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# Effectiveness of an Educational Program on Physical and Psychological Quality of Life among Breast Cancer Patients in Erbil City, Iraq: A Quasi-Experimental Study

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**Abstract** **Background:** Breast cancer is the most common malignancy among women worldwide and is associated with substantial impairment in physical and psychological quality of life (QoL). In Erbil City, Iraq, structured supportive interventions for breast cancer patients remain limited. This study evaluated the effect of a structured educational program on physical and psychological QoL using a quasi-experimental design. **Methods:** A quasi-experimental pre-post study with a control group was conducted among 120 female breast cancer patients recruited from Nanakaly and Rizgary Teaching Hospitals between November 2024 and May 2025. Participants were non-randomly allocated into intervention ($n = 60$) and control ($n = 60$) groups based on baseline stress levels for ethical considerations. The intervention group received three structured educational sessions addressing disease knowledge, symptom management, coping strategies and treatment adherence, in addition to routine care, while the control group received standard care only. QoL was assessed before and 4-6 weeks after the intervention using a validated questionnaire. Data were analyzed using t-tests, ANCOVA and multiple linear regression. **Results:** At baseline, no significant differences were observed between groups in physical or psychological QoL. After adjustment for baseline scores, ANCOVA demonstrated a significant improvement in physical QoL in the intervention group compared with controls ($F(1,117) = 23.83$, $p < 0.001$, partial $\eta^2 = 0.169$). No statistically significant improvement was observed in psychological QoL ($p = 0.453$). Regression analysis indicated that older age was associated with higher physical QoL but lower psychological QoL, while employment status was positively associated with psychological outcomes. **Conclusion:** Structured educational programs may contribute to improved physical quality of life among breast cancer patients; however, education alone appears insufficient to produce measurable improvements in psychological well-being. These findings suggest that educational interventions should be complemented by targeted psychosocial support to address the multidimensional needs of breast cancer patients in resource-limited settings.

**Key Words** Breast Cancer, Quality of Life, Educational Intervention, Physical Health, Psychological Well-Being, Quasi-Experimental Study, Kurdistan Region and Patient Education

## INTRODUCTION

Breast cancer is the most prevalent malignancy among women globally and a primary contributor to cancer-related morbidity and mortality. Breast cancer represents around 2.3 million new cases and 685,000 deaths each year, constituting a significant public health issue [1]. A diagnosis of breast cancer significantly impacts the psychological well-being and quality of life (QoL) of patients, as the disease and its treatment interfere with physical functioning, emotional stability, social roles and overall life satisfaction [2,3].

In the Kurdistan Region of Iraq, breast cancer constitutes the most common malignancy among women and represents a growing public health challenge. Recent clinical observations and regional reports suggest an increasing disease burden, often accompanied by delayed diagnosis and limited access to comprehensive supportive care services. Despite this, structured educational and psychosocial support interventions tailored to the local context remain limited [4].

The quality of life has become a vital outcome in cancer care, going beyond conventional survival metrics to include the patient's subjective experience of physical, psychological, social and spiritual well-being [5]. In breast cancer patients, the physical aspect of quality of life (QoL) involves symptoms like fatigue, pain, appetite loss and side effects from treatment. In contrast, the psychological aspect includes emotional distress, anxiety, depression, coping ability, self-image and fear of recurrence [6-8]. Both domains exhibit significant vulnerability throughout the disease trajectory, as patients frequently undergo intensive treatments such as surgery, chemotherapy, radiotherapy and hormonal therapy, which can adversely affect physical functioning and mental health [9,10]. Importantly, QoL experiences may vary across disease stages, with early-stage patients often facing concerns related to treatment side effects and role functioning, while patients with advanced disease may experience greater symptom burden and psychological distress [11].

Educational programs are increasingly acknowledged as effective non-pharmacological interventions for enhancing the quality of life in cancer patients. These programs offer organized information regarding the disease, treatment alternatives, symptom management and coping strategies with the objective of empowering patients through knowledge and self-care competencies [12,13]. These interventions decrease uncertainty and anxiety while also improving treatment adherence, encouraging healthy lifestyle choices and strengthening patients' sense of control and resilience [14,15]. From a theoretical perspective, improved disease-related knowledge may reduce uncertainty, enhance perceived control and strengthen self-efficacy, thereby facilitating adaptive coping and emotional adjustment among patients. However, evidence suggests that improvements may be domain-specific, with physical outcomes often showing more consistent benefits than psychological outcomes, particularly in short-duration interventions lacking structured psychosocial components. Research indicates that breast cancer patients engaged in educational interventions experience notable enhancements in physical symptoms, such as decreased fatigue and improved sleep, as well as psychological outcomes, including reduced depression, heightened satisfaction and better coping skills, in contrast to those receiving standard care [16].

