

Prevalence of Anxiety Symptoms in Women Newly Diagnosed with Breast Cancer in Kazakhstan and Its Associated Factors

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Abstract

Introduction: Diagnosis of breast cancer is associated with high psychological distress. There is a lack of studies examining the prevalence of anxiety among newly diagnosed breast cancer patients in Kazakhstan. Objective: This study aims to assess the mean prevalence and associated sociodemographic and clinical factors of anxiety symptoms in women newly diagnosed with breast cancer. It also aims to determine independent predictors of anxiety risk. **Methods:** An analysis of 162 newly diagnosed breast cancer patients at the oncology institute in Almaty was performed. Data were collected using a structured questionnaire on social, demographic, and clinical information, as well as the Beck Anxiety Inventory. In addition, multiple regression analysis was used to model the relationship between anxiety risk and independent predictors. **Results:** The average age of the patients was 54.41 years (SD=8.1; min.-max: 32-75). The majority of the patients were married (52%), employed or self-employed (51%), had children (91%), had a bachelor's or a graduate degree (50%), lived in an urban area (54%), did not drink (41%), did not smoke (67%), did not engage in physical activity (54%), and had social support (91%). A total of 48% of patients had symptoms of moderate anxiety, and 33% had symptoms of severe anxiety. Based on the multivariate analysis, factors associated with a lower risk of anxiety symptoms included higher household income (OR -2.21 (95 CI: -1.35, -3.07)) and having reliable social support (OR -2.93 (95% CI: -2.25, -3.61)). **Conclusion:** The prevalence of anxiety symptoms is very high among newly diagnosed breast cancer patients. Anxiety is more likely to develop in patients from low-income households and those without reliable social support.

Keywords: Psychological distress- cancer patients- social support- income

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Introduction

Breast cancer is a major public health issue. Women are most likely to develop the disease, which accounts for 24.2% of the total cancer incidence worldwide (Bray et al., 2018). In addition, 15% of all cancer deaths are caused by breast cancer (Bray et al., 2018). Several studies have shown that breast cancer incidence and mortality differ greatly among different countries, with high-income countries exhibiting a higher incidence and developing countries exhibiting a higher mortality rate (Shin et al., 2010; Lee et al., 2018; Forouzanfar et al., 2011). Breast cancer incidence increased by 42.1% in Kazakhstan from 3,272 cases in 2009 to 4,648 cases in 2018 (Toguzbayeva et al., 2021). Screening programs have played a major role in identifying patients at an early stage of breast cancer (Igissinov et al., 2019; Toguzbayeva et al., 2021).

Despite the achievements in the early diagnosis of

breast cancer, breast cancer patients still face many challenges, including a high psychological burden (Xu et al., 2022). Several well-established studies show that breast cancer patients experience a high psychological burden from the time of diagnosis throughout their entire life (Ng et al., 2015; Maass et al., 2015; İzci et al., 2016; Faller et al., 2017; Zainal et al., 2021). Based on a systematic meta-analysis, anxiety among breast cancer patients ranged from 4.1% to 97.5% (Hashemi et al., 2020). There is evidence that women undergoing diagnostic evaluations for breast cancer experience high levels of anxiety (Montgomery and McCrone, 2010) (Harding, 2014). In addition, high levels of anxiety and depression were observed among long-term breast cancer survivors (Maass et al., 2015; Breidenbach et al., 2022; Zainal et al., 2013). The treatment of breast cancer disrupts a patient's daily life and changes their personality, as well as placing additional burdens on their caregivers (Trusson et al., 2016). As a result, the patient

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deals with psychological problems (Hashemi et al., 2020; Fiszer et al., 2014; Hodgkinson et al., 2007). Patients with breast cancer who were experiencing high levels of psychological distress had a greater disability, lower quality of life, and even a lower survival rate (Ng et al. 2017; von Heymann-Horan et al. 2013; Mols et al. 2013).

Studies demonstrate, however, that patients with cancer do not manage their mental health issues timely or adequately and are at a higher risk of being undertreated (Reece et al., 2013; Singer et al., 2013). Therefore, it is important to determine the prevalence of anxiety among breast cancer patients and understand the extent of the problem. In Kazakhstan, no studies have examined the prevalence of anxiety among breast cancer patients.

