ORIGINAL ARTICLE

EFFECT OF PSYCHOEDUCATIONAL INTERVENTION ON ANXIETY AMONG BREAST CANCER PATIENTS IN AHMADU BELLO UNIVERSITY TEACHING HOSPITAL ZARIA

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ABSTRACT

Background: Breast cancer (BC) is a disease of global public health concern whose incidence is rising, leading to significant morbidity and mortality. Psychological burden associated with BC diagnosis and treatment has negative consequences on the patients in addition to physical symptoms. Many psychosocial interventions have been developed and evaluated to reduce psychological disorders such as anxiety and depression in high-income countries. However, Nigeria and similar resource-constrained settings have received inadequate attention in this regard.

Objective: To assess the effect of psychoeducational intervention (PEI) on anxiety among breast cancer patients in Ahmadu Bello University Teaching Hospital (ABUTH), Zaria.

Methods: The study was conducted using a quasi-experimental study design. After obtaining informed consent, eligible BC patients were recruited and assigned to intervention or control groups (1:1 distribution). For all participants, socio-demographic and clinical data were collected using a validated semi-structured questionnaire. The level of anxiety was assessed pre- and post-intervention using the anxiety sub-scale of the Hospital Anxiety and Depression scale (HADS). For the intervention group, each participant had three sessions of PEI administered with contents centered on education regarding breast cancer management, psychological support, and stress management, while the control group participants received routine BC care only. Data was entered into a secured computer and

analyzed using SPSS version 25.0. The results were presented in frequency tables and charts after appropriate statistical analyses. Correlation coefficients between the response to PEI and continuous variables were determined. The level of statistical significance was set at 0.05.

Results: A total of 70 BC patients (mean age of 46.1 ± 11.3 years) participated in this study. The mean HADS anxiety score of the participants was 11.89 ± 2.52, and 48.6% had moderate while 15.7% had severe levels of anxiety. There was no significant difference between the intervention and control groups in terms of baseline data. Compared to the control group, a significant decrease in mean anxiety score of 2.44 (95% CI 1.55; 3.44, $p<0.001$) with an effect size of 0.81 was noted in the intervention group after PEI. A significant negative correlation ($r=-0.415$, $p=0.015$) between age and response to PEI was observed.

Conclusion: High prevalence of anxiety was noted among BC patients. Psychoeducational intervention was effective in reducing anxiety, and age was a significant predictive factor that determined response to the intervention. In our environment, assessment of anxiety and training of clinicians on PEI should be incorporated into the routine BC management.

Keywords: Breast cancer, Anxiety, Psychoeducation, Hospital Anxiety and Depression Scale

INTRODUCTION

Breast cancer (BC) is a major public health problem affecting women globally, with an estimated 2.3 million new cases in 2022, making up 11.6% of all cancer cases.[1] Despite the progress made in screening, diagnosis, and treatment,[2] female BC is the fourth leading cause of cancer-related deaths (estimated 666,000 deaths worldwide in 2022).[1] With an incidence of 22.4 per 100,000 women[3] and being the leading cause of cancer deaths in sub-Saharan Africa (SSA),[1] BC poses a great challenge to women's health, especially in Nigeria, which is the most populous country in the region.[4]

BC diagnosis and treatment have a significant impact on the physical, psychological, and social well-being of patients.[5] A wide range of psychological morbidities, including anxiety disorders, depression, cognitive alteration, disrupted sexual function, impaired social interaction, among others, were reported to be associated with BC.[6,7] These psychological distress commonly arise as a consequence of physical symptoms, treatment side-effects, fear of recurrence, and other life stresses,[8] leading to poor treatment compliance, disruption of daily functioning, impaired health-related quality of life (HRQoL), serious disability, and increased mortality.[9] The psychological burden is severe among African women with BC due to the high sociocultural significance attached to the breast as a symbol of femininity and beauty, with resultant fear of discrimination when the integrity of breast tissue is distorted by cancer and/or treatment.[10]