In resource-limited settings such as Erbil City, access to specialized psychological counseling services may be constrained. Consequently, structured educational programs delivered by oncology nurses and healthcare professionals represent a pragmatic and scalable supportive strategy that can be integrated into routine cancer care. It is important to distinguish such educational approaches from formal psychosocial or counseling interventions, which are specifically designed to address emotional distress and require specialized training and resources.

Although there is a global focus on psychosocial support, research in low- and middle-income regions, particularly in the Middle East, remains limited. Cultural, social and resource-related factors significantly impact patient outcomes in these areas. In Iraq, particularly in the Kurdistan Region, the incidence of breast cancer is increasing; however, healthcare services are limited, with insufficient emphasis on organized educational and supportive interventions [17]. In this context, assessing the influence of educational programs on the quality of life of breast cancer patients is essential for incorporating holistic care into oncology and addressing unmet patient needs.

This study examines and compares the effect of a structured educational program on the physical and psychological aspects of quality of life among breast cancer patients in intervention and control groups. By focusing on these two domains, the study aims to assess changes in quality of life before and after the intervention within a real-world clinical setting and to explore whether structured educational support is associated with measurable improvements, thereby informing supportive care strategies for breast cancer patients.

## METHODS

### Study Design and Setting

This study employed a quasi-experimental pre-post design with a non-equivalent control group to examine the effect of a structured educational program on physical and psychological quality of life among breast cancer patients. The study was conducted at Nanakaly Teaching Hospital and Rizgary Teaching Hospital in Erbil City, Kurdistan Region of Iraq, between November 2024 and May 2025.

Any implication of randomization has been removed to accurately reflect the non-random allocation procedure used.

### Sample Selection and Participants

The study population comprised female patients diagnosed with breast cancer who were receiving treatment or follow-up care at the participating hospitals.

Purposive sampling was used to recruit participants, which may limit the generalizability of the findings to similar hospital-based settings.

### Inclusion Criteria

- Women aged ≥18 years
- Confirmed diagnosis of breast cancer at any treatment phase (surgery, chemotherapy, radiotherapy, hormonal therapy or combinations)
- Ability to communicate verbally with or without assistance
- Willingness to participate and provide written informed consent

### Exclusion Criteria

- Patients with clinically diagnosed severe psychiatric disorders or documented cognitive impairment that could compromise informed participation
- Patients in terminal or critical condition who were unable to attend educational sessions

### Group Allocation

Participants were allocated into intervention (n = 60) and control (n = 60) groups using a non-random, purposive allocation approach based on baseline stress levels.

Patients exhibiting higher perceived stress were preferentially assigned to the intervention group for ethical reasons, to ensure access to structured educational support.

This selective allocation may have resulted in baseline non-equivalence between groups, which was addressed analytically using ANCOVA.

### Educational Intervention

The intervention consisted of three structured educational sessions, each lasting 45-60 minutes. Content included disease information, treatment-related side-effect management, lifestyle guidance, stress coping strategies and treatment adherence. Sessions were delivered by oncology nurses using interactive lectures, group discussions and printed materials.

Given the relatively short duration of the program and follow-up period, its ability to influence psychological outcomes may have been limited, as psychological adaptation often requires longer and more intensive interventions.

The control group received routine care, including informal education provided during clinical visits, without participation in structured sessions.

To minimize contamination, intervention sessions were delivered separately; however, informal information exchange between participants cannot be fully excluded.

### Data Collection Instruments and Procedures

Quality of life was assessed using a validated quality-of-life questionnaire adapted from established instruments, covering physical and psychological domains. The physical domain comprised 9 items and the psychological domain 11 items, rated on a Likert-type scale (0-10), with higher scores indicating greater severity.

Face-to-face interviews were conducted, which may have introduced social desirability bias, although standardized instructions and trained interviewers were used to reduce this effect.

A pilot study was conducted among 15 breast cancer patients prior to data collection. Minor linguistic modifications were made to improve item clarity based on pilot feedback and the pilot sample was excluded from the final analysis to prevent data contamination. The instrument demonstrated acceptable internal consistency (Cronbach's alpha = 0.705).

Post-intervention data were collected 4-6 weeks after program completion, which may be insufficient to assess sustained quality-of-life changes, particularly psychological outcomes.