This study aims to assess the mean prevalence and associated sociodemographic and clinical factors of anxiety symptoms in women newly diagnosed with breast cancer. It also aims to determine independent predictors of anxiety risk.

Materials and Methods

Study design and sample

This analysis is part of a descriptive, cross-sectional study examining the sociodemographic and psychosocial determinants of depression and anxiety in breast cancer patients. The sample size was calculated by using OpenEpi, Version 3, an open-source sample size calculator. The following criteria were used: seven percent of unexposed with the outcome, and 27.7% of exposed with the outcome (Geyikci et al., 2018; Yang et al., 2021). Fleiss, Statistical Methods for Rates and Proportions with continuity correction determined the sample size to be 122 patients. The sample size was adjusted upwards to account for the non-response rate and the higher rate of mental health issues among the general population following the pandemic. 214 newly diagnosed breast cancer patients at Almaty's oncology hospital were randomly selected (simple random sampling) between May 2021 and February 2022. Patients who consented and met the inclusion criteria for the study were recruited. The inclusion criteria: female patients with a confirmed diagnosis of breast cancer; the diagnosis was received within six months prior to inclusion; stage I to IV breast cancer; ability to read, write and communicate in Russian or Kazakh languages; ability to provide informed consent. Exclusion criteria: current psychiatric disorder or serious neurological disorder; manic episode; intellectual disability, or developmental disorder; current active suicidal ideation; referral to palliative care. Among all approached patients, 162 were recruited for the study and are included in the analysis (response rate = 75.7%). This study was approved by the Ethics Committee of the Kazakh Medical University of Continuing Education. The study details were explained to all participants, and they signed an informed consent form.

Assessment Instruments

In order to collect independent data, we used a structured questionnaire. During the face-to-face interview, we used a self-report Beck Anxiety Inventory

(BAI) survey form to operationalize the dependent variable. BAI was translated into Kazakh and locally validated.

There were two sections to the questionnaire. The first section included individual social and demographic variables, such as age, place of residence, marital status, number of children, socioeconomic status, educational level, income level, and social support. The Kazakhstan nominal average income per person rate in 2020 (116 126 kzt) was used to range the income levels. Questions regarding social support and social support reliability were yes/no questions. A second section included variables related to the clinical diagnosis, the histopathological diagnosis, as well as breast cancer stage. The interviewer completed the second section based on the patient's medical record. A treatment question was not included for newly diagnosed patients.

The BAI is a 21-item self-administered survey that measures the severity of anxiety symptoms in adults. Each item has a list of four statements arranged in increasing severity about a particular symptom of anxiety. Those items are rated from "0" (symptom is not present) to "3" (symptom is always present). The BAI total score is calculated as the sum of all items. The BAI score of 0 to 7 is a minimal range, 8 to 15 is mild, 16 to 25 is moderate, and 26 to 63 is a severe range of anxiety symptoms.

Statistical Analyses

This study used IBM SPSS for Windows (version 21.0, SPSS INC., Chicago, IL, USA) statistical software to analyze the data. Descriptive statistics were calculated to present sample sociodemographic and clinical characteristics (independent variables). For continuous data, mean and standard deviation; for categorical data, frequency and percentage were presented. Anxiety was considered the outcome (dependent variable). For anxiety, the percentages of each grade (minimal, mild, moderate, and severe) were calculated. To analyze the relationship between independent variables and the outcome of interest, we calculated the odds ratio (OR) with a 95% confidence interval. In order to identify significant factors associated with anxiety in newly diagnosed breast cancer patients, a multiple regression analysis was conducted. The Hosmer-Lemeshow goodness-of-fit test was used to test the model's fit. All tests were two-tailed with a significance level of 0.05.