Anxiety is an emotional reaction to stressors with profound concern about what will happen in the future.[11] It serves as a means of coping with difficult challenges, but becomes harmful when excessive, resulting in anxiety disorders.[12] Anxiety disorders constitute part of the most common psychological distress affecting BC patients with negative consequences on treatment decision and HRQoL,[13] ultimately resulting in overall poor treatment outcomes and low survival rates.[14] The detrimental effect of anxiety affects all

domains of HRQoL and extends from pre-diagnosis to the survivorship period.[13]

A meta-analysis of studies conducted across the globe showed the mean prevalence of anxiety among BC patients to be 41.9%.[15] In Nigeria, anxiety was reported in 36.9% of the cancer patients studied at University College Hospital, Ibadan (2013 to 2014)[16] and 56% of the participants receiving cancer care at Abia and Akwa Ibom states (2020 to 2021) reported moderate to severe anxiety.[17] Also, a cross-sectional study at Lagos State University Teaching Hospital showed that about 1 in 5 BC patients were affected by anxiety disorders.[18] A study conducted in South-East Nigeria showed that anxiety is a significant factor that determines the mode of coping strategy adopted by cancer patients.[19] Considering the high prevalence and negative effects of anxiety, reducing it is paramount to ensure good outcomes for BC patients.

As part of the measures to reduce anxiety and improve the capacity of patients to adapt to the diagnosis and treatment of BC, various therapy modalities were investigated, with significant positive results recorded for psychosocial interventions.[20] Report from systematic reviews and meta-analyses showed that psychoeducational intervention (PEI) as a form of psychological therapy is effective in reducing anxiety significantly for all stages of BC.[21,22] Compared to other psychological interventions, PEI is easier to administer by healthcare providers after receiving adequate training from mental health professionals with the use of fewer resources.[23]

Most of the studies conducted to assess the impact of psychological interventions on anxiety among BC patients were done in high-income countries (HIC), creating a gap in low and middle-income countries (LMIC).[20] Factors, such as sociocultural differences, variations in health facilities, and access to health services, limit the translation of research outcomes from HIC to improve treatment in LMIC like Nigeria.[21] Even though a few studies[24-26] were conducted to evaluate the effectiveness of some psychosocial interventions on anxiety among BC patients in South-west and South-east parts of Nigeria, limitations still exist, considering the unknown effect of such interventions among BC patients in other geopolitical zones of the country, keeping in mind the geographic, sociocultural, and religious differences.

Considering the negative consequences of anxiety disorders on treatment outcomes and the effectiveness of PEI in reducing anxiety among BC patients, this study aims to incorporate PEI into conventional cancer care in northern Nigeria to assess the feasibility and benefit of adding psycho-oncological services into routine BC care to achieve optimal and sustainable outcomes as recommended by previous studies.[21,26] The results of this study will hopefully guide policy and the formulation of local guidelines about assessment for anxiety and administration of PEI for BC patients.

MATERIALS AND METHODS

Study Design

The study was conducted in Ahmadu Bello University Teaching Hospital, Zaria, one of the Federal Tertiary Health centers in Nigeria, which serves as a Center of Excellence for Radiotherapy and Oncology, contributing to cancer treatment, research, and training. The

study was conducted from October 2023 to October 2024 using a Quasi-experimental pretest-posttest study.[27]

Sample Size

From the report of a previous similar study[26] conducted in Lagos, the values below were obtained to determine the sample size:

m1 (mean of post-test anxiety score for control group) = 12.36

sd1 (standard deviation of post-test anxiety score for control group) = 2.36

m2 (mean of post-test anxiety score for intervention group) = 9.67

sd2 (standard deviation of post-test anxiety score for intervention group) = 1.23

Pooled standard deviation (sdP) and effect size (*d*) were calculated using the formulae below: below:[28,29]

sd_P = = = = 1.88

= 12.36 – 9.67/ 1.88

= 2.69/1.88 = 1.43

Sample size (*n*) was calculated using the formula for intervention quantitative studies [30]

Where:

$Z_{\alpha/2}$ is the required level of significance ()

$Z_\beta = Z_{0.20} = 0.84$ (from Z table at 80% power)

By inputting the values above,

= = = 27.13

Adding an attrition factor of 20% to the minimum sample size,

Final sample size: *n* /0.8 i.e.

