RESEARCH PAPER

Exploring the relationship between depression and quality of life among the breast cancer patients: A cross-sectional, observational study

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ABSTRACT

Background

Breast cancer is a serious health problem around the globe, and India has the highest mortality from this disease. In addition to the physical symptoms, the initial diagnosis and exhausting treatment process usually induce patients' to extremely susceptible to depression. This psychological symptom adversely impairs patients' quality of life. Therefore, the present study focused more to reveal the depression and quality of life status of the patients with breast cancer.

Methodology

A cross-sectional, observational study was conducted among 54 breast cancer patients visited to the Oncology department of Jaipur National University Institute of Medical Sciences and Research Centre from January to March 2026. Patients were enrolled in the study as per the inclusion and exclusion criteria of the study. Patient Health Questionnaire-9 and WHOQOL-BREF questionnaires were used to assess the level of depression and quality of life of the patients respectively. Data obtained from the study were analysed using non-parametric tests such as Mann-Whitney U test, Kruskal-Wallis test and Spearman's rank correlation test. Significance level $p<0.05$ was considered for all the analysis.

Results

The mean age of the patients was 48.94 years. About 57.41% patients were found to be depressed in which nearly one-fifth [11(20.37%)] of the patients reported moderately severe depression. However, an equal proportion of the patients experienced mild [10(18.52%)] and moderate depression [10(18.52%)]. The patients' quality of life scores was found to be highest for psychological domain [79.16(61.45-87.50)] and lowest for physical domain [57.14(37.50-68.75)]. Demographic variables such as monthly family income, occupation and education level were associated with depression and quality of life components. Association between depression and quality of life (QoL) showed a significant negative correlation across all quality of life domains.

Conclusion

Depression was the most common problem among the breast cancer patients that reduced their overall quality of life. A strong negative relation proved the necessity of mental health screening and need of proper psychological support for breast cancer patients.

Keywords: Breast Cancer, Depression, Quality of Life, PHQ-9.

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Introduction

Breast cancer is a major health problem among the women worldwide, leading to high mortality and morbidity rates among them. It is a global health challenge due to its complex etiology and diverse clinical presentations. [1] There is still valid reason for breast cancer is not known. [2] In 2022, 2.3 million women worldwide were diagnosed with breast cancer, and 670,000 of them died. [3] According to GLOBOCAN 2022 data India gave third rank worldwide with the cases of 192,020 and in death statistics, India have first rank with the death of 98,337. [4] The ideal treatment plan for

breast cancer patients is determined by disease stage, tumour size. It is commonly treated with chemotherapy, radiotherapy, and either open or laparoscopic surgery [5]. An individual's experience with a cancer diagnosis is different. It might lead to varying degrees of emotional and mental conditions. Many factors can lead to emotional and mental distress, including a cancer diagnosis and the long uncertain treatment that follows. Many worries and anxieties occur in patient's mind upon receiving the diagnosis. Irrational concerns can be the root of many mental health difficulties [6]. One possible cause of cancer-related stigma is the loss of femininity, which can be symbolised by hair loss or the removal of the breast following cancer treatment [7]. They are more likely to experience anxiety, despair, and a diminished feeling of self-worth. Existing research suggests that breast cancer survivors are more likely to experience anxiety and depression. In Korean breast cancer research patients had 39% depression [8]. A mexican cross-sectional study found that over 69% of breast cancer patients experienced symptoms of depression. Having breast cancer may be a challenging time for many people. Receiving its diagnosis to treatment is among the most distressing events a patient can go through. [9]

Quality of life (QoL) is an important or prevalent part in cancer research. The term "quality of life" is a multidimensional concept, including physical, mental, social, cognitive, and environmental factors. Because of its measurable and repeatable nature, quality of life is an essential component of cancer treatment and illness prognosis [10]. WHO researchers described quality of life as "the individual's perception of his position in life within his cultural context and value systems, related to his objectives, expectations, standards and social relationships" [11]. A key endpoint measure for the quality of management and care in oncology practice is quality of life, as it reflects the patient's perceptions of how the cancer diagnosis and treatment affect their everyday functioning [12]. Cancer has a different impact on several aspects of people's quality of life. As survival rates improve, the quality of life experienced by patients has become a crucial issue because cancer treatment duration is high chances of getting back and all its symptoms makes the life tougher for an individual [13]. Although depressive symptoms are prevalent among cancer patients and can have a detrimental impact on quality of life, they are occasionally misunderstood as part of the cancer treatment process [14]. In India, most cancer care primarily focuses on physical treatment, with limited emphasis on psychological assessment and support. Evaluating the depression and its relationship with QoL is therefore essential to identify patients at risk, provide timely psychological interventions, and promote overall cancer management that enhances both mental health and overall quality of life [15].