Results

Sociodemographic and Clinical Characteristics

Descriptive sample characteristics are presented in Table 1. The 162 women who were included to the present analysis were 54.41 years on average (SD=8.1; min.-max.:32-75). The majority of the patients were married (52%), employed or self-employed (51%), had children (91%), had a bachelor's or a graduate degree (50%), urban residents (54%), had a monthly household income between 116 126 – 232 252 kzt (57%), did not drink (41%), did not smoke (67%), did not engage in physical activity (54%), and had social support (91%). Most of the patients responded that they cannot rely

Table 1. Characteristics of the Study Participants (n=162)

Variable	n (%)
Age (years)	
< 50	39 (24)
50-59	76 (47)
≥60	47 (29)
mean ±SD	54.41 ±8.1
Marital status	
Married	84 (52)
Divorced	43 (27)
Single	10 (6)
Widowed	21 (13)
Cohabitate	4 (2)
Social status	
Employed or Self Employed	82 (51)
Unemployed	30 (18)
Retired	50 (31)
Children	
No	14 (9)
Yes	148 (91)
Schooling	
High school	23 (14)
Technical / Special degree or Not completed bachelor's degree	59 (36)
Bachelor's degree or Graduate degree	80 (50)
Residence	
Rural	19 (12)
Suburban	56 (34)
Urban	87 (54)
Monthly income level (kzt)	
less than 116 126	24 (15)
116 126 – 232 252	92 (57)
232 252 – 348 378	32 (20)
348 378 and higher	14 (8)
Alcohol use	
Never	67 (41)
Once in a while	60 (37)
Several times a month	19 (12)
Several times a week	16 (10)
Smoking	
Do not smoke	108 (67)
Electronic cigarettes	22 (13)
Regular cigarettes	32 (20)
Physical activity	
Never	88 (54)
Once in a while	51 (32)
Several times a month	19 (12)
Several times a week	4 (2)
Social support	
Yes	148 (91)
No	14 (9)

Table 1. Continued

Variable	n (%)
Reliability	
Yes	43 (27)
No	119 (73)
Clinical diagnosis	
Unilateral breast cancer	154 (95)
Bilateral breast cancer	8 (5)
Histopathological diagnosis	
Invasive ductal carcinoma	137 (85)
Invasive lobular carcinoma	6 (4)
Invasive lobular duct	8 (5)
Low differentiated adenocarcinoma	4 (2)
No diagnosis in medical records	7 (4)
Stage	
I or II	128 (79)
III	23 (14)
IV	11 (7)

on their social support person or persons (73%). 95% of participants had unilateral breast cancer, 85% of participants had invasive ductal carcinoma, and 79% of participants had early-stage breast cancer (stage I or II).

Prevalence of Anxiety Symptoms among Newly Diagnosed Breast Cancer Patients

The mean total score of the BAI questionnaire was 22.96 (SD=9.88). According to the cut-off score of BAI between 16 and 25, 48.15% of patients had symptoms of moderate anxiety, and the cut-off score of BAI was between 26 and 63, 33.33% of patients had symptoms of severe anxiety. Total scores of the BAI questionnaire are presented in Table 2.

Factors Associated with Anxiety

All collected independent characteristics of newly diagnosed breast cancer patients were included in the logistic regression model to find their association with anxiety symptoms. According to the univariate analysis, factors associated with moderate and severe anxiety symptoms were age, social status, schooling, monthly household income level, and reliability of social support. As a next step, significant characteristics from the univariate analysis were included in the stepwise logistic regression model – the backward LR method. This analysis showed that monthly household income level and

Table 2. Prevalence of Anxiety Symptoms in Breast Cancer Patients (n=162)

Anxiety symptom's severity (BAI scoring)	n (%)
Minimal (0 – 7)	12 (7.41)
Mild (8 – 15)	18 (11.11)
Moderate (16 – 25)	78 (48.15)
Severe (26 – 63)	54 (33.33)
Mean ± SD	22.96±9.88

BAI, Beck Anxiety Inventory; SD, standard deviation

Table 3. Association between Social and Clinical Variables and Anxiety in Breast Cancer Patients

