

Prevalence of depression and anxiety among patients with breast cancer: a cross-sectional study

Abbas Bukhari (1)
 Ali Farsi (2)
 Fawaz Albaqami (1)
 Abdulaziz Jowharji (1)
 Mansoor Radwi (3)
 Abdalmohsen Albaqami (1)
 Mohammed Fallatah (1)
 Abdullah Alammari (1)
 Waleed Alghamdi (4)

(1) College of Medicine, King Abdulaziz University, Jeddah, Saudi Arabia

(2) Department of Surgery, Faculty of Medicine, King Abdulaziz University, Jeddah, Saudi Arabia

(3) Department of Hematology, College of Medicine, University of Jeddah, Jeddah Saudi Arabia

(4) Division of Psychiatry, Department of Medicine, Faculty of Medicine, King Abdulaziz University, Jeddah, Saudi Arabia

Corresponding author:

Dr. Fawaz Albaqami
 Medical Intern, College of Medicine, King Abdulaziz University,
 Jeddah, Saudi Arabia
 Tel.: 966534704213
 Email: lifawaz.16@gmail.com

Received: January 2021; Accepted: February 2022; Published: March 1, 2022.

Citation: Abbas Bukhari et al. Prevalence of depression and anxiety among patients with breast cancer: a cross-sectional study. *World Family Medicine*. 2022; 20(3): 6-14. DOI: 10.5742/MEWFM.2022.952506

Abstract

Background: Breast cancer patients have a significant rate of depression, according to prior studies. During some phases of patient management, particularly early after surgery, these patients are at risk for depression.

Objectives: to assess the prevalence of depression and anxiety among patients with breast cancer and risk factors associated with it.

Methods: This cross-sectional study enrolled 74 patients diagnosed with breast cancer in the general surgery clinic at King Abdulaziz University Hospital in Jeddah, Saudi Arabia. Two questionnaires were used, Patient Health Questionnaire-9 (PHQ-9) and General Anxiety Disorder-7 (GAD-7), filled in by patients who attended the clinic or electronically by sending the questionnaires to the patients. Significant depression was defined as PHQ-9 score ≥ 10 and significant anxiety was defined as GAD-7 score ≥ 10 . Sociodemographic and medical data were also

collected. This research was approved by the unit of biomedical ethics at King Abdulaziz University Faculty of Medicine.

Results: From the 74 patients with breast cancer, 36% of the women were found to have depression and 24% were found to have anxiety and the prevalence of having both depression and anxiety was 23.0%. Mean PHQ-9 score was (8.9, SD: 5.8). The mean GAD-7 score was (6.7, SD: 5.2). Significant depression and significant anxiety were found to be more in Saudi nationals, those who did not go for surgical therapy, patients with metastatic disease at the time of filling in the questionnaire and married women. These results were not statistically significant.

Conclusion: This study showed that the prevalence of depression and anxiety was similar to previously conducted studies; it also showed no associations between the risk factors studied and anxiety or depression in patients with breast cancer.

Keywords: Breast Cancer, depression, anxiety, Saudi Arabia, PHQ-9, GAD-7

Introduction

Breast cancer is the most frequent type of cancer in women all over the world. Breast cancer rates are greater among women in more developed countries, and rates are rising in almost every country (1). In Saudi Arabia, it accounts for 16.9% of all adult cancer patients (2), with a 13.08 percent fatality rate (3). The cost of treatment was found to be 50 billion Saudi Riyals (\$13 billion USD) per year during the year 2018 (4). Breast cancer is treated using a multimodal approach that includes surgery, radiation, hormone therapy, immunotherapy, and chemotherapy, depending on the patient's symptoms, stage, and overall health (5).

