A two-tool assessment of the quality of life of patients with breast cancer using generic and disease-specific tools in a Nigerian teaching hospital

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ABSTRACT

Assessing the quality of life (QoL) of breast cancer (BC) patients using a triangulation of tools is crucial for understanding their well-being and tailoring specific interventions to improve their overall experience. The study assessed the QoL of BC patients using a combination of generic and disease-specific validated questionnaires. The study utilized a self-administered questionnaire-based cross-sectional design among BC patients attending the Oncology clinic in a Nigerian teaching hospital. The 23-item EORTC-BR23 questionnaire and the 15-item HRQoL 15D questionnaire were provided to consenting eligible respondents for data collection. Descriptive (e.g., frequency, percentages, mean, median, etc.) and inferential (T-test and one-way ANOVA) statistical analyses were conducted on the cleaned data, with significant p values set at less than 0.05. A total of 60 female BC patients participated in the study. Respondents that were aged 41-50 years and 50-60 years were 20 (33.3%) and 19 (31.7%) respectively. Patients who were diagnosed with BC one year ago before the study were 22 (39.3%) with 51 (85%) reporting no positive family history of BC. Patients who had undergone surgery, radiotherapy, hormonal therapy, and chemotherapy were 52 (86.7%), 27 (45.0%), 14 (24.1%), and 54 (90%) respectively. The patients scored 30.00 ± 4.67% and 72.36 ± 2.93% for *future perspective* and *body image,* respectively, in the functional scales of the EORTC-BR23 with a maximum possible score of 100%. On the symptom scale, they scored 47.46 ± 2.52% and 63.40 ± 5.03% for *side effects of therapy* and *being upset about hair loss,* respectively. The patients' quality of life *utility score* in the 15-D tool was 0.79 ± 0.02. With p values less than 0.005, *age, time since diagnosis,* and *cancer stage* were influential determinants of patients' QoL. The QoL of the participants based on the HRQoL-15D was determined to be high. For the EORTC-BR23, respondents reported high quality of life for body image and sexual function but low quality of life for both sexual enjoyment and future perspective in terms of the functional scale. The symptom scale of EORTC-BR23 showed high symptoms for only the domain of upset by hair loss resulting in low QoL. Socio-demographic factor that affects the QoL of BC patients were age, number of years since diagnosis and stage of BC.

INTRODUCTION

Worldwide, breast cancer (BC) is a common malignancy that mostly affects women and is linked with high morbidity and mortality (1). The World Health Organization reports that BC is the most prevalent disease among women worldwide, with an estimated 2.3 million new cases being diagnosed in 2020 alone (2). In Nigeria, BC is a major public health concern, being the most common cancer affecting women in the country (3,4) and accounting for about 25% of all cancer cases (5).

BC and its treatment can have a substantial influence on patients' Quality of Life (QoL), especially in terms of physical functioning, emotional well-being, social interactions, and overall health perception (6,7). Quality of Life (QoL), is a multidimensional concept that encompasses physical, psychological, and social well-being, as well as spiritual aspects of life (8). To improve survival rates and decrease the likelihood of cancer recurrence, BC patients undergo a range of treatments, including surgeries, radiotherapy, and chemotherapy which are often accompanied by adverse side effects (9), that could also have negative consequences on their quality of life. Studies have shown that chemotherapy side effects can impact a patient's quality of life, potentially leading to early treatment discontinuation (10) although BC survivors might benefit from a better quality of life post-treatment (11). Evaluating the QoL of BC patients is an essential aspect of cancer care that can help healthcare providers understand the impact of the disease and its treatment on patients' lives and tailor interventions to improve their overall well-being (12).

Assessing different aspects of QOL is crucial, yet choosing the right QOL tool poses challenges for researchers and healthcare providers. Variances in findings regarding the link between cancer symptoms and QOL highlight the importance of understanding differences among QOL instruments in terms of their content and scope. This understanding is essential for accurately measuring the impact of cancer on individuals' well-being. Studies have been carried out in order to determine the quality of life of cancer patients, especially BC using generic QoL tools (13–15) or cancer-specific quality-of-life tools (16,17).

By integrating both disease-specific and generic tools, there is a wide understanding of how chronic conditions impact various aspects of life (18). Disease-specific QoL for BC focuses on issues like treatment side effects, body image, and specific concerns related to BC (19). Conversely, generic QoL tools complement this perspective by encompassing broader dimensions of well-being, such as mental health, social interactions, and overall physical functioning (20).