Variable	Presence of Anxiety n (%)	Absence of Anxiety n (%)	COR (95% CI)	AOR (95% CI)
Age (years)				
< 50	25 (64.1)	14 (35.9)	-1.09 (-0.63; -1.55)*	
50-59	64 (84.2)	12 (15.8)	Reference	
≥ 60	43 (91.5)	4 (8.5)	0.70 (0.09; 1.31)	
Marital status				
Married	63 (75.0)	21 (25.0)	Reference	
Divorced	38 (88.4)	5 (11.6)	9.29 (3.91; 14.67).	
Single	9 (90.0)	1 (10.0)	1.09 (0.01; 2.17)	
Widowed	19 (90.5)	2 (9.5)	1.15 (-6.70; 9.00)	
Cohabitate	3 (75.0)	1 (25.0)	-1.15 (-2.33; 0.03)	
Social status				
Employed or Self Employed	61 (74.4)	21 (25.6)	Reference	
Unemployed	25 (83.3)	5 (16.7)	0.54 (-0.01; 1.09)	
Retired	46 (92.0)	4 (8.0)	1.37 (0.79; 1.95)*	
Number of children				
Yes	120 (81.1)	28 (18.9)	Reference	
No	12 (85.7)	2 (14.3)	0.33 (-0.46; 1.12)	
Schooling				
High school	23 (100)	0	17.66 (4.06; 31.26)	
Technical/Special degree or Not completed bachelor's degree	52 (88.1)	7 (11.9)	1.10 (0.63; 1.57)*	
Bachelor's degree or Graduate degree	57 (71.3)	23 (28.7)	Reference	
Place of residence				
Urban	69 (79.3)	18 (20.7)	Reference	
Suburban	48 (85.7)	8 (14.3)	0.45 (-0.01; 0.91)	
Rural	15 (78.9)	4 (21.1)	-0.02 (-0.64; 0.60)	
Monthly income level (kzt)				
less than 116 126	24 (100)	0	16.67 (3.36; 29.98)	16.87 (-1.37; 35.11)
116 126 – 232 252	80 (87.0)	12 (13.0)	Reference	Reference
232 252 – 348 378	24 (75.0%)	8 (25.0)	-0.80 (-0.29; -1.31)	-0.29 (-0.92; 0.34)
348 378 and higher	4 (28.6%)	10 (71.4)	-2.81 (-2.14; 3.48)***	-2.21 (-1.35; -3.07)*
Alcohol use				
Never	50 (74.6)	17 (25.7)	Reference	
Once in a while	53 (88.3)	7 (11.7)	0.94 (0.45; 1.43)	
Several times a month	14 (73.7)	5 (26.3)	-0.05 (-0.64; 0.54)	
Several times a week	15 (93.7)	1 (6.3)	1.62 (0.55; 2.69)	
Smoking				
Do not smoke	88 (81.5)	20 (18.5)	Reference	
Electronic cigarettes	15 (68.2)	7 (31.8)	-0.72 (-0.2; -1.24)	
Regular cigarettes	29 (90.6)	3 (9.4)	0.79 (0.13; 1.45)	
Physical activity				
Never	75 (85.2)	13 (14.8)	Reference	
Once in a while	42 (82.4)	9 (17.6)	-0.21 (-0.68; 0.26)	
Several times a month	13 (68.4)	6 (31.6)	-0.98 (-0.40; -1.56)	
Several times a week	2 (50)	2 (50)	-1.75 (-0.71; -2.79)	

Table 3. Continued

Variable	Presence of Anxiety n (%)	Absence of Anxiety n (%)	COR (95% CI)	AOR (95% CI)
Social support				
Yes	120 (81.1)	28 (18.9)	Reference	
No	12 (85.7)	2 (14.3)	0.33 (-0.46; 1.12)	
Reliability of social support				
Yes	22 (51.2)	21 (48.8)	-2.46 (-2.00; -2.92)***	-2.93 (-2.25; -3.61)***
No	110 (92.4)	9 (7.6)	Reference	Reference
Clinical diagnosis				
Unilateral breast cancer	125 (81.2)	29 (18.8)	Reference	
Bilateral breast cancer	7 (87.5)	1 (12.5)	0.49 (-0.60; 1.58)	
Histopathological diagnosis				
Invasive ductal carcinoma	112 (81.7)	25 (18.3)	Reference	
Invasive lobular carcinoma	3 (50.0)	3 (50.0)	-1.49 (-0.64; -2.34)	
Invasive lobular duct	6 (75.0)	2 (25.0)	-0.40 (-1.25; 0.45)	
Low differentiated adenocarcinoma	4 (100)	0	16.07 (-3.71; 35.85)	
No diagnosis in medical records	7 (100)	0	16.07 (1.12; 31.02)	
Stage				
I or II	101 (78.9)	27 (21.1)	Reference	
III	20 (87.0)	3 (13.0)	0.58 (-0.08; 1.24)	
IV	11 (100)	0	16.25 (4.33; 28.17)	