Depression is a mood illness that causes a person to feel gloomy and disinterested all of the time (6,7). According to previous studies, depression affects 38.2 percent to 68.6 percent of all breast cancer patients (8,9,10). Depression was more prevalent in patients with breast cancer throughout various times of patient management, notably early after surgical therapy, according to studies conducted in South Korea, Egypt, and Croatia (8,11,12). It has also been found to be more likely after radical mastectomy compared with breast conserving surgery (13). Other studies have found risk factors for depression in patients with breast cancer were age between 40 and 60 years, being divorced or widowed, lower education level, diagnosis of other diseases, radical mastectomy, presence of lymphedema, rural residence, unorthodox Christianity, bad/very bad symptoms burden, medium or low self-esteem, and poor body image (9,10).

When anxiety becomes severe and chronic, it is known as Generalized Anxiety Disorder (GAD) (14). Previous research has found that the prevalence of GAD in individuals with breast cancer ranges from 25% to 73.3 percent (8,9,15,16). Anxiety levels were observed to be higher before surgery (17) and in radical mastectomy compared to breast conserving surgery (18). Anxiety was found to be worse before chemo/radiotherapy (15,17,18). Being divorced or widowed, having a lower educational level, living in a rural area, practising unorthodox Christianity, and having a lot of unpleasant/very terrible symptoms were all risk factors for GAD (9).

The Patient Health Questionnaire-9 (PHQ-9) questionnaire was established in 1999 (19) and Generalized Anxiety Disorder-7 (GAD-7) questionnaire in 2006 (20). PHQ-9 was validated in 2001 and it was shown that for a score of 10 or more the questionnaire had a sensitivity of 88% and specificity of 88% and a likelihood ratio of 7.1 that is suggestive of major depression (21). GAD-7 was published with its validation, and a score of 10 or higher was proposed as a cutoff for likely GAD, with a sensitivity of 89 percent, specificity of 82 percent, positive predictive value of 29, negative predictive value of 99, and a likelihood ratio of 5.1 (20).

This study aimed to assess the prevalence of depression and anxiety among patients with breast cancer, and the risk factors associated with it.

Methodology

Study design: a cross-sectional study was carried out. **Study setting:** the general surgery clinic at King Abdulaziz University Hospital in Jeddah, Saudi Arabia.

Study population: patients who attended the study setting and were diagnosed based on histopathology reports with invasive ductal carcinoma, invasive lobular carcinoma, invasive carcinoma of undetermined type, ductal carcinoma in situ, lobular carcinoma in situ, and phyllodes tumour were included in this study.

Data collection: standardised questionnaires (PHQ-9) (19,20) and (GAD-7) (20) were sent to be filled electronically by the participants on their own, over the phone, or via paper questionnaires in the clinic. Significant depression was defined as PHQ-9 score ≥ 10 (19,20) and significant anxiety was defined as GAD-7 score ≥ 10 (20). In conjunction with the questionnaires, sociodemographic and medical data were collected which included: age, sex, marital status, number of children and nationality, date of diagnosis, presence or absence of metastasis at the time of diagnosis, if the patient had undergone surgical treatment, type of the surgery (mastectomy vs. lumpectomy), and preoperative hemoglobin (g/dl).

Data analysis: Statistical analysis was performed using the SPSS V.20 software package (SPSS, Chicago, Illinois, USA). For descriptive analysis, continuous variables were presented as mean and standard deviation. Categorical variables were summarized using counts and percentages. Missing variables are computed with respect to available/total data. For comparative analysis, a chi-squared test was used to compare dichotomous data. Independent samples t-test was used to compare continuous data with normal distributions, and Mann-Whitney U test for continuous data without normal distributions. Statistical significance was defined as a p-value ≤ 0.05 .

Ethical approval: the Unit of Biomedical Ethics Research Committee at King Abdulaziz University, Faculty of Medicine approved the use of indicated data along with the requirement of written informed consent (Reference No 199-21).

Results

From the people who have been reached out to fill the questionnaires, a total of 104 responses were returned, of which 25 were found to be duplicates, 3 non cancerous breast lesions, and 2 non-breast related conditions. In addition to this, five entries were found to have the wrong medical record number so no data from the medical record system was collected about them. The final sample included 74 participants with a mean response rate of 71.2%.