Therefore, the total sample size was 70.

35 participants each for the intervention and control groups

Inclusion criteria:

All histologically confirmed female breast cancer patients aged between 18 and 70 years who consented to participate in the study.

Exclusion Criteria:

1. Previous or current diagnosis of any mental disorder.
2. Co-morbid chronic conditions such as: hypertensive heart disease, diabetes mellitus, thyroid disorders, and other forms of cancer.
3. Recurrent breast cancer.
4. Poor performance status: Eastern Cooperative Oncology Group (ECOG) score of ≥ 3.

Procedure

In the Oncology clinic and Chemotherapy suite, female BC patients were identified and screened for eligibility to participate in the study by review of clinical notes and asking relevant questions. Patients who met the eligibility criteria were introduced to the study, and those interested in participating were enrolled after obtaining informed consent. Case notes of enrolled patients were tagged with unique identifiers to avoid duplication.

Participants were then assigned to Group A (intervention) or Group B (control) by balloting using equal-sized cards labelled A or B. These steps were repeated on every clinic/chemotherapy day until the entire sample size was reached.

Instruments

1. A semi-structured Socio-demographic/clinical Questionnaire: It is divided into socio-demographic, clinico-pathological, and treatment characteristics sections.
2. The level of anxiety was assessed using the anxiety sub-scale of the Hospital Anxiety and depression Scale (HADS).[31] This widely used instrument was designed for detecting anxiety in non-psychiatric hospital clinics. It has good psychometric properties[32] and was used in many BC studies.[14,20,33] HADS was validated in Nigeria as a useful instrument for detecting psychiatric morbidity among cancer patients,[34] and its reliability was confirmed with Cronbach's alpha coefficients of r = 0.77 for anxiety among BC patients.[24]

Intervention (Group A)

Each member of this group received PEI, which was administered individually in three sessions (each lasting for about 30 minutes), 2 to 4 weeks apart, aligned to chemotherapy and clinic schedules. Face-to-face format was utilized for the 1st and 3rd sessions (in isolated rooms) while the 2nd session was delivered via telephone. The intervention was in addition to routine care given to all BC patients in the hospital. As recommended by a systematic review and meta-analysis on psychoeducation,[21] the intervention was designed to be delivered in multiple sessions via different channels, and the delivery method was adapted to fit the local context by integration into clinical care to ensure optimal and sustainable outcomes.

Outline of Psychoeducational Intervention (PEI)

Based on the structured comprehensive model of PEI[35,36] that has been tested by BC studies across the globe,[21,33,37,38] the intervention was formulated to investigate its effect on anxiety in our environment. Components of the intervention were:

Session 1: BC education

Participants were oriented, and the schedule of the program was described while establishing a good relationship with the research team. Based on each participant's response about the causes of BC, their main concern, and expectation from treatment, the discussion was channeled to debunk misconceptions and explain facts in simple terms with illustrations. Other themes of discussion were BC treatment methods, associated side effects, and their management, as well as the importance of adequate nutrition.

Session 2: Psychosocial support

This session served as a means of showing psychological support to participants by enquiring about their day-to-day functioning and providing appropriate advice as may be required after a course of chemotherapy or a clinic visit. Basic skills for effective communication and the benefits of good interpersonal relationships with family and friends were discussed.

Session 3: Stress management

During this session, participants were taught how to recognize negative emotions and replace them with positive ones. Also, training was conducted on effective ways of coping with BC stress, including deep breathing and relaxation techniques when physiological and psychological symptoms of anxiety are felt.

Control (Group B)

Participants in this group received usual BC care at ABUTH. This includes general health talks on cancer treatment modalities and management of side effects by oncology nurses on clinic days. The health talk differs from PEI as it is not BC specific, delivered in groups, and not in serially organized sessions. Hence, exposure of all the participants to the health talk was not likely to affect the outcome of this study.