Despite the high prevalence of BC in Nigeria (21), few studies have investigated the quality-of-life of the country's BC patients (17,22) and existing studies in this area are often narrow in focus, relying on a single quality of life assessment tool (17,23). This limited approach may overlook important dimensions of quality of life.

This present study assessed the quality of life (QoL) of breast cancer patients in a Nigerian teaching hospital using generic and disease-specific QoL assessment tools, identifying the socio-demographic factors associated with patients' QoL.

METHODS

Study Design

This study employed a questionnaire-based cross-sectional survey among breast cancer patients attending the oncology out-patient clinic at a Nigerian teaching hospital

Study Population and Study Sample

The study populations were female breast cancer patients aged 20 years and above who attended the Oncology Clinic in a Nigerian teaching hospital and who provided informed consent to be part of the study. Time-based recruitment process was employed in the study. The data collection for the study was for eight (8) weeks (May to June 2023). During the period of visit, about 165 patients attended the clinic, but 60 consented to participate in the study. Of the 105 that declined, 25 complained of time, 19 were not literate enough to respond to the questionnaires in English, and 61 gave no reason.

For inclusion in the study, participants had to have a formal diagnosis of breast cancer and be undergoing chemotherapy treatment. Moreover, those who had undergone surgery, radiotherapy, or hormonal therapy were also eligible.

Data Collection Procedure

The study participants were approached during their regular out-patient clinic days. This allowed for a convenient and non-disruptive approach, as the participants were already present for their scheduled visits. The questionnaires were designed to be self-administered, providing the participants with the freedom to independently complete the survey at their own pace and in a comfortable environment. Each respondent spent an average of 20 minutes to complete the two instruments.

Study Instrument

The study instrument utilized in this study had five distinct sections. The first section focused on gathering socio-demographics while the second section concentrated on obtaining clinical information pertinent to the participants' breast cancer diagnosis. The third section obtained information on the participants' treatment regimens while the fourth and fifth sections contained the breast-cancer-specific QoL, the European Organization for Research and Treatment of Cancer (EORTC) (24) and the health-related QoL-15D questionnaire (25), a generic QoL assessment tool. EORTC comprises 23 items that are designed to evaluate various domains of QoL, such as body image, sexual functioning, future perspective and systemic therapy side effects. The EORTC Quality of Life Group provides the tool and scoring manual for using it. The 15D questionnaire provides a broader perspective on patients' health-related quality of life by evaluating 15 dimensions namely mobility, self-care, usual activities, pain/discomfort, and anxiety/depression.

Data Management and Data Analysis

After the collection of data, the responses were given code numbers and then entered into Microsoft Excel spreadsheet version 2019. The data was cleaned to identify data sets that were fit for data analysis. The cleaned data was exported to the Statistical Product and Service Solutions (version 27) for statistical analysis. Categorical variables were presented with frequencies, percentages, and maximum and minimum scores, while mean and standard error of means (SEM) were used to present the continuous variables.

The standard for scoring the EORTC- QoL-BR23 was obtained from the patented scoring manual from the EORTC group (24). The scoring procedures were as follows:

1. The average of the items that contribute to the scale was estimated; this was the raw score
2. A linear transformation was used to standardize the raw score so that the scores range from 0 to 100. In practical terms, if items I_I, I_2 I_n are included in a scale the procedure is as follows:

The raw score (RS) was calculated as raw score

$$\mathrm{RS} = \frac{(I_1 + I_2)}{n}$$

The linear transformation was applied to 0–100 to obtain score S,

$$Functional\ scale: S = \frac{(1 - [RS - 1]}{range} \times 100$$

$$Symptom\ scale: S = \frac{[RS - 1]}{range} \times 100$$

Range is the difference between the maximum possible value of RS and the minimum possible value. All mean scores were transformed linearly into a scale from zero to one hundred points, as described above, where zero represents the worst health status and one hundred the best state of health except for the symptom scale, in which the higher score represents more symptoms and the worst QoL.

For the HRQoL-15D questionnaire, the algorithm used to calculate patients' utility scores was obtained from the creators of the instrument (25). Additionally, guidelines for handling missing data were provided.

To assess the variations in patients' socio-demographic details and clinical characteristics concerning the QoL scores on both the functional scale and symptoms scale, as well as the 15D QoL utility scores, one-way ANOVA (for comparisons involving more than two variables) and Student’s t-test (for comparisons involving two variables) were employed. Statistical significance was set at $p<0.05$.