Descriptive statistics summarized participant characteristics. Independent t-tests and paired t-tests were used for group comparisons.

ANCOVA was employed to evaluate post-intervention outcomes while controlling baseline scores. Although ANCOVA cannot fully eliminate bias arising from non-random group allocation, it was used to reduce baseline imbalance.

Variables such as exercise and alcohol use were defined as binary self-reported behaviors (yes/no).

Given the exploratory nature of analyses, marginal p-values were interpreted cautiously.

No participant dropouts occurred during the study; therefore, missing data handling was not required.

## RESULTS

A total of 120 participants were divided equally into intervention (n = 60) and control (n = 60) groups. Due to the non-random allocation strategy, demographic profiles in both groups were broadly comparable but not assumed to be strictly equivalent.

In both the intervention and control groups, the majority of participants were from Nanakaly Hospital (80.0% and 81.7%, respectively). The largest age group was 46-57 years, comprising 43.3% of the intervention group and 45.0% of the control group, followed by 33-45 years (30.0% vs. 31.7%). Most participants resided in urban areas (61.7% and 68.3%), while smaller proportions were from suburban (26.7% vs. 21.7%) and rural settings (11.7% vs. 10.0%). Marital status showed that an overwhelming 86.7% in both groups were married, with only small percentages unmarried or divorced. Regarding education, primary school level was

Table 1: Frequency and percentage distribution of demographic variables in intervention and control groups (n=120)

| | Intervention | | Control | |
|---|---|---|---|---|
| Variable | Frequency | Percent | Frequency | Percent |
| Hospital | | | | |
| Nanakaly | 48 | 80.0 | 49 | 81.7 |
| Rizgary | 12 | 20.0 | 11 | 18.3 |
| Age Group | | | | |
| 33-45 Years | 18 | 30.0 | 19 | 31.7 |
| 46-57 Years | 26 | 43.3 | 27 | 45.0 |
| 58-70 Years | 16 | 26.7 | 14 | 23.3 |
| Living Situation | | | | |
| Urban | 37 | 61.7 | 41 | 68.3 |
| Sub-Urban | 16 | 26.7 | 13 | 21.7 |
| Rural | 7 | 11.7 | 6 | 10.0 |
| Marital Status | | | | |
| Married | 52 | 86.7 | 52 | 86.7 |
| Unmarried | 5 | 8.3 | 6 | 10.0 |
| Divorced | 3 | 5.0 | 2 | 3.3 |
| Educational Status | | | | |
| Illiterate | 15 | 25.0 | 14 | 23.3 |
| Read and Write | 8 | 13.3 | 10 | 16.7 |
| Primary School | 18 | 30.0 | 17 | 28.3 |
| High School Graduate | 4 | 6.7 | 4 | 6.7 |
| Institute/College Graduate | 10 | 16.7 | 11 | 18.3 |
| Post Graduate | 5 | 8.3 | 4 | 6.7 |
| Occupational Status | | | | |
| Housewife | 38 | 63.3 | 44 | 73.3 |
| Employee | 19 | 31.7 | 12 | 20.0 |
| Retired | 3 | 5.0 | 4 | 6.7 |
| Religion | | | | |
| Muslim | 58 | 96.7 | 56 | 93.3 |
| Christian | 2 | 3.3 | 4 | 6.7 |
| Income Status | | | | |
| Insufficient | 20 | 33.3 | 18 | 30.0 |
| Barely Sufficient | 14 | 23.3 | 18 | 30.0 |
| Sufficient | 24 | 40.0 | 21 | 35.0 |
| Exceeds Needs | 2 | 3.3 | 3 | 5.0 |

Table 2: Mean difference of physical and psychological quality of life after intervention between groups

| Variable | Group | Mean | S.D. | p value | Mean Difference | 95% CI Lower | 95% CI Upper |
|---|---|---|---|---|---|---|---|
| Physical (post) | Intervention | 48.73 | 19.06 | 0.348 | -3.17 | -9.83 | 3.49 |
| | Control | 51.90 | 17.75 | - | - | - | - |
| Psychological (post) | Intervention | 59.88 | 9.20 | 0.324 | 1.88 | -1.89 | 5.65 |
| | Control | 58.00 | 11.52 | - | - | - | - |