Data collection

At enrollment, socio-demographic/clinical characteristics and pre-test anxiety level (T_a) were assessed for all participants using the semi-structured questionnaire and anxiety sub-scale of HADS, respectively. Post-test anxiety level (T_b) was assessed at the end of the study for all participants. The data collected was cleaned and checked for internal consistency. It was saved carefully in a password-protected computer to prevent access by unauthorized people and ensure the confidentiality of all sensitive information.

Data analysis

The data obtained was analyzed using Statistical Packages for Social Sciences (SPSS) version 25.0, manufactured by the International Business Machines Corporation (IBM), California. Socio-demographic/clinical characteristics and T_a of all participants were compared (for groups A and B) using appropriate statistical tests (chi-squared test, Fisher's exact test, and independent t-test) and summarized in tables and figures.

The mean difference in level of anxiety at pre- and post-test for each of the groups was calculated. To compare the statistical significance of the change in level of anxiety for Groups A and B after the intervention, a paired sample t-test was used for each group. For Group A participants only, response to PEI was calculated as: $((T_b - T_a)/ T_a) \times 100\%$
Where: T_a = pre-test HADS anxiety score and T_b = post-test HADS anxiety score

Responders were defined as those who had at least a 25% decrease in pre-test HADS anxiety score (T_a) after PEI. To assess factors that determine response to PEI, bivariate analyses were conducted appropriately. 5% level of significance was set for all analyses

Ethical Considerations

Ethical approval was obtained from the Health Research and Ethics Committee of Ahmadu Bello University Teaching Hospital, Zaria (ABUTH-HREC/01/02/23).

RESULTS

A total of 70 female breast cancer patients participated in this study with a mean age of 46.1 ± 11.3 (range: 25-70) years. Majority 53(75.7%) were married, single 8(11.4%), widowed 7(10.0%) and 2(2.9%) were divorced. More than half 40, 57.1%) of the subjects in this study were Muslims and from diverse ethnic groups, with 26(37.1%) being Hausa, Yoruba 8(11.4%), and Igbo 6(8.6%). The majority, 52(74.3%), reside in Kaduna State, while others were from other states in Northern Nigeria. Other socio-demographic characteristics were outlined in Table 1.

In Group A, one participant died two weeks after recruitment into the study. While in Group B, one participant was lost to follow-up despite all attempts to contact her, and another participant declined to participate in the post-test assessment. Therefore, the number of

participants at the end of the study reduced to 34 and 33 for Groups A and B, respectively

Table 1: Socio-demographic characteristics of study participants

Variables (N = 70)	Group A	Group B	Total	P value
	Mean (standard deviation)			
Age (years)	44.7 (10.9)	47.5 (11.6)	46.1 (11.3)	0.292
	Frequency (%)			
Age Groups (years)				
≤ 40	15 (42.9)	8 (22.9)	23 (32.9)	
41-50	11 (31.4)	15 (42.9)	26 (37.1)	
51-60	7 (20.0)	6 (17.1)	13 (18.6)	
≥ 61	2 (5.7)	6 (17.1)	8 (11.4)	
Marital status				
Currently married	25 (71.4)	28 (80.0)	53 (75.7)	0.577
Not married	10 (28.6)	7 (20.0)	17 (24.3)	
Level of Education				
Non-formal	7 (20.0)	7 (20.0)	14 (20.0)	0.917
Secondary	11 (31.4)	10 (28.6)	21 (30.0)	
Tertiary	17 (48.6)	18 (51.4)	35 (50.0)	
Monthly income (₦)				
< 30,000	14 (40.0)	21 (60.0)	35 (50.0)	0.107
30,000 – 100,000	11 (31.4)	8 (22.9)	19 (27.1)	
>100,000	10 (28.6)	6 (17.1)	16 (22.9)	
Use of National Health Insurance				
Yes	12 (34.3)	6 (17.1)	19 (27.1)	0.282
No	23 (65.7)	29 (82.9)	51 (72.9)	
Use of CHF				
Yes	2 (5.7)	5 (14.3)	8 (11.4)	0.259
No	33 (94.3)	30 (85.7)	62 (88.6)	

CHF: Cancer Health Fund

All the patients had invasive carcinoma, no special type (NST), except 1(1.4%), which was invasive lobular carcinoma. Lung was the commonest 15(75%) site of metastasis reported from the 20(28.6%) patients with stage IV disease. Other clinicopathological characteristics of the study participants were presented in Table 2.