The study aimed to assess depression, quality of life and the association between depression and quality of life in breast cancer patients and, depression and QoL correlation with patients' demographic variables.

Methodology

Study design, Study population and Sample size for the study

A cross-sectional, observational study was conducted among 54 breast cancer patients visited to Oncology department of Jaipur National University Institute of Medical Sciences and Research Centre (JNUIMSRC), Jaipur, Rajasthan from January to March 2026. The study included females aged ≥ 18 years with breast cancer who were on different therapeutic interventions including surgical procedures. Patients showed their willingness to participate in the study were included in the study. Sample size calculation was done at 95% confidence level, 5% margin of error, and an assumed 50% response distribution based on the total eligible patients' population visited to the hospital. The targeted sample size was found to be 54 patients who have been recruited in the study by consecutive sampling method. A written consent was sought from the patients before the initiation of the study.

Ethical approval for the study:

The study was approved by the Institutional Ethics Committee of Jaipur National University, Institute for Medical Sciences and Research Centre (JNUIMSRC), Jaipur, India (Approval No. JNUIMSRC/IEC/2025/209).

Data collection tools

Patient's demographic information was collected by using demographic questionnaire form prepared for patients in English language. However, PHQ-9 questionnaire was used to assess the patient's depression level. PHQ-9 questionnaire contains total nine questions that measures the patient's mental health status throughout the previous two weeks to identify the depression level and its severity. Each question was evaluated on 4-point Likert scale (0= Not at all; 1= Several days; 2= More than half days; 3= Nearly every day). The maximum and minimum possible score for PHQ-9 questionnaire were Zero (0) and twenty-seven (27) respectively. Depression was categorised as None (score: 0-4); mild (score: 5-9); moderate (score: 10-14); moderately severe (score: 15-19) and severe (20-27) [16].

The WHOQOL-BREF questionnaire containing 26 questions was used to assess the quality of life of the patients on 5-point Likert scale. Out of 26 questions, first two questions described about the general

health and overall quality of life, whereas, rest 24 questions were divided into four domains; Physical (7 questions; Qs. no. 3,4,10,15,16,17,18), Psychological (6 questions; Qs. no. 5,6,7,11,19,26), Social (3 questions; Qs. no. 20,21,22) and Environmental (8 questions; Qs. no. 8,9,12,13,14,23,24,25). Among 26 questions, question 3, 4, and 26 of physical and psychological domains have been reversely coded. The domain score is determined by averaging the item scores within each domain. They then linearly translated the scores to a scale from 0 to 100. Higher the scores secured by the patients indicate their better quality of life [17].

Statistical Analysis

The statistical analysis of the data was performed using the IBM SPSS Statistics Version-27. Descriptive statistics were used to summarize the demographic and clinical characteristics of the patients and categorical variable were presented in frequency and percentages value whereas continuous variables were reported in Median (IQR). Shapiro-Wilk test was used to determine the data distribution pattern, which was found not-normally distribution. Based on data distribution, non-parametric tests were used to perform the data analysis. Mann-Whitney U test was used to compare between the groups whereas, Kruskal-Wallis test determined the association between continuous variables and categorical variables. Similarly, a correlation between depression and quality of life was established using Spearman's rank correlation coefficient test. A p-value<0.05 was considered statistically significant for all the analysis.