Table 3: ANCOVA results for the effect of educational programme on physical and psychological quality of life in breast cancer patients

| Dependent Variable | Source | df | F | p-value | Partial $\eta^2$ |
|---|---|---|---|---|---|
| Physical QoL (post) | Group | 1,117 | 23.83 | <0.001 | 0.169 |
| | Physical (pre) | 1,117 | 383.61 | <0.001 | 0.766 |
| Psychological QoL (post) | Group | 1,117 | 0.57 | 0.453 | 0.005 |
| | Psych (pre) | 1,117 | 280.91 | <0.001 | 0.706 |

Table 4: Multiple regression models for predictors of post-intervention physical and psychological quality of life

| Predictor | β (B) Physical QoL (post) | 95% CI (Lower- Upper) | p-value | β (B) Psychological QoL (post) | 95% CI (Lower- Upper) | p-value |
|---|---|---|---|---|---|---|
| Age | 5.33 | 0.09 -10.57 | 0.046* | -5.31 | -7.99 - -2.64 | <0.001*** |
| BMI | 2.78 | -1.87 -7.42 | 0.239 | -0.86 | -3.23 -1.52 | 0.476 |
| Exercise (Yes) | 0.62 | -9.77 -11.01 | 0.905 | 3.26 | -2.05 -8.56 | 0.226 |
| Smoking (Yes) | 2.95 | -6.96 -12.87 | 0.556 | -3.41 | -8.48 -1.65 | 0.184 |
| Alcohol (Yes) | 6.21 | -12.14 -24.55 | 0.504 | 2.40 | -6.97 -11.77 | 0.613 |
| Education (High school) | -15.33 | -30.13 - -0.53 | 0.043* | -0.09 | -7.64 -7.47 | 0.982 |
| Education (Post graduated) | -18.71 | -35.50 - -1.93 | 0.029* | -0.24 | -8.81 -8.33 | 0.956 |
| Occupation (Employee) | -1.95 | -13.04 -9.14 | 0.728 | 7.94 | 2.28 -13.60 | 0.006** |
| Stage of Cancer (II) | 7.12 | -3.88-1012 | 0.202 | -2.42 | -8.03-3.20 | 0.395 |

the most common (30.0% vs. 28.3%), followed by illiterate participants (25.0% vs. 23.3%). Occupationally, the majority were housewives (63.3% vs. 73.3%), while employees formed a smaller group (31.7% vs. 20.0%). Almost all participants were Muslim (96.7% vs. 93.3%) and income status showed that around 40.0% of the intervention group and 35.0% of the control group reported sufficient income, while about one-third in each group reported insufficient income (Table 1).

Comparison of the quality categories shows that lack problem occurred more frequently with the control group (65.0%) than with the intervention group (48.3%). Moderate problem (35.0%) was more frequent in the intervention group than in the control group (26.7%) and high problem also more frequently in the intervention group (16.7%) than in the control group (8.3%) (Figure 1).

The comparison of physiological quality categories indicates that little difficulty was somewhat more prevalent in the control group (55.0%) than in the intervention group (46.7%). The intervention group had a higher percentage of moderate difficulty (51.7%) than the control group (43.3%), but both groups had the same low percentage of high difficulty (1.7%) (Figure 2).

After the intervention, the average score for physical quality of life was a little lower in the intervention group (48.73±19.06) than in the control group (51.90±17.75). The mean difference of −3.17 was not statistically significant (p = 0.348; 95% CI: −9.83 to 3.49). The intervention group exhibited a superior mean score (59.88±9.20) in psychological quality of life compared to the control group (58.00±11.52), reflecting a mean difference of 1.88; however, this disparity was not statistically significant (p = 0.324; 95% CI: −1.89 to 5.65). These unadjusted findings indicate that raw post-intervention means did not demonstrate significant group differences (Table 2).