Table 2: Clinicopathological characteristics of study participants

Variables (N = 70)	Group A	Group B	Total	P value
	Frequency (%)			
Stage at presentation				
II	10 (28.6)	11 (31.4)	21 (30.0)	0.877
III	16 (45.7)	13 (37.2)	29 (41.4)	
IV	9 (25.7)	11 (31.4)	20 (28.6)	
Molecular subtype				
Luminal A	9 (25.7)	5 (14.3)	14 (20.0)	
Luminal B	8 (22.9)	9 (25.7)	17 (24.3)	
HER2-type	7 (20.0)	3 (8.6)	10 (14.3)	
Triple negative	4 (11.4)	10 (28.5)	14 (20.0)	
Not available	7 (20.0)	8 (22.9)	15 (21.4)	
SBR Grading				
Grade 1	2 (5.7)	0 (0.0)	2 (2.9)	
Grade 2	7 (20.0)	5 (14.3)	12 (17.1)	
Grade 3	7 (20.0)	9 (25.7)	16 (22.9)	
Not available	19 (54.3)	21 (60.0)	40 (57.1)	
ECOG Score				
0	19 (54.3)	17 (48.6)	36 (51.4)	0.739
1	14 (40.0)	17 (48.6)	31 (44.3)	
2	2 (5.7)	1 (2.8)	3 (4.3)	
Duration since BC diagnosis				
≤ 6 months	22 (62.9)	15 (42.9)	37 (52.8)	
7 months to 1 year	4 (11.4)	5 (14.2)	9 (12.9)	
> 1 year	9 (25.7)	15 (42.9)	24 (34.3)	
Treatment received				
Systemic therapy (ST)	22 (62.9)	15 (42.9)	37 (52.9)	0.241
ST + surgery	8 (22.9)	13 (37.1)	21 (30.0)	
ST + surgery + EBRT	5 (14.3)	7 (20.0)	12 (17.1)	
Chemotherapy cycles given				
1 - 4	14 (48.3)	7 (24.1)	21 (36.2)	
5 - 8	11 (37.9)	18 (62.1)	29 (50.0)	
≥ 9	4 (13.8)	4 (13.8)	8 (13.8)	

SBR: Scarff-Bloom-Richardson, ECOG: Eastern Cooperative Oncology Group
EBRT: External Beam radiotherapy

Using appropriate statistical tests for categorical and continuous variables, the results showed that there were no significant differences in socio-demographic/clinical characteristics and baseline level of anxiety between intervention and control groups before PEI was administered (Tables 1, 2 & 3).

Table 3: Baseline level of anxiety among breast cancer patients

Variables (N = 70)	Group A	Group B	Total	P value
	Mean (standard deviation)			
HADS anxiety score	11.83 (2.65)	11.94 (2.43)	11.89 (2.52)	0.851
Anxiety Level	**Frequency (%)**			
Mild (8-10)	13 (37.1)	12 (34.3)	25 (35.7)	1.000
Moderate (11-14)	16 (45.7)	18 (51.4)	34 (48.6)	
Severe (15-21)	6 (17.2)	5 (14.3)	11 (15.7)	

After the intervention in Group A, a significant decrease in the mean of HADS anxiety score of 2.44 ($p<0.001$) was noted with a large Glass's delta effect size of 0.81. The intervention is likely to reduce the HADS anxiety score by 1.55 to 3.44 units among breast cancer patients in the population. In comparison, a small decrease in anxiety level (mean difference = -0.39, p = 0.182) was noted in Group B, which was not statistically significant (Table 7).