Results

The mean age of the patients was 48.94 ± 10.56 years. Mostly patients were married [52(96.30%)] with non-educated backgrounds [36(66.67%)] and unemployed [45(83.33%)]. More than a half [34(62.96%)] of the patients were residing in urban areas with median monthly family income of [15000 INR (10000-30000)]. More than half [36(66.67%)] of the patients were vegetarian with non-smoking habits [49(90.74%)]. Slightly less than a half [24(44.4%)] of the patients were detected stage 2 breast cancer. About two third of the patient were at menopause stage [38(70.37%)] and having breast cancer within the duration of 01 to 12 months [47(87.04%)] with no family history [52(96.29%)] of cancer (Table 1)

Table-1 Demographic characteristics of the breast cancer patients

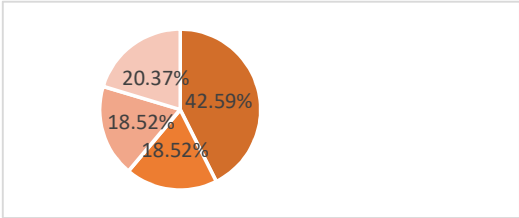
Variables		n (%)	Mean ± SD Median(IQR)
Age (in years)	21-30	2 (3.70)	48.94 ± 10.56
	31-40	10 (18.52)	
	41-50	20 (37.04)	
	>50	22 (40.74)	
Marital Status	Married	52 (96.30)	
	Single	1 (1.85)	
	Widow	1 (1.85)	
Educational status	Non-Educated	36 (66.67)	
	Primary	9 (16.67)	
	Secondary	5 (9.26)	
	Tertiary	4 (7.41)	
Occupational status	Employed	9 (16.67)	
	Unemployed	45 (83.33)	
Residential Area	Rural	20 (37.04)	
	Urban	34 (62.96)	
Monthly Family Income 1 USD = 92.56	5000-10000	16 (29.63)	15000 INR (10000-30000) (162.05 USD)
	10001-15000	12 (22.22)	
	15001-20000	6 (11.11)	
	>20000	20 (37.04)	
Dietary Habits	Non-Vegetarian	18 (33.33)	
	Vegetarian	36 (66.67)	

Social History	Non-Smoker	49 (90.74)	
	Smoker	5 (9.26)	
Stage of Cancer	Stage-1	2 (3.70)	
	Stage-2	24 (44.44)	
	Stage-3	12 (22.22)	
	Stage-4	16 (29.63)	
Duration Since Diagnosis (in months)	1-12	47 (87.04)	
	13-24	4 (7.41)	
	25-36	2 (3.70)	
	>36	1 (1.85)	
Family History of Cancer	No	52 (96.29)	
	Yes	2 (3.70)	
Menstrual Status	Irregular	7 (12.96)	
	Menopause	38 (70.37)	
	Regular	9 (16.67)	

The median (inter quartile range) score of the PHQ-9 was 6.50 (2.75-13.00). The 57.41% patients were found to be depressed in which about one-fifth [11(20.37%)] of the patients reported moderately severe depression. Whereas, an equal proportion of the patients experienced mild depression [10(18.52%)] and moderate depression [10(18.52%)]. While, slightly less than a half [23(42.59%)] of the patients had none-minimal depression. (Figure 1).

Figure 1 Distribution of Patients in different class of depression

The patient' s quality of life score found as highest in psychological domain [79.16(61.45-87.50)] followed by environmental [65.62(56.25-75.00)] followed by social [62.50(50.00-75.00)] and physical domain [57.14(37.50-68.75)]. However, the physical quality of life domain was having lowest median score. (Table 2) The median (IQR) score for general quality of life of the patients was 4.00(3.00-4.00). Slightly more than a half



[28(51.85%)] of the patients had overall "Good" quality of life whereas the median score 3.00(2.00-4.00) was found satisfactory regarding patients' personal satisfaction towards health but slightly more than one third [21(38.89%)] of the patient showed their dissatisfaction level towards their health.

Table-2 Domain specific quality of life score of breast cancer patients (N=54)

QoL domain	Median(IQR)
Physical	57.14(37.50-68.75)
Psychological	79.16(61.45-87.50)
Social	62.50(50.00-75.00)
Environmental	65.62(56.25-75.00)

A Spearman's rank-order test was conducted to determine the association between patients age, monthly family income, and duration of diagnosis with their quality of life domains and depression. Patients age showed a statistically significant, moderate negative correlation with the Social domain of QoL ($r = -0.308$, $p = 0.023$). While the patients' monthly family income showed very strong positive correlation with environmental QoL ($r = 0.853$, $p < 0.001$) and a strong positive correlation with psychological domain ($r = 0.527$, $p < 0.001$). A significant but weak positive correlation with physical QoL ($r = 0.288$, $p = 0.035$). Furthermore, a significant weak negative correlation between monthly family income and depression ($r = -0.299$, $p = 0.028$), showing that higher family income is associated with lower levels of depression. However, the duration since diagnosis had a statistically significant, moderate negative correlation with physical QoL ($r = -0.340$, $p = 0.012$), domain (Table 3).