The mean age was 50 (standard deviation [SD]: 11.9) and the average number of children was 3.1 (SD: 2.4). All study participants were female: 48 (64.9%) were married, 9 (12.2%) single, 9 (12.2%) widowed, and 8 (10.8%)

divorced. Saudi nationals comprised 35 (47.3%) of the participants and the rest were of multiple different nationalities. A total of 8 (10.8%) were found to have distant metastasis, 55 (83.8%) had surgery of whom 17 (23%) underwent lumpectomy, whereas 37 (50%) underwent mastectomy. The mean PHQ-9 score was 8.9 (SD: 5.8). The mean GAD-7 score was 6.7 (SD: 5.2). The prevalence of depression (PHQ-9 score ≥ 10) and anxiety (GAD-7 score ≥ 10) was 27 (36.5%) and 18 (24.3%), respectively (Table 1).

Responses from the PHQ-9 questionnaire are displayed (Figure 1) (Table 2), and responses from the GAD-7 questionnaire are displayed (Figure 2) (Table 3).

Our study showed that the positive predictive value of the GAD-7 as a predictor for depression using PHQ-9 as a standard was 94% and the negative predictive value to be 82%. Using PHQ-9 as a predictor for anxiety with GAD-7 as standard reveals a positive predictive value of 63% and a negative predictive value of 98% (Table 4); whereas the prevalence rate of having both depression and anxiety was 17 (23.0%).

Our analysis did not show any significant correlation between either depression or anxiety and the risk factors studied for patients with breast cancer (Tables 5 and 6). Saudis who exhibited depression 10 (82.90%) were fewer

than non-Saudis 17 (69.20%); the same pattern was seen in Saudis who exhibited anxiety 6 (71.40%) compared with non-Saudis 12 (56.40%).

From the women who had metastasis, 3 (62.50%) were found to have significant depression and 2 (75%) were found to have significant anxiety, while among those who were free from metastasis 22 (62.10%) displayed significant depression and 15 (74%) displayed significant anxiety.

Of participants who did not undergo surgical therapy those who were found to have marked depression were 3 (75%) and those who were found to have marked anxiety were 2 (83.30%). Of the participants who received surgical management 10 (41.20%) from the lumpectomy group were shown to be depressed and 7 (58.80%) were shown to have anxiety, while 12 (67.60%) from the mastectomy group were shown to have depression and 8 (78.40%) were shown to have anxiety.

Among married women with breast cancer, 15 (68.80%) had significant depression and 10 (79.20%) had significant anxiety, which is higher than the 3 (66.70%) single women who had depression and the 2 (77.80%) who had anxiety; 6 (33.30%) widowed had depression while 4 (55.60%) had anxiety, and as for divorced ladies 3 (62.50%) had depression when 2 (75%) had anxiety.

Table 1: Baseline characteristics for the 74 participants

Variables	N (mean)	Percentage (SD)
Age (in years)	(50)	(11.9)
Saudi nationality	35	47.3
Marital status	Married	48
	Single	9
	Widowed	9
	Divorced	8
Female	74	100
Number of children	(3.1)	(2.4)
Age at Diagnosis (in years) ^a	(48)	(12.1)
Presence of Metastasis ^b	8	10.8
Patient did not have surgery ^c	12	16.2
Patient did have surgery, type ^c	Lumpectomy ^d	17
	Mastectomy ^d	37
Hemoglobin (g/L) ^e	(12)	(1.4)
PHQ-9 score	(8.9)	(5.8)
GAD-7 score	(6.73)	(5.2)
PHQ-9 score ≥ 10	27	36.5
GAD-7 score ≥ 10	18	24.3
Missing variables present: a (N= 7), b (N = 8), c (N = 7), d (N = 8), e (N = 8)		