Table 4: Pre and post-test HADS anxiety scores for intervention (A) and control (B) groups

Groups	Mean (sd)		MD	95% CI of MD			
	Pre-test	**Post-test**		**Lower**	**Upper**	**P value**	**Effect size**
A (N = 34)	11.71 (2.59)	9.26 (3.09)	**-2.44**	-3.34	-1.55	**<0.001**	**0.81**
B (N = 33)	11.91 (2.34)	11.52 (2.46)	-0.39	-0.19	0.98	0.182	

sd: standard deviation, MD: mean difference

The bar chart (figure 1) below shows the change in pre- (baseline) and post-intervention level of anxiety for participants in group A. The level of anxiety for about a quarter 8, 23.5%) of the participants in the group became normal. Also, the proportion of those with moderate anxiety dropped from 16(45.7%) to 7(20.6%) after the intervention.

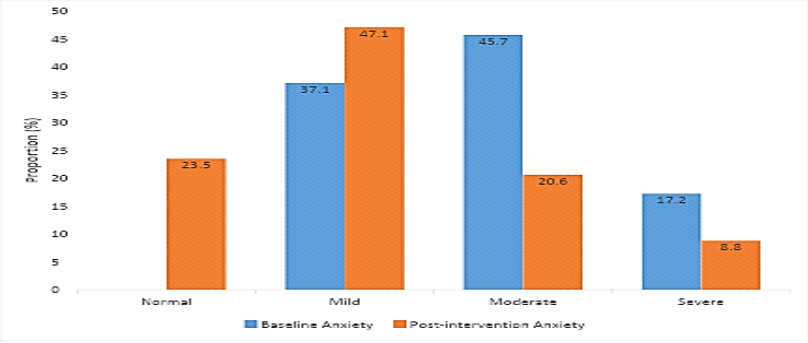

Figure 1: Bar chart showing change in level of anxiety for Group A participants

The median (IQR) percentage decrease in anxiety score recorded in group A was 25.83 (19.28) %, and the change ranged from a 60% decrease to a 50% increase in anxiety score after PEI. More than half 19(55.9%) of the participants in group A responded to PEI (i.e. had at least 25% decrease in pre-test HADS anxiety score) while 15(44.1%) had either less than 25% decrease 9(26.4%), no change 2(5.9%), or increase in anxiety HADS score after the intervention 4(11.8%).

There was a statistically significant difference (p = 0.042) in the mean age of responders and non-responders. No significant association was noted for other variables (Table 5). Correlation analysis showed a moderate negative (r = - 0.415, p = 0.015) relationship between age and response to PEI, which was statistically significant (Figure 2). In summary, age was the only factor observed to predict the degree of anxiety reduction when PEI was administered to BC patients.

Therefore, the linear regression equation is Response to PEI (%) = -74.848 + 1.210 (age in years).

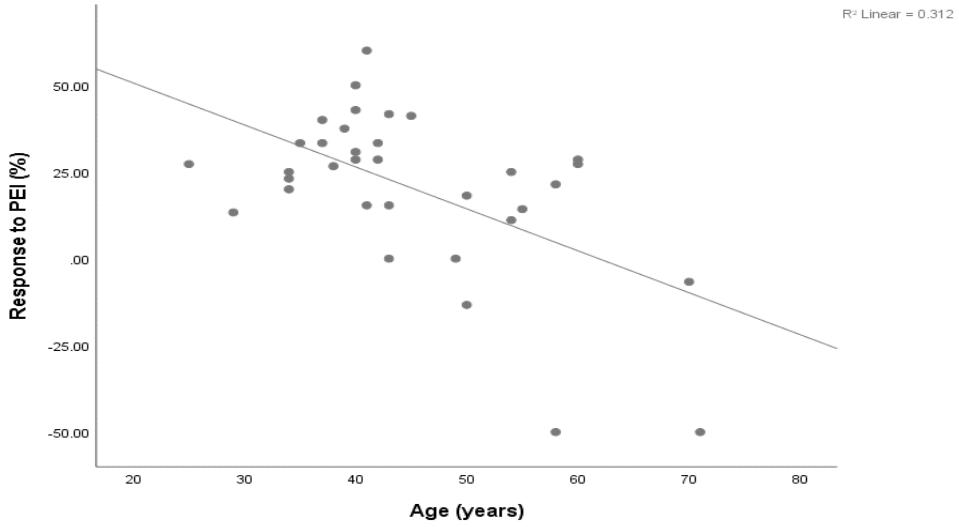

Figure 2: Scatter diagram showing the relationship between age and response to PEI