Ethical Considerations

The study was conducted in accordance with the ethical principles of the Declaration of Helsinki. Ethical approval was obtained from the Health Research and Ethics Committee of the study setting.

RESULTS

A total of 60 patients participated in the study. Respondents within the ages of 41-50 years and 50-60 years were 20 (33.3%) and 19 (31.7%) respectively. Participants who were married were 52 (86.7%). Patients who were diagnosed with BC one year ago before the study were 22 (39.3%) with 51 (85%) reporting no positive family history of BC. **See Table 1.** Patients who were at stage two of BC disease were 32 (56.1%). The patients who had undergone surgery, radiotherapy, hormonal therapy, and chemotherapy were 52 (86.7%), 27 (45.0%), 14 (24.1%), and 54 (90%), respectively. **See Table 2.**

Whereas 9 (15%), 4 (6.7%), 10 (16.7%), and 37 (61.7%) patients responded *not at all*, *a little*, *quite a bit* and *very much* respectively, for hair loss based on the EORTC-BR23, 10 (19.6%), 5 (9.8%), 16 (31.4%) and 20 (39.2%) expressed being upset about the hair loss on the same scale. On the item of being worried about their health in the future, were 8 (13.3%), 8 (13.3%), 14 (23.3%) 30 (50.0%) expressed *not at all, a little, quite a bit* and very much respectively. Complete categorical responses to the EORTC-BR23 questionnaire are presented in **Table 3.** **Table 4** presents the quality of life scores for patients based on the EORTC-BR23. In terms of patients' future perspective within the functional scales of the EORTC-BR23, the mean score was 30.0000 ± 4.66720%. For body image within the functional scale, the score was 72.3611 ± 2.93455%.

Similarly, the patients scored 47.0603 ± 2.52070% for the side effects of therapy. Further details regarding the functional scales and symptom scales, along with their corresponding quality of life scores, is presented in **Table 4.**

Among patients aged 41-50 years, the mean sexual function score was 89.4737 ± 4.80458% (F(df)= 7.41(4), ***p*≤ 0.001**). For patients aged 61-70 years, the mean score for future perspective was of 27.78 ± 15.91% (F(df)= 4.89(4), (***p* =0.002**), Additionally, the mean score for side effects of therapy among patients aged 21-30 years was of 19.05 ± 3.37% (F(df)= 4.199(4), ***p* =0.005**). Arm symptoms in stage 2 breast cancer patients had a mean score of 37.15 ± 4.13% (F(df)= 4.36(4), ***p* =0.004**). **Supplementary document I** contains detailed results on the relationships between patients’ characteristics and the functional and symptom scales of the EORTC-BR23.

From a Likert scale of *no problem, slight problem, moderate problem,* and *complete dysfunction* for the 15D QoL questions, patients that had *no problem* for *hearing*, *depression* and *sexual activity* were 55(91.7%), 15(25%), and 31(51.7%) respectively. **See Table 5** for details.

From a maximum possible score of 1.00 on the 15D scale, the mean utility score of the patients was found to be 0.7934 ± 0.02153. The median utility score was 0.8187, with range of 0.65.

The mean utility 15D score for patients within the ages of 21-30 years was 0.9778 ± 000801 The mean differences in the scores of patients in the reference age (21-30 years) compared to those aged 51-60 years and 6170 years were 0.23004 ± 0.08882 (95% CI: 0.0520 – 0.4080, ***p*= 0.012**) and 0.22183 ± 0.10422 (95% CI: 0.0130– 0.4307, ***p*= 0.038**). **See Supplementary document II for details**

Table 6 highlights the comparison of the 15-D utility scores for some parameters across socio-demographic details and clinical characteristics of the patients. The number of years since breast cancer diagnosis shows that patients with five years since diagnosis had a mean 15-D utility score of 0.5036 ± 0.07200 with a minimum and maximum score of 0.43 and 0.58 respectively (95% CI: -0.4112 – 1.4184, ***p*≤ 0.002).** Patients at stage one of breast cancer had a mean 15-D utility score of 0.8669 ± 0.03127 with a minimum and maximum score of 0.72 and 1.00 respectively (95% CI: 0.7981– 0.9357, ***p*≤ 0.001).**

DISCUSSION

This study was conducted to assess the quality-of-life of breast cancer patients attending the Oncology Clinic in a Nigerian teaching hospital using two quality of life tools; HRQoL-15D and the EORTC-BR23.