Figure 1: Proportions of participants' responses to PHQ-9

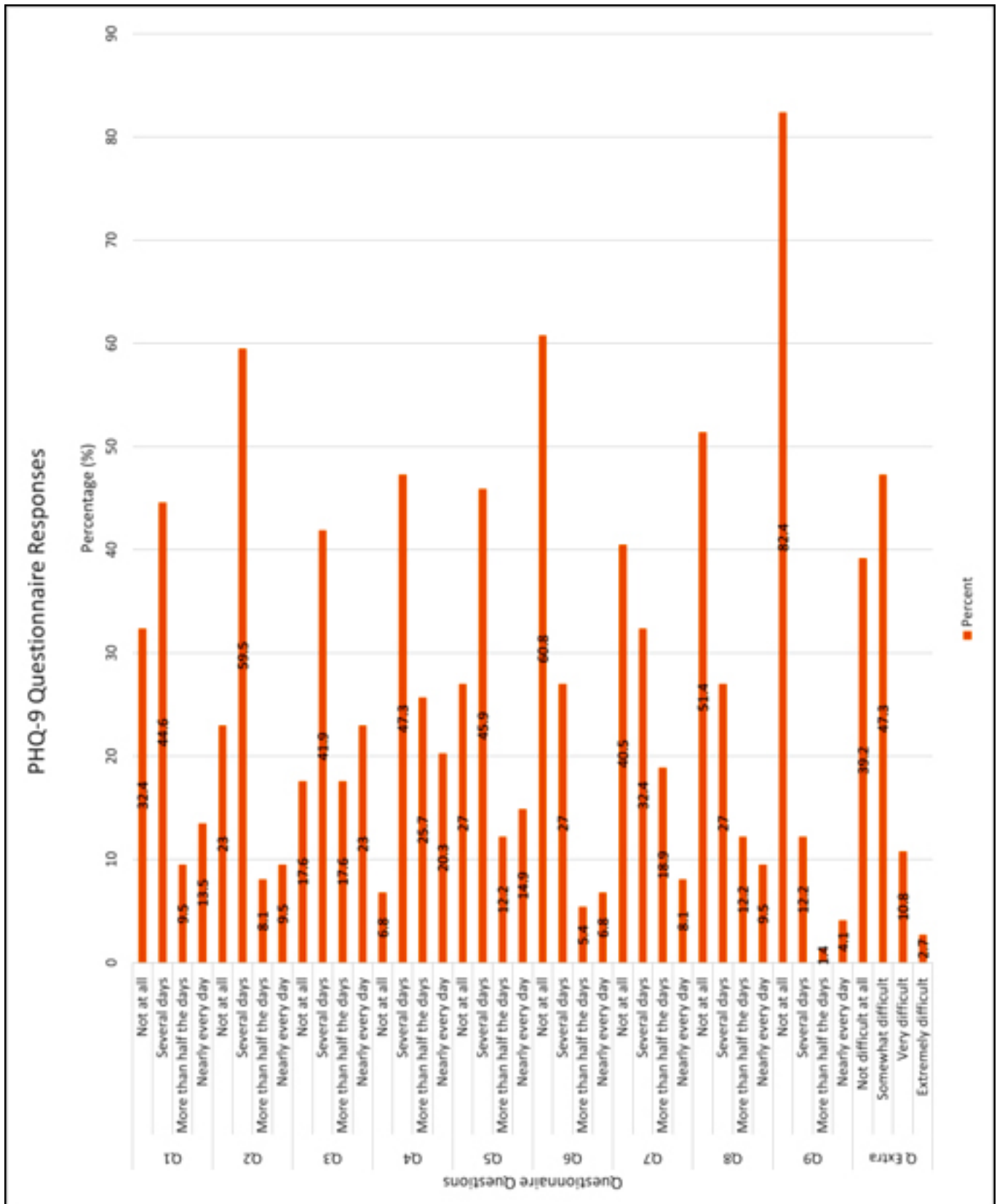


Table 2: PHQ-9 Questionnaire

Q1-Little interest or pleasure in doing things
Q2-Feeling down, depressed, or hopeless
Q3-Trouble falling or staying asleep, or sleeping too much
Q4-Feeling tired or having little energy
Q5-Poor appetite or overeating
Q6-Feeling bad about yourself or that you are a failure or have let yourself or your family down
Q7-Trouble concentrating on things, such as reading the newspaper or watching television
Q8-Moving or speaking so slowly that other people could have noticed. Or the opposite, being so fidgety or restless that you have been moving around a lot more than usual
Q9-Thoughts that you would be better off dead, or of hurting yourself
Q Extra-If you checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?