Table 5: Factors associated with response to PEI

Variables	Responders (N = 19)	Non-responders (N = 15)	Total (N = 34)	P value
	Mean (sd)			
Age	41.7 (8.5)	49.3 (12.3)	45.0 (10.9)	**0.042**
	Frequency (%)			
Marital Status				
Currently married	16 (84.2)	9 (60.0)	25 (73.5)	0.139
Not married	3 (15.8)	6 (40.0)	9 (26.5)	
Educational level				
Non-formal	4 (21.1)	3 (20.0)	7 (20.6)	
Secondary	5 (26.3)	5 (33.3)	10 (29.4)	
Tertiary	10 (52.6)	7 (46.7)	17 (50.0)	
Monthly income (₦)				
< 30, 000	9 (47.4)	4 (26.7)	13 (38.2)	
30, 000 – 100, 000	6 (31.6)	5 (33.3)	11 (32.4)	
>100, 000	4 (21.0)	6 (40.0)	10 (29.4)	
Use of National Health Insurance				
Yes	6 (31.6)	6 (40.0)	12 (35.3)	0.882
No	13 (68.4)	9 (60.0)	22 (64.7)	
Stage				
II	8 (42.1)	2 (13.3)	10 (29.4)	
III	8 (42.1)	8 (53.3)	16 (47.1)	
IV	3 (15.8)	5 (33.3)	8 (23.5)	
Chemotherapy				
Yes	15 (78.9)	14 (93.3)	29 (85.3)	0.355
No	4 (21.1)	1 (6.7)	5 (14.7)	
Surgery				
Yes	10 (52.6)	3 (20.0)	13 (38.3)	0.370
No	9 (47.4)	12 (80.0)	21 (61.7)	
EBRT				
Yes	4 (21.1)	1 (6.7)	5 (14.7)	1.000
No	15 (78.9)	14 (93.3)	29 (85.3)	

DISCUSSION

The mean age of study participants was 46.1 ± 11.3 years, which conforms with findings of previous studies conducted among BC patients in the southern part of Nigeria[18,24] and Ghana[39] but is lower than the average age (53.05 ± 10.71) of BC patients from a study done in Spain.[40] With an age range of 25-70 years and about two-fifths of the patients within 41-50 years, it shows that the study sample was representative of BC patients from various age groups in Nigeria, as reported by a study of BC patients.[41] As this study was conducted in the North-western part of Nigeria, Hausa and Fulani tribes made up the majority (42.8%) of the participants, unlike a similar study in Lagos,[18] where most (75%) of the participants were Yoruba.

The most common histologic subtype of BC diagnosed was invasive carcinoma NST, and the triple negative molecular subtype was common in conformity with Nigerian statistics.[42,43] As reported by previous African studies,[18,44] the majority (70%) of the patients presented with advanced disease. This study included a significant number of newly diagnosed BC patients, as the median (IQR) period from histological diagnosis to participation in this study was 6(18) months. In contrast to that, the average time since BC diagnosis for participants in the Spanish study was 22.79 ± 42.06 months.[40] This disparity may be due to relatively longer survival of BC patients in HIC.

In terms of treatment modalities received, most patients (82.9%) in our study, Lagos (50.0%)[18] and Ethiopia (67.9%)[44] received chemotherapy. High use of chemotherapy compared to other modalities, as reported by a systematic review for BC treatment modalities in Nigeria,[45] is likely because most patients present at advanced stages, hence requiring chemotherapy for neoadjuvant or palliative purposes before surgery and EBRT are required. This study included BC patients at various phases of management, not restricted to those on adjuvant chemotherapy as in the Taiwan study,[46] to ensure comprehensive assessment and wider applicability of findings.