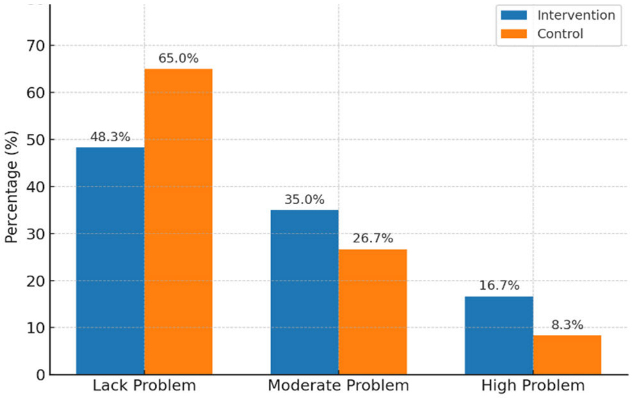

Figure 1: Quality of Patients' life according to Physical domain

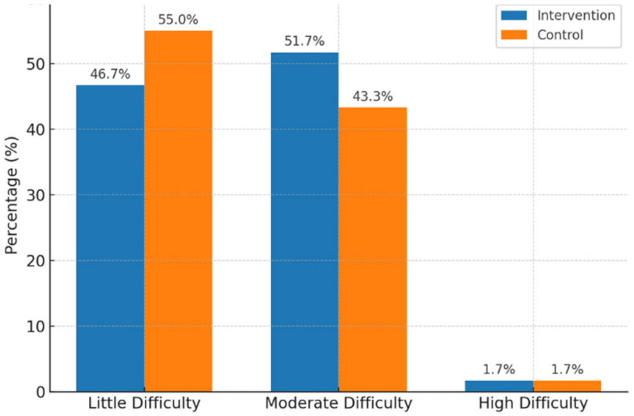

Figure 2: Quality of Life according to Psychological Well Being

After adjustment for baseline quality-of-life scores using ANCOVA (Table 3), the analysis demonstrated a significant group effect on physical quality of life (F(1,117)

= 23.83, $p < 0.001$, partial $\eta^2 = 0.169$), indicating superior physical outcomes in the intervention group compared to the control group. This adjusted effect contrasts with the unadjusted comparisons and reflects correction for baseline imbalance. Conversely, the group effect on psychological quality of life was not statistically significant ($F(1,117) = 0.57$, $p = 0.453$, partial $\eta^2 = 0.005$). Baseline scores were strong predictors of post-intervention outcomes in both domains ($p < 0.001$), with large effect sizes (partial $\eta^2 = 0.766$ for physical and 0.706 for psychological).

Table 4 summarizes the regression analyses that looked at sociodemographic, lifestyle and clinical factors that could affect breast cancer patients' quality of life after treatment. The model showed that age was a significant positive predictor ($\beta = 5.33$, 95% CI = 0.09-10.57, $p = 0.046$) for physical quality of life. This means that older patients tended to report better physical outcomes after the intervention. Conversely, elevated educational attainment, specifically at the high school ($\beta = -15.33$, $p = 0.043$) and postgraduate ($\beta = -18.71$, $p = 0.029$) levels, correlated with diminished physical quality of life. Other indicators, such as BMI, exercise, smoking, alcohol use, occupation and cancer stage, did not exhibit significant correlations with physical results.

Age was a significant negative predictor for psychological quality of life ($\beta = -5.31$, 95% CI = -7.99 to -2.64, $p < 0.001$), indicating that older participants exhibited diminished psychological well-being. Conversely, employment status (employee group) had a positive correlation with psychological quality of life ($\beta = 7.94$, 95% CI = 2.28-13.60, $p = 0.006$), suggesting that employed patients experienced superior psychological outcomes compared to their non- employed counterparts. Other factors, such as education, BMI, exercise, smoking, alcohol consumption and cancer stage, did not significantly predict psychological well-being. These findings indicate that sociodemographic factors, specifically age, education and occupation, are more significant in influencing quality of life outcomes than lifestyle or clinical variables in this cohort of breast cancer patients.

## DISCUSSION

### Main Findings

This study evaluated the efficacy of an educational program on the physical and psychological quality of life (QoL) of breast cancer patients in Erbil City. While the educational intervention demonstrated measurable benefits in physical quality of life, these findings should be interpreted cautiously in light of methodological and contextual limitations. The results underscore both the potential advantages and constraints of formal educational initiatives within this demographic.

### Quality of Life in the Physical World

The educational program exhibited a statistically significant enhancement in physical quality of life after adjustment for baseline values using ANCOVA. This finding is consistent with earlier studies reporting that educational interventions can improve symptom management, treatment adherence and physical well-being among breast cancer patients [18,19]. However, given the non-randomized study design, this association should be interpreted as indicative rather than causal.

The intervention group reported superior physical outcomes despite elevated baseline levels of overweight and obesity, conditions typically associated with poorer physical health. One possible explanation is that structured guidance on symptom control, diet and self-care enabled more effective management of treatment-related side effects, even among higher-risk patients.

The observed improvement in physical QoL supports the role of education as a potentially cost-effective and scalable supportive strategy in resource-limited settings. Patients who participated in structured sessions appeared better equipped to recognize and manage fatigue, appetite changes and pain. Prior research suggests that patient empowerment through knowledge may reduce uncertainty, improve adherence to medical regimens and encourage engagement in health-promoting behaviors [20-22]. Nevertheless, such benefits are likely influenced by contextual factors, including healthcare access and baseline patient characteristics.