Table 3: GAD-7 Questionnaire

Q1-Feeling nervous, anxious, or on edge
Q2-Not being able to stop or control worrying
Q3-Worrying too much about different things
Q4-Trouble relaxing
Q5-Being so restless that it is hard to sit still
Q6-Becoming easily annoyed or irritable
Q7-Feeling afraid as if something awful might happen
Q Extra-If you checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?

Figure 2: Proportions of participants' responses to GAD-7

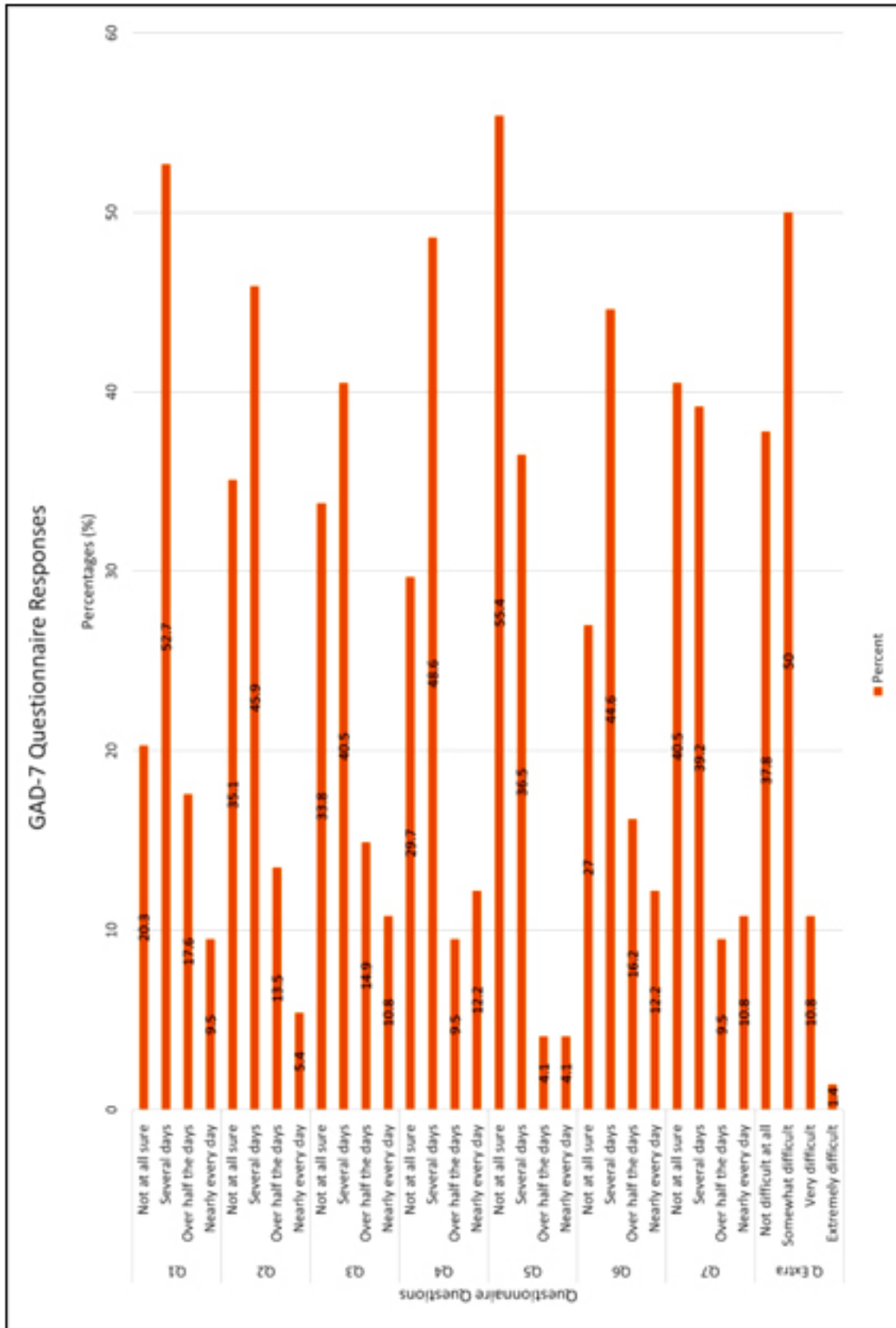


Table 4: Concordance between PHQ and GAD scoring system

		PHQ-9 Score ≥ 10		
		Yes	No	Total
GAD-7 Score ≥ 10	Yes	17	1	18
	No	10	46	56
	Total	27	47	74

Table 5: Risk Factors (categorical) associated with high PHQ or GAD score

	PHQ ≥ 10	P-value	GAD ≥ 10	P-value
Nationality				
Saudi	82.90%	0.19	71.40%	0.23
Non-Saudi	69.20%		56.40%	
Surgery Status				
None	75%	0.11	83.30%	0.23
Lumpectomy	41.20%		58.80%	
Mastectomy	67.60%		78.40%	
Metastasis				
Yes	62.50%	0.98	75%	0.95
No	62.10%		74%	
Marital Status				
Married	68.80%	0.25	79.20%	0.51
Single	66.70%		77.80%	
Widowed	33.30%		55.60%	
Divorced	62.50%		75%	

Table 6: Risk Factors (Continuous) associated with high PHQ or GAD score

Variable	PHQ-9 ≥ 10		GAD-7 ≥ 10	
	Mean difference	P-value	Mean difference	P-value
Age	0.80	0.44	0.79	0.81
Number of children	0.29	0.87	0.7	0.29
Age at diagnosis	0.57	0.41	1.9	0.58
Hemoglobin	0.88	0.70	0.1	0.89

Discussion

This study aimed to assess the prevalence of depression and anxiety among patients with breast cancer. In a patient who scores <10 in the PHQ-9 it is unlikely that he/she has concomitant anxiety; thus, GAD-7 may not be necessarily filled in by him/her. On the other hand, in a patient who scores >10 on GAD-7 it is likely that he/she has concomitant depression; thus, PHQ-9 is necessary to be filled in.

Our study found the prevalence of depression to be 36.5%, which is similar to the result of Tsaras et al (38%) and it was lower than the results of other studies such as Alagizy et al (68.7%) and Boing et al (49.2%) (8,9,10). For GAD, the prevalence in our study was 24.3%, which is lower than the reports in other studies such as Tsaras et al (32%), Villar et al (48.6%), and Alagizy et al (73.3%) (8,9,15). We theorize that the results of our study were lower than that of other papers due to the variable timing of the questionnaire in relation to the time from diagnosis and stage of management and therefore that might influence their answers.

It's possible that among oncology patients, treatment focuses mostly on the medical issues, while psychological suffering receives less attention. Lueboonthavatchai discovered that psychosocial challenges such as poor family relationships and functioning, maladaptive problems, and conflict resolution can contribute to sadness and anxiety in breast cancer patients (22). According to Helgeson et al., even after the physical ailment has been treated, psychological suffering may persist and accompany the patient for a long time after therapy, negatively affecting the patient's quality of life (23). Understanding these common psychiatric disorders and associated psychosocial factors in patients with breast cancer can help in planning their treatment. Determining the exact prevalence of depression and anxiety in these patients can also help policymakers to design better preventive plans for depression and anxiety.