The finding of this study that about half of the participants had moderate level of anxiety is comparable to previous reports as 58.3% of BC patients had moderate-to-severe anxiety in Ghana,[39] 52% and 32% of the subjects had moderate and severe anxiety respectively in Egypt[33] as well as in Ethiopia where anxiety was reported in 60.7% of the participants.[44] Studies in Spain[40] and France[47] measured anxiety using the State-Trait Anxiety Inventory (STAI), showed mean scores of 19.06 ± 12.18 and 46.27±13.87, respectively. Despite variations in methods of assessing and reporting anxiety, it is clear that anxiety is a global problem affecting BC patients.

The fact that the mean HADS score in this study (11.89 ± 2.52) is higher than the pooled mean score of 7.3 (95% CI 5.3, 9.2) for 1197 patients reported in a systematic review supports the finding that the prevalence of anxiety is higher in LMICs compared to HICs.[15] As 51.3% of cervical cancer patients had moderate anxiety in a study conducted in the south-south part of Nigeria, this shows that anxiety is not restricted to BC patients.[48] The high level of anxiety reported in this study

could be attributed to stress relating to the psychological impact of advanced stages of disease (70% of the patients had stage III and IV), lower income status (half of the patients had income less that national minimum wage (at the time of the study)) among other factors.

This study provided evidence that PEI was effective in improving anxiety significantly among BC patients (mean difference: -2.44, 95 % CI -3.34 – -1.55, p<0.001); similar to the findings of studies across the globe: Southern part of Nigeria,[26] Egypt,[33] Taiwan,[46] and France.[47] In the Norwegian study, PEI was compared to a standard group intervention, which had components of psychological support, unlike the control group in other studies. For this reason, both groups yielded improvement in anxiety, but no significant difference was noted between the groups.[38]

Although previous studies[21,23] stated that lengthy PEI may not be feasible in low resource settings and recommended the need for further studies to evaluate the content of PEI, type of delivery, and the optimal dose, our study showed that three sessions (each lasting for about 30 minutes) were effective when integrated into BC clinical care. Also, this study supports the findings from the subgroup analysis of the systematic review[21] that the individual approach of PEI is effective in reducing anxiety. Furthermore, this study showed the feasibility of incorporating telemedicine into BC care in our setting to reduce the cost of transportation to the hospital for specific services. In addition to the positive impact of PEI on HRQoL of women with vesico-vaginal fistula in Zaria,[49] this study further showed that PEI is culturally acceptable and can be utilized to address other emotional distress in our environment.

The reasons behind the effectiveness of PEI in reducing anxiety are likely because it provides BC patients with appropriate medical information and teaches them ways to cope with the stress triggered by the BC diagnosis and treatment.[38] PEI could not reduce anxiety completely, as other unmet needs, such as funding, uncertainty about response to treatment, etc., contribute to anxiety. As suggested by a study that assessed the effect of PEI in reducing the burden on family caregivers taking care of paediatric cancer patients in Nigeria,[50] PEI should be complemented by other support systems to derive maximum results.

It was clear that younger BC patients (less than 40 years) responded to PEI better than older patients. This is likely because younger patients better understood and practiced the techniques they were taught during the intervention. Factors influencing the effectiveness of PEI were not determined by most studies. A study reported that dispositional optimistic or pessimistic characteristics of the participants (measured using the Life Orientation Test Y Revised) were not a factor that affected response to PEI in terms of reducing anxiety among BC patients.[38]

CONCLUSION

Anxiety was found to be a major emotional distress affecting breast cancer patients. PEI was effective in reducing anxiety significantly among BC patients when compared to the control group. Age was identified as a factor that predicts response to PEI. Assessment for

anxiety using the HADS instrument and administration of PEI should be incorporated into routine BC care.

Strengths of the Study

1. The study incorporated PEI sessions into routine clinic and chemotherapy schedules to enable practical application of the findings in low-resource settings.
2. The study provided data from the Northern part of Nigeria, which has significantly different sociocultural characteristics compared to previous studies.
3. Unlike most previous studies, factors that determine response to PEI were assessed in this study.

Limitations of the Study

1. Anxiety was assessed using a self-report subjective tool.
2. The possibility of recall bias exists when participants completed the pre- and post-test assessments.

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