Regression analysis indicated that older age was associated with better physical quality of life. This finding contrasts with some previous literature suggesting younger age as a protective factor against physical decline [23]. One possible, but not definitive, interpretation is that older women in the local context may demonstrate greater disease acceptance, familial support or adaptive coping strategies. Given the exploratory nature of this analysis, these explanations remain speculative and warrant further investigation.

Conversely, higher educational attainment was associated with lower physical QoL scores. This association may reflect heightened symptom awareness or higher health expectations among more educated patients, rather than poorer objective health status.

### Psychological Quality of Life

The educational intervention did not produce a statistically significant improvement in psychological quality of life compared to the control group. Although participants in the intervention group reported modest improvements in perceived satisfaction and control, these changes did not reach statistical significance. This finding highlights an important limitation of short-term educational interventions when addressing complex psychological distress.

Psychological well-being in breast cancer patients is often influenced by fear of recurrence, body image concerns, social role disruption and existential uncertainty. Educational interventions may increase understanding and coping knowledge but may be insufficient to generate measurable psychological change without structured psychosocial or therapeutic components. Previous studies similarly report that meaningful psychological improvement often requires counseling, peer support or cognitive-behavioral approaches [24,25].

Regression analysis demonstrated that older age was associated with poorer psychological quality of life, despite its association with better physical outcomes. This divergence underscores the multidimensional and non-parallel nature of quality-of-life domains. Older patients may experience increased social isolation or anxiety despite physical adaptation. Employment status emerged as a protective factor for psychological well-being, aligning with evidence that employment provides social interaction, financial stability and a sense of purpose [26,27].

### Sociodemographic and Clinical Indicators

Beyond age and occupation, lifestyle factors such as smoking, alcohol consumption, BMI and exercise were not significantly associated with QoL outcomes. This contrasts with findings from other contexts where lifestyle behaviors exert stronger predictive effects [28,29]. The absence of association in this study may reflect the overriding influence of structural and societal determinants, including limited healthcare resources, financial constraints and cultural factors within the local setting.

### Implications for Practice

The findings suggest that structured educational programs may contribute to improved physical quality of life among breast cancer patients in the Kurdistan Region. However, education alone appears insufficient to address psychological distress comprehensively. Integrating educational interventions with targeted psychosocial supports such as counseling, peer support groups and stress management strategies, may yield more balanced improvements across quality-of-life domains. Tailoring interventions to specific demographic subgroups, particularly older patients and unemployed women, may further enhance effectiveness.

## CONCLUSIONS

In conclusion, the educational program was associated with an improvement in physical quality of life, but did not result in a statistically significant improvement in psychological quality of life, among breast cancer patients in Erbil City. These findings should be interpreted cautiously, given the quasi-experimental design, non-random allocation and short follow-up period. Sociodemographic factors, particularly age, education and occupation, were associated with variations in quality of life within this specific clinical setting, whereas lifestyle and clinical characteristics showed no significant relationship.

Although psychosocial support was not directly evaluated in this study, the absence of meaningful psychological improvement suggests that education alone may be insufficient to address psychological distress. Therefore, future interventions should consider combining educational programs with structured psychosocial components, such as counseling or peer support, to better address the multidimensional needs of breast cancer patients.

Given that the study was conducted in two public hospitals within Erbil City, the findings may not be generalizable to other regions or healthcare systems. Further studies employing randomized designs, longer follow-up periods and broader settings are warranted to confirm and extend these findings and to inform the development of comprehensive supportive care strategies in resource-limited environments.

## Limitations

This study has several important limitations that warrant careful consideration. The quasi-experimental design and purposive sampling restrict causal inference and limit generalizability beyond similar hospital-based settings. The short follow-up period may not capture sustained changes in quality of life, particularly psychological outcomes. Reliance on self-reported measures introduces the possibility of response bias. Furthermore, although baseline stress was analytically addressed, unmeasured psychosocial and cultural factors may have influenced the observed outcomes. These limitations suggest that the findings should be interpreted as context-specific associations rather than definitive evidence of intervention effectiveness.

## Ethical Statement

This study was approved by the Ethical Committee of the college of Nursing (Approval No. 2476 on 1-9-2024). Written informed consent was obtained from all participants prior to data collection.

All methods were performed in accordance with relevant guidelines and regulations. The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.

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