independent t-Test.

Table 2. Mean score of perceived stress in women under treatment for breast cancer (n = 166)

Variable	Mean ± SD	Range of achieved score	Range of achievable score
Perceived stress	32.9 ± 5.2	16–47	0–56

Table 3. Socio-demographic predictors of perceived stress in women under treatment for breast cancer (n = 166)

Variable	B (95% CI)*	p
Income (reference: enough)		
Not enough	4.2 (1.1 to 7.4)	0.007
To some extent enough	1.3 (-1.7 to 4.3)	0.400
Education of mother (reference: elementary-secondary)		
High school – diploma	4.2 (1.9 to 6.7)	0.001
University	-0.2 (-2.3 to 1.9)	0.874
Marital satisfaction (reference: low)		
Moderate	-4.6 (-7.6 to -1.7)	0.002
High	-1.8 (-4.6 to 0.9)	0.196

*95% Confidence Interval; Adjusted R² = 21.5%.

Discussion

The data analysis results indicated a high mean score of perceived stress in the participants. This finding can be attributed to the feeling of not being understood, a feeling of dependence on others, specifically family members, the unpredictable nature of the disease and high treatment costs. Annoying and unpleasant memories of consequences may cause confused thoughts about the future and fear of relapse, which, in turn, can affect the level of stress [25]. Since the majority of participants had primary education and were within the first year post-diagnosis, they had insufficient information about therapeutic outcomes and, consequently, experienced a higher level of stress.

Other studies have also reported the high prevalence of stress in women with breast cancer. In a quasi-experimental study conducted on 30 patients with breast cancer in Imam Hossein hospital of Tehran (capital of Iran), Aminnasab et al. reported the high prevalence of stress in these patients [26]. Ozdemir and Tas Arslan conducted a cross-sectional study on 100 women with breast cancer at a training and research hospital in Turkey and showed that the stress level was significantly higher in this group [27]. Pouy et al. carried out a quasi-experimental study performed on 66 patients diagnosed with breast cancer visiting one of the specialised medical centres of Ilam, Iran. The results showed high stress among cancer patients [28].

Breast cancer is a chronic disease that still causes deep fear and stress in people despite medical advances. Among the different types of cancer, breast cancer is the most prevalent malignancy and leading cause of emotional and psychological complexities [29]. Stress management interventions empower individuals to reduce stress and adapt themselves to stressful situations [30]. Such interventions are comprised of factors such as raising the awareness of stress, relaxation training, identification of inefficient thoughts, mental imagination, problem-solving training, self-expression skills training and planning for activities [31]. The identification of stress-coping mechanisms and methods is an important factor affecting the mental-psychological status of cancer patients [32]. Stress-coping skills refer to the use of different intellectual-behavioural techniques people use when dealing with problems [33].

Monthly income for life expenses is one of the effective factors on perceived stress in patients suffering from breast cancer. That is, patients whose income did not suffice their expenses experienced higher stress levels. Patients at lower economic and social classes who suffer from insufficient income faced major problems in coping with disease which could increase their stress level [34]. People from lower social classes are prone to higher stress levels due to their limited resources and therefore leaving them in relative poverty and shortcomings. Therefore, stress can affect emotional capabilities and abilities more intensively than those in moderate and higher social classes. One of the problems of low-income patients is treatment expenses and lack of access to supportive facilities such as hospitals and or support groups for cancer patients due to financial problems. In case of financial problems, patients will be forced to work longer hours but due to their physical inability, this is not possible and in more severe cases, they even lose their jobs [35]. In fact, this is the beginning of the stress for the patients. In these cases, cancer patients provide treatment costs from their family members and friends, but because patients usually lose their jobs, they cannot compensate the treatment costs provided by family and friends. Financial problems cause mental pressure and stress in cancer patient making the continuation of treatment more difficult [36]. Cross-sectional research conducted by Koosha et al. (2017) in Tehran on 100 breast cancer patients referring to Jihad-e Daneshgahi Breast Cancer Research Center in a random manner for 4 months which revealed significant relation between the reduction of high economic situation and increase of mental pressures among breast cancer patients ($p < 0.05$) [37].

High school and diploma educational level is another factor affecting the perceived stress level of breast cancer patients; that is, patients with a high school and diploma educational level had higher stress levels than those having elementary and secondary educational levels. Therefore, people with higher educational levels experienced higher levels of stress compared to those with lower education. This reveals that people with higher educational levels are prone to more intense issues. Better occupational and social positions, higher income levels and having higher self-esteem are among the reasons for this difference [38]. A descriptive-analytical study by Mehrabani et al. on 260 breast cancer patients referring to Bahman Hospital 22 of Neishabur City was performed and lasted for 35 months, which revealed a significant statistical relationship between higher educational levels and stress [39].

Marital satisfaction is another variable affecting perceived stress in breast cancer patients, in that patients with higher marital satisfaction levels experienced lower stress than those with lower marital satisfaction. Breast cancer creates problems due to the reduction of body power, decrease of ability for daily activities and hospitalisation of patients, and the stress created due to these issues is a great factor in the creation of sexual problems [40]. Disorders in marital relations have a great effect on the integrity and stability of wife-husband relations and their stress levels. For the clarification of this relation, it could be said that patients who are exposed to higher levels of mental pressure experience more intense stress, more easily lose their energy when facing problems and hardships, experience more weakness, suffer from lower body immune levels and, finally, have higher stress results with lower marital satisfaction [41]. A descriptive study by Fallahchai was conducted in a voluntary manner on 186 breast cancer patients under treatment in Shiraz and Mashhad City for 24 months, which revealed a significant statistical relation between an increase of marital satisfaction and a decrease in stress levels among patients [42].

Women account for about half of the world's population, and their health is of great importance. Considering the prevalence of breast cancer and its adverse effects on patients' lives, it is necessary to reflect on and address this issue by identifying the factors affecting breast cancer in order to reduce the prevalence and mortalities caused by it. Therefore, problems caused by breast cancer can be greatly reduced by increasing mental and psychological support for patients and reducing their stress. Hence, it is necessary to emphasise psychosocial support (individual counselling, support groups, relaxation, adaptive skills, etc.) and stress reduction.

Since the present research was a cross-sectional descriptive-analytical study, there was no problem regarding the participants' follow-up, attrition or poor cooperation. In such studies, outcomes can be achieved at a low cost or without additional costs. Considering the cross-sectional nature of this study, the relationship between perceived stress and some socio-demographic variables does not necessarily represent a causal relationship. This can be regarded as one of the study limitations.

In addition to survival, people today desire a better quality of life [43]. It is also necessary to take measures to increase the presence of clinical psychologists in the oncology wards of hospitals. The findings of the present study can be applied by future studies on breast diseases, planning and policymaking in the field of cancer patients, services and the training of health-care providers. It is recommended to conduct more qualitative and quantitative studies about the factors affecting perceived stress in breast cancer patients in order to provide effective solutions in this regard.

Conclusions

The results indicated that the mean score of perceived stress in women undergoing breast cancer treatments is above average. Therefore, it is necessary to develop and execute strat-

egies to reduce stress in such patients. Training families in social support methods, group counselling sessions for patients with breast cancer and, most importantly, establishment of respectful relationships with patients based on mutual understanding seem to play a key role in the control of this disease and stress reduction.

Source of funding: This study was financially supported by the Tabriz University of Medical Sciences (IR.TBZMED.REC.1395.10).

Conflicts of interest: The authors declare no conflicts of interest.

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Figures: 0

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Received: 10.08.2022

Reviewed: 20.01.2023

Accepted: 14.04.2023

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