It is our belief that the therapeutic journey of patients with cancer can be filled with feelings of anxiety and uncertainty, especially those undergoing their first cycle of chemotherapy compared with other treatment methods such as surgery or radiotherapy. As it has the longest duration and socially recognized side effects such as hair loss, Jimenez-Fonseca et al found that younger, poorly educated patients and those undergoing their first chemotherapy session recorded higher levels of anxiety compared with older, well-educated patients and those who had multiple episodes of chemotherapy (24). Another noteworthy point made by Lee et al is that patients who suffer anxiety before starting chemotherapy sessions may have a higher risk of chemotherapy-induced peripheral neuropathy, which provides insight into how managing anxiety before treatment can affect a patient's overall well-being (25). We feel that a better knowledge of these components and their roles will aid in the reduction of stress in patients through therapy, and that this could be a future research topic.

Managing anxiety and depression in patients with breast cancer is particularly important as an increased risk of attempted/successful suicide has been found among patients with anxiety disorders (26) and depression (27) in general. Carreira et al has even shown in a systemic review of different adverse mental health issues among patients with breast cancer that breast cancer survivors have a 37%–60% higher risk of attempted suicide than women in the comparison groups (28). Particular attention needs to be paid in this population for any self-harm or suicidal ideation.

Limitations

There were some limitations to our study. The sample size of 74 participants is considered small, thus the results cannot be generalized to the whole population of patients with breast cancer. Another limitation was the large number of questions answered by the participants that may have been tiresome to some participants and therefore could have affected the accuracy of their answers. Moreover, the data was collected in a cross-sectional manner with some patients filling in the questionnaire immediately after the diagnosis while others filled it in during or after completion of treatment.

Conclusion

In our study, 36 percent of breast cancer patients were found to be depressed, while 24 percent were found to be anxious. There were no links found between the risk factors investigated and anxiety or depression in breast cancer patients. A prospective study analysing the stage of highest risk for GAD and depression among patients with breast cancer undergoing therapy is suggested as a future research option.

Acknowledgements

The authors gratefully acknowledge all participants' cooperation

References

1. World Health Organization: Breast cancer. 2019. <https://www.who.int/cancer/prevention/diagnosis-screening/breast-cancer/en/>
2. Saudi Health Council Saudi Cancer Registry. Cancer incidence report Saudi Arabia 2013. 2019. <https://nhic.gov.sa/eServices/Documents/2014.pdf>
3. Alotaibi RM, Rezk HR, Juliana CI, Guure C.: Breast cancer mortality in Saudi Arabia: Modelling observed and unobserved factors. *PLoS One* 2018; 13(10):e0206148.
4. Alghamdi A, Balkhi B, Alqahtani S, Almotairi H. The economic burden associated with the management of different stages of breast cancer: A retrospective cost of illness analysis in Saudi Arabia. *Healthcare* 2021; 9:907-1007.
5. PDQ Adult Treatment Editorial Board. Breast Cancer Treatment (Adult) (PDQ®): Health Professional Version. 2022 Jan 20. In: PDQ Cancer Information Summaries [Internet]. Bethesda (MD): National Cancer Institute (US); 2002-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK65744/>.