Summary of Findings

The study included 60 female patients, predominantly aged between 41-60 years old. The majority were married, had completed tertiary education, and were self-employed. Most participants had been diagnosed with breast cancer one to two years prior to the study and had no positive family history of breast cancer. A significant portion of the participants were at stage two of breast cancer, and a substantial number had undergone various treatments, including surgery, radiotherapy, hormonal therapy, and chemotherapy.

While the EORTC-BR23 provided insights into the patients' disease-specific quality of life, the 15D HRQoL gave a broader outlook on their health condition. Findings from the EORTC-BR23 revealed that a substantial proportion of participants reported experiencing hair loss and being upset about it, just as a considerable number expressed concerns about their health in the future. Results from the functional scales showed variations in scores across different age groups, indicating potential differences in body image, sexual function, and future perspective. Variations in the overall QoL among the patients were observed from the 15-D tool. While most patients reported *no problem* with hearing function, a significant portion reported slight to moderate problems with sexual activity and depression. The overall mean utility score was below the maximum possible score of 1.00, indicating some degree of impairment in quality of life.

Age, cancer stage, and time since diagnosis were some of the patient factors that were found to be associated with their QoL.

Comparison with other studies

Although many studies have been carried out in order to determine the quality of life of cancer patients, especially breast cancer using either generic tools like the health-related Quality of Life 15-dimension (14,15) or the cancer-specific quality of life tools like the European Organization for Research and Treatment- Breast Cancer Related (EORTC-BR23) (16), no study have been carried out to comparatively evaluate the quality of life of breast cancer patients using a two tool assessment of both the breast cancer-specific tool; EORTC-BR23 and the generic tool; 15-D.

Overall, both tools offer valuable insights into the well-being of breast cancer patients, with the generic tool providing a comprehensive view of quality of life, and the disease-specific tool allowing for a more focused exploration of breast cancer-related aspects of well-being. These assessments aid in understanding and addressing the unique challenges faced by breast cancer patients to improve their overall quality of life.

Based on the EORTC-BR23, the mean quality of life scores for breast cancer patients were examined, focusing on the functional and symptom scales. Comparing the functional and symptom scales, it is evident that, on average, breast cancer patients reported higher quality of life scores in the functional domains, compared to the symptom domains which is in line with a study by Imran al el. (16). The functional scales assessed aspects of body image, sexual function, sexual enjoyment, and future perspective. The QoL score for body image indicated that, on average, breast cancer patients had relatively positive perceptions of their body image, which agrees with studies by Moodi *et. al.,* and Spatuzzi *et.al.,* which showed higher scores and better QoL for body image (26,27).

Similarly, the mean score for sexual function suggested that, on average, patients reported good sexual function with minimal issues but sexual enjoyment had a lower mean score, indicating that this aspect of quality of life may be impacted for some individuals. This is similar, in part, to the studies conducted by Imran *et al.* and Malik *et al.* They observed low scores for both sexual functioning and sexual enjoyment (16,28). The lower score in sexual enjoyment could be attributed to the patients' disease state and the psychological distress associated with breast cancer. The psychological trauma induced by breast cancer may have a negative impact on both sexual enjoyment and functioning among these patients (29,30).

The future perspective in this study showed the worse quality of life within the functional scales. This is worse than the quality of life in the study conducted by Abu-Helalah *et. al.,* and Imran *et al.,* which was 51.41±38.81 and 54.8±29.4 respectively (16,31). As attributed by Maheu *et al.,* the reason for this low score about the future perspective can be due to the uncertainty, psychological impact, physical effects, social and relationship concerns, financial worries, and existential contemplation that often accompany a breast cancer diagnosis (32). These challenges collectively contribute to patients' concerns about their future, highlighting the need for comprehensive support and care to help them regain a more positive outlook on life beyond their diagnosis.