Table-3 Association between patient's age, monthly family income and duration of diagnosis with QoL domains and depression (N=54)

Variables		Physical	Psychological	Social	Environmental	Depression
Age	r	-.093	.096	-.308	.149	.029
	p	.503	.488	.023*	.284	.833

Monthly Family Income	r	.288	.527	.251	.853	-.299
	p	.035*	< .001**	.067	< .001**	.028*
Duration Since Diagnosis	r	-.340	-.087	-.131	.098	.191
	p	.012*	.530	.346	.483	.167

* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed)

A Mann-Whitney U test was conducted to determine the association between patients' demographic variables (occupation and smoking) with their quality of life domains and depression. Patients' occupation showed a statistically significant difference with depression (p = 0.033), physical QoL (p = 0.002), and environmental QoL (p < 0.001), While patients' smoking habit had a statistically significant association with the psychological QoL domain (p = 0.028).

A Kruskal-Wallis test was conducted to determine the association between patients' demographic variables (education level, and marital status) with their quality of life domains and depression. Patients' education level showed a statistically significant association with depression (p=0.013), physical QoL (p=0.024), psychological QoL (p=0.049), and environmental QoL (p=0.004), while marital status showed no significant associations. (Table 4).

Table-4 Association between patients' demographic variables with quality of life domains and depression (N=54)

Demographic Variables	Depression	Physical	Psychological	Social	Environmental
Occupation	0.033*	0.002**	0.124	0.260	<0.001**
Smoking	0.810	0.881	0.028*	0.184	0.510
Education Level	0.013*	0.024*	0.049*	0.225	0.004**
Marital Status	0.655	0.258	0.231	0.699	0.542

* Significant at the 0.05 level. ** Significant at the 0.01 level

A Spearman's rank-order test was conducted to evaluate the relationship between patients' depression and quality of life (QoL) domains. The analysis revealed statistically significant negative correlations across all quality of life domains.

Depression showed a strong, statistically significant negative correlation with the physical QoL domain (r=-0.852, p<0.001) and with the psychological QoL domain (r =-0.692, p< 0.001). Furthermore, a statistically significant, strong negative correlation was observed between depression and the environmental QoL domain (r = -0.520, p < 0.001). A significant, but moderate negative correlation was also found between depression and the Social QoL domain (r = -0.371, p = 0.006). Overall, these findings strongly indicate that as the level of depression increases, the physical, psychological, social, and environmental quality of life of the patients significantly decreases. (Table 5).

Table-5 Association between depression and quality of life domains (N=54)

Variables	r- value	p- value
Depression - Physical	-.852	<0.001**
Depression - Psychological	-.692	<0.001**
Depression - Social	-.371	0.006**
Depression - Environmental	-.520	<0.001**

* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed)

A Spearman's rank-order correlation analysis was conducted to evaluate the inter-domains correlations between the four domains of quality of life. The analysis revealed statistically significant positive correlations across all QoL domains, indicating that an improvement in one domain is closely associated with improvements in the others.

The very strong statistically significant positive correlation was observed between the Psychological and Environmental domains (r = 0.719, p < 0.001), followed by a strong positive correlation between the Physical and Psychological domains (r = 0.552, p < 0.001). Furthermore, the Physical QoL domain demonstrated a significant moderate positive correlation with the Environmental domain (r = 0.455, p < 0.001) and the Social domain (r = 0.315, p = 0.020). Similarly, a statistically significant moderate positive correlation was found between the Psychological and Social domains (r = 0.354, p = 0.009). However, a significant, weaker, positive correlation was observed between the Social and Environmental QoL domains (r = 0.291, p = 0.032). (Table 6).

Table-6 Inter-domains correlations of WHOQOL-BREF (N=54)

Quality of Life Domains	R	P
Physical - Psychological	.552	<0.001**

Physical - Social	.315	0.020*
Physical - Environmental	.455	<0.001**
Psychological - Social	.354	0.009**
Psychological Environmental	.719	<0.001**
Social - Environmental	.291	0.032*

* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed)

Discussion

An attempt was made to assess the depression and quality of life among breast cancer. The mean age and marital status of the study participants were consistent with the findings from a study conducted by Alawadi and Ohaeri, where researcher found the mean age and marital status of the patients 48.3 years and 89.9% respectively [18]. About two third of the patients were illiterate in present study which is in line with the previous study findings [19]. Furthermore, in a study by Dadheech et al., education and employment were consistent with our study at 60% and 84.3%, respectively [20]. Our study showed an association between the presence of depression and employment, income, and educational levels. This is related to a Greek study done by Tsaras et al., which reported that women with breast cancer with less education were more likely to have sensations of despair and fear [21].