reliability of social support were significant predictors of moderate and severe anxiety symptoms risk. The risk of moderate or severe anxiety symptoms in patients with the highest monthly household income level was twice as low as in patients with an average monthly household income range of 116 126 – 232 252 kzt (OR -2.21 (95 CI: -1.35, -3.07)). Patients who responded that they could rely on their social support had a three times lower risk of developing moderate and severe anxiety symptoms than those whose social support was not reliable (OR -2.93 (95% CI: -2.25, -3.61)). The overall logistic regression was statistically significant. The model seems to explain 54.1% of the variation in anxiety symptoms, and it can properly classify 88.9% of breast cancer patients. The fit of the multivariate model was flawless (p=0.863). The results of univariate and multivariate logistic regression analyses are presented in Table 3.

Discussion

In this study, we examined the prevalence and determinants of anxiety symptoms among newly diagnosed breast cancer patients. Based on the results of the BAI questionnaire, 81.48 percent of patients had moderate or severe anxiety symptoms. The monthly household income level and the level of social support were significant predictors of moderate and severe anxiety symptoms.

The prevalence of anxiety symptoms in newly diagnosed breast cancer patients was higher than in previous studies (Karibayeva et al., 2020b; Hashemi et al., 2020). It may be a result of different methodological

approaches in the studies. Additionally, it may be because we did not focus on the diagnosis of clinical anxiety but rather screened patients for anxiety symptoms.

Among newly diagnosed breast cancer patients, higher income levels were significantly associated with lower rates of moderate and severe anxiety symptoms. In our study, the odds of patients with high income levels experiencing moderate or severe anxiety symptoms were twice as low as for those with average income levels. Although most of our patients (57%) had monthly household incomes between the nominal average income per person rate in 2020 and its twofold range, 15% of participants had monthly incomes below this rate. The lower income level was also associated with higher levels of anxiety and distress in previous studies (Srivastava et al., 2016; Hassan et al., 2015).

The results of this study demonstrate the importance of reliable social support on the prevalence of anxiety among breast cancer patients. Due to breast cancer's untreatable nature and long-term exposure, there is a great psychological burden for patients and their caregivers (Grunfeld et al., 2004; Kale and Carroll, 2016). Furthermore, other studies have also shown that lower perceived social support was associated with higher psychological distress in breast cancer patients (Perez-Tejada et al., 2019).

In the present analysis, there are few limitations. The analysis here is based on an observational study design, so randomization is not used to allocate by chance the risk factors under investigation (Boyko, 2013). Additionally, half of our study participants had bachelor's or graduate degrees, and there may have been a self-selection bias.

Finally, we did not examine the prevalence of clinical anxiety diagnoses. Research should be focused on the changing socioeconomic status of breast cancer patients over time, and the prevalence of anxiety and depression among breast cancer survivors.

In Kazakhstan, the psychological burden of newly diagnosed breast cancer patients is extremely high, based on the results of this study. According to an analysis of the same population of breast cancer patients, the prevalence of severe and moderate depression symptoms was 77% (Karibayeva et al., 2020c). In order to decrease patients' psychological burden, improve quality of life, and increase overall survival, psychological and social support services should be tailored to the most vulnerable groups of patients. A review of existing and necessary resources led the authors of this study to conclude that scientific and methodological approaches to providing psycho-social support for cancer patients in Kazakhstan are insufficiently developed. Future research may address this issue.

Author Contribution Statement

Indira Karibayeva: Conceptualization, Methodology, Investigation, Formal Analysis, Writing – Original / draft preparation. Botagoz Turdaliyeva: Resources, Software, Data curation, Supervision. Nor Zuraida Zainal: Validation, Writing - Review and Editing. Fatima Bagiyarova: Writing – Original /draft preparation, Supervision, Project Administration: Dinara Kusainova: Investigation.

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Ethical Declaration

This study was approved by the Ethics Committee of the Kazakh Medical University of Continuing Education (Study ID: 06-2020).

Availability of data

According to the patient consent form data is not available for scientific use by others than the project group members.

Study Registration

The study protocol has been registered with ClinicalTrials.gov Protocol Registration and Results System (Reference: NCT05011409).

Conflict of Interest

The authors declare no conflict of interest regarding this article.

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