On the symptom scale, which assessed side effects of therapy, breast symptoms, arm symptoms, and being upset by hair loss, patients reported different levels of impact. The QoL score for side effects of therapy indicated that, on average, patients reported low to moderate levels of side effects from treatment. This reflects advancements in treatment, individual variations, supportive care, patient adherence, psychological resilience, and baseline health as factors influencing the reported side effects (33). Personalized care remains essential to address specific patient needs (34). Breast symptoms had the lowest mean quality of life score compared to other symptom scale domains. Breast cancer and its treatments, such as surgery, radiation, and chemotherapy, can lead to physical discomfort and symptoms related to the breasts (35). These may include pain, swelling, tenderness, and changes in breast appearance which can negatively impact a patient's overall QoL. Arm symptoms result was also another disturbing parameter that had a low QoL score for the symptom scale. Chemotherapy and radiation can cause lymphatic system disruption, resulting in arm lymphedema, marked by swelling and discomfort, that could significantly affect a patient's quality of life (QoL) (36). Additionally, some patients may experience arm pain, numbness, or discomfort due to surgery nerve damage (37). These symptoms lead to functional limitations, making daily tasks challenging and eroding independence, further reducing overall QoL. More so, the mean score for being upset by hair loss was moderate, indicating that, on average, patients experienced some upset due to hair loss (38).

Using the 15-D quality of life tool, participants in this study had about 80% overall quality of life. Notably, this score is slightly lower than the scores reported in previous studies conducted by Roine *et. al.* and Toija *et. al.*, where the mean 15D utility scores for breast cancer patients were 0.896 (SD 0.078) and 0.922 (SD 0.066), respectively (15,39). This disparity may indicate differences in patient populations, treatment modalities, or other factors affecting quality of life scores.

The relationship between age and the QoL seen in this study could be explained that older patients may have honed more coping mechanisms over time, enabling them to navigate the challenges posed by breast cancer and its effects on sexual function with greater effectiveness (40). This psychological adaptation might positively influence their perception of their sexual well-being. Additionally, as individuals age, their priorities and expectations regarding sexual activity and intimacy may transform. Older patients might place less emphasis on sexual performance and more on emotional intimacy and companionship, which could lead to higher reported QoL scores (41).

The observation of the relationship between age and the functional scale also suggests a dynamic relationship between age and quality of life. The symptom scale for therapy side effects demonstrated a divergence among age groups of breast cancer patients. This discovery aligns with research conducted in China, underscoring the presence of age-specific variations in symptomatology among Chinese women undergoing chemotherapy for breast cancer (42).

From the 15D tool, age and cancer stages were related to the QoL of breast cancer patients. Generally, as patients get older, their 15D scores decrease (39), but there's an exception in the 51 to 70 age range where no notable differences were observed. Also, there are substantial differences in scores between different breast cancer stages, with stage 4 patients having the lowest scores. This emphasizes the challenges and burdens faced by those at an advanced cancer stage, similar to findings in other studies (43).

Policy implication

The study emphasizes the importance of comprehensive well-being considerations in cancer care policies. It highlights the significance of continuous monitoring through these QoL tools to track changes in well-being and intervention effectiveness throughout the cancer journey. Additionally, the findings stress the need for targeted resource allocation to address specific patient needs revealed by disease-specific tools and broader aspects covered by generic tools. Policymakers can use these insights to refine treatment strategies, focusing on personalized interventions to alleviate treatment side effects and psychosocial concerns. The study advocates for data-driven decision-making in healthcare policies, emphasizing a patient-centric approach and fostering further research collaborations to enhance breast cancer patient care within the Nigerian healthcare system.

Strengths and Limitations

The study's strength lies in its comprehensive evaluation of BC patients' QoL using both disease-specific and generic assessment tools, enabling an all-inclusive understanding of their well-being. While the cross-sectional nature of the study, its single-hospital design, and the relatively small sample size impose limitations, these findings may not be generalizable to the wider patient population in Nigeria, emphasizing the need for future larger, multicenter studies to validate and extend the applicability of these results across diverse patient populations within the country.

CONCLUSION

Regarding the EORTC-BR23, respondents reported high QoL in areas related to body image and sexual function. However, respondents had low QoL scores for sexual enjoyment and future perspective on the functional scale. More so, concerning the symptom scale of the

EORTC-BR23, patients had a significantly high symptom burden concerning hair loss while side effects due to therapy, breast symptoms, and arm symptoms showed relatively lesser symptoms. Overall, the QoL of the patients was found to be high, using the HRQoL-15D tool. Socio-demographic factors affecting patients' quality of life were age, number of years since diagnosis, and the stage of breast cancer.