This study revealed a high prevalence of depressive symptoms among the participants. About 57.41% of the patients were found to be depressed, in which about one-fifth [11(20.37%)] reported moderately severe depression. Whereas, an equal proportion of the patients experienced mild depression [10(18.52%)] and moderate depression [10(18.52%)]. A similar high prevalence was reported by Okati et al. in their study, which demonstrated that 66.6% of breast cancer patients suffered from depression [22]. Another study conducted by Hussein et al., found that 77.8% patients experienced depression with 35.8% meeting the criteria for major depressive disorder [23].

Similarly, Kakhniashvili *et al*. also found a significant frequency of depressive symptoms where 63% of breast cancer survivors had depressive symptoms [24]. In a study by Hessami et al. in Iran, a high overall depression prevalence of 46.6% was demonstrated among breast cancer patients [25]. There are several reasons for the existence of depression. After receiving a breast cancer diagnosis, the majority of women struggle to accept the fact, cope with the illness's uncertainty, and fear the worst. The current study's findings demonstrated that depression was prevalent in the community under investigation, yet it is frequently disregarded or remains misdiagnosed. Treatment-related side effects such fatigue and pain might also contribute to depression [26].

In this study, the educational status deeply influenced the overall quality of life of the patients. A similar finding was reported by Nageeti et al. in their study, noting that patient education, along with other socioeconomic variables were significant determinants of global health and QoL scores [27]. Family monthly income was associated with the patients' overall quality of life in present study which is similar to the Smail et al study findings where the researchers observed low quality of life among the lower-income women compared to higher-income women [28]. The present study also highlighted a negligible impact of marital status on patient's quality of life similar to other studies [29]. However, a substantial correlation between QoL and employment was observed in current study which is in line with the findings from a cross-sectional study conducted in Southeastern India [30]. A comparable result was noticed between an Indian study and current study regarding reduction in QOL among breast cancer patients (overall mean QoL score = 59.3) [31].

In this study, all the domains of quality of life, including physical, social, and environment domains, scored below 70 (max score 100) with the lowest score for the physical domain (57.14) which is supported by a study conducted in South India [32]. Kluthcovsky *et al*. reported a quality of life of physical (score; 63.4), psychological (score; 66.2), social (score; 75), and environmental domains (score; 68.7), which is similar to the findings from current study with a lowest score in the physical domain [33]. Furthermore, Marinkovic et al. also reported a lowest score in the physical domain (52.55) due to persistent physiological and emotional burden of cancer treatments drastically impairs the global health status and functional capacity of survivors [34].

The present study revealed that patients with depression experienced a poorer overall QOL than those without depression. Previous studies based on cross-sectional data have shown that depression is inversely related to QOL among breast cancer patients and survivors [35]. Another study by Ardebil showed that all domains of HRQOL were affected by depression. Significant differences were found between depression and treatment type [36]. In a study by Jones et al. in USA reported that as depression increases, the quality of life of breast cancer patients decreases [37]. Early identification is required for better clinical management.

Conclusion

The present study highlights the fact that depression is a widespread and curable entity in breast cancer patients which greatly affects their overall quality of life. As depression is proven negatively associated with QOL Patients experience great physical and mental stress from the disease and adverse effects of

therapies. These findings strongly support the need for a holistic and personalized approach to cancer care. It is highly recommended to include routine screening for depression as a standard part of breast cancer treatment. Psychosocial help at an early stage and appropriate psychiatric referral by health care providers are useful in alleviating patient's suffering and improving their quality of life in the long term. Like other research studies, this study is also not free from the limitations. As the study was limited to only one hospital, therefore, findings of this study cannot be generalized top the overall population with breast cancer. There may be a chance of recall biases as the questionnaire was filled by the patients. Another limitation could be the duration of the study that restricted to capture long term effects of the disease condition.

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Conflicts of interest
There are no conflicts of interest.

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