6. World Health Organization (WHO). Depression. 2018. <https://www.who.int/news-room/fact-sheets/detail/depression>.
7. American Psychiatric Association. What Is Depression? 2021. <https://www.psychiatry.org/patients-families/depression/what-is-depression>
8. Alagizy HA, Soltan MR, Soliman SS, Hegazy NN, Gohar SF. Anxiety, depression and perceived stress among breast cancer patients: single institute experience. *Middle East Curr Psychiatry*;2020, 27:29-39.
9. Tsaras K, Papatheanasiou IV, Mitsi D, Veneti A, Kelesi M, Zyga S, et al. Assessment of depression and anxiety in breast cancer patients: Prevalence and associated factors. *Asian Pac J Cancer Prev* 2018; 19(6):1661-1669.
10. Boing L, Pereira GS, Araújo CDCR, Sperandio FF, Loch MDSG, Bergmann A, Borgatto AF, Guimarães ACA. Factors associated with depression symptoms in women after breast cancer. *Rev Saude Publica* 2019;1;53:30-42.
11. Kim MS, Kim SY, Kim J-H, Park B, Choi HG. Depression in breast cancer patients who have undergone mastectomy: A national cohort study. *PLoS One* 2017; 12(4):e0175395.
12. Dujmović A, Marčinko D, Bulić K, Kisić H, Duduković M, Mijatović D. Quality of life and depression among female patients undergoing surgical treatment for breast cancer: A prospective study. *Psychiatr Danub* 2017; 29(3):345-350.
13. Salibasic M, Delibegovic S. The quality of life and degree of depression of patients suffering from breast cancer. *Med Arch* 2018; 72(3):202-205.
14. US department of health and human services. National Institutes of Health NIH Publication No. 19-MH-8090: Generalized anxiety disorder: When worry gets out of control. (2016). <https://www.nimh.nih.gov/health/publications/generalized-anxiety-disorder-gad/index.shtml>.
15. Villar RR, Fernández SP, Garea CC, Pillado MTS, Barreiro VB, Martín CG. Quality of life and anxiety in women with breast cancer before and after treatment. *Rev Lat Am Enfermagem* 2017; 25:e2958.
16. Al-Zaben FN, Sehlo MG, Koenig HG A cross-sectional study of anxiety and marital quality among women with breast cancer at a university clinic in western Saudi Arabia. *Saudi Med J* 2015; 36(10):1168-1175.
17. Wagner JF, Lüdders D, Hoellen F, Rody A, Banz-Jansen C. Treatment anxiety in breast cancer patients. *Arch Gynecol Obstet*;2019, 299(5):1365-1371
18. Ching LC, Devi MK, Kim Emily DNurs AN. Anxiety in patients with breast cancer undergoing treatment: A systematic review. *JBI Libr Syst Rev* 2010; 8(25):1016-1057.
19. Spitzer RL, Kroenke K, Williams JB. Validation and utility of a self-report version of PRIME-MD: The PHQ primary care study. Primary care evaluation of mental disorders. Patient health questionnaire. *JAMA* 1999;282(18):1737-1744.
20. Spitzer RL, Kroenke K, Williams JB, Löwe B. A brief measure for assessing generalized anxiety disorder: The GAD-7. *Arch Intern Med* 2006; 166(10):1092-1097.
21. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: Validity of a brief depression severity measure. *J Gen Intern Med* 2001; 16(9):606-613.
22. Lueboonthavatchai P. Prevalence and psychosocial factors of anxiety and depression in breast cancer patients. *J Med Assoc Thai* 2007; 90(10):2164-2174.
23. Helgeson VS, Snyder P, Seltman H. Psychological and physical adjustment to breast cancer over 4 years: Identifying distinct trajectories of change. *Health Psychol* 2004; 23:3-15
24. Jimenez-Fonseca P, Calderón C, Hernández R, Ramón Y Cajal T, Mut M, Ramchandani A, et al. Factors associated with anxiety and depression in cancer patients prior to initiating adjuvant therapy. *Clin Transl Oncol* 2018; 20(11):1408-1415.
25. Lee KM, Jung D, Hwang H, Son KL, Kim TY, Im SA, et al. Pre-treatment anxiety is associated with persistent chemotherapy-induced peripheral neuropathy in women treated with neoadjuvant chemotherapy for breast cancer. *J Psychosom Res* 2018; 108:14-19.
26. Nepon J, Belik SL, Bolton J, Sareen J.: The relationship between anxiety disorders and suicide attempts: findings from the National Epidemiologic Survey on alcohol and related conditions. *Depress Anxiety* 2010; 27(9):791-798.
27. Dong M, Zeng L-N, Lu L, Li XH, Ungvari GS, Ng CH, et al. Prevalence of suicide attempt in individuals with major depressive disorder: a meta-analysis of observational surveys. *Psychol Med* 2019; 49(10):1691–1704.
28. Carreira H, Williams R, Müller M, Harewood R, Stanway S, Bhaskaran K. Associations between breast cancer survivorship and adverse mental health outcomes: A systematic review. *J Natl Cancer Inst* 2018; 110(12):1311-1327.