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Table 1: Socio-demographic details of patients

Characteristics	**Frequency**	**Percentage**
Age (years)		
21-30	4	6.7
31-40	11	18.3

41-50	20	33.3
51-60	19	31.7
61-70	6	10.0
Total	60	100.0
Marital Status		
Married	52	86.7
Unmarried	8	13.3
Total	60	100.0
Level of Education		
No formal education	1	1.7
Primary Education	5	8.3
Secondary Education	16	26.7
Tertiary Education	38	63.3
Total	60	100.0
Employment Status		
Unemployed	6	10.0
Civil/Public servant	20	33.3
Self-employed	34	56.7
Total	60	100.0
Number of years since diagnosis		
1.00	22	39.3
2.00	19	33.9
3.00	9	16.1
5.00	2	3.6
7.00	1	1.8
8.00	1	1.8
10.00	1	1.8
11.00	1	1.8
Total	*56	100.0
Family History		
Present	9	15.0
Absent	51	85.0
Total	60	100.0
Relapse		
Present	10	16.7
Absent	50	83.3
Total	60	100.0

*Four (4) respondents did not respond to the number of years since diagnosis

Table 2: Disease- related characteristics of the patients (N=60)

Characteristics	**Frequency**	**Percentage**
Cancer Sage		

Stage 0	3	5.3
Stage 1	12	21.1
Stage 2	32	56.1
Stage 3	7	12.3
Stage 4	3	5.3
Total	*57	100.0
Undergone Surgery		
No	8	13.3
Yes	52	86.7
Total	60	100.0
Undergone Radiotherapy		
No	33	55.0
Yes	27	45.0
Total	60	100.0
Undergone Hormonal therapy		
No	44	75.9
Yes	14	24.1
Total	**58	100.0
Undergone Chemotherapy		
No	6	10.0
Yes	54	90.0
Total	60	100.0

*Three (3) respondents did not respond to the question about cancer stage

**Two (2) respondents did not respond to the question if they have undergone hormonal therapy

Table 3: Patients responses to the European Organization for Research and Treatment of Cancer breast cancer-specific quality of life-23 questionnaire (N=60)

S/N	Items	Not at All	A little	Quit A Bit	Very Much
1	Did you have a dry mouth?	23 (38.3)	14 (23.3)	18 (30.0)	5 (8.3)
2	Did food and drink taste different than usual?	21 (35.0)	16 (26.7)	14 (23.3)	9 (15.0)
3	Were your eyes painful, irritated or watery?	28 (46.7)	15 (25.0)	9 (15.0)	8 (13.3)
4	Have you lost any hair?	9 (15.0)	4 (6.7)	10 (16.7)	37 (61.7)
5	Answer this question only if you had any hair loss: Were you upset by the loss of your hair?	10 (19.6)	5 (9.8)	16 (31.4)	20 (39.2)
6	Did you feel ill or unwell?	5 (8.3)	14 (23.3)	27 (45.0)	14 (23.3)
7	Did you have hot flushes?	10 (16.7)	13 (21.7)	25 (41.7)	12 (20.0)
8	Did you have headaches?	22 (36.7)	22 (36.7)	9 (15.0)	7 (11.7)
9	Have you felt physically less attractive as a result of your disease or treatment?	21 (35.0)	19 (31.7)	14 (23.3)	6 (10.0)
10	Have you been feeling less feminine as a result of your disease or treatment?	25 (41.7)	24 (40.0)	8 (13.3)	3 (5.0)
11	Did you find it difficult to look at yourself naked?	30 (50.0)	24 (40.0)	5 (8.3)	1 (1.7)
12	Have you been dissatisfied with your body?	27 (45.0)	21 (35.0)	9 (15.0)	3 (5.0)
13	Were you worried about your health in the future?	8 (13.3)	8 (13.3)	14 (23.3)	30 (50.0)
14	To what was extent were you interested in sex?	40 (70.2)	10 (17.5)	4 (7.0)	3 (5.3)
15	To what extent were you sexually active?	38 (66.7)	10 (17.5)	6 (10.5)	3 (5.3)
16	Answer this question only if you have been sexually active: To what extent was sex enjoyable?	1 (5.9)	8 (47.1)	5 (29.4)	3 (17.6)
17	Did you have any pain in your arm or shoulder?	12 (20.0)	15 (25.0)	21 (35.0)	12 (20.0)
18	Did you have a swollen arm or hand?	26 (43.3)	12 (20.0)	12 (20.0)	10 (16.7)
19	Was it difficult to raise your arm or move it sideways?	17 (28.3)	21 (35.0)	14 (23.3)	8 (13.3)
20	Have you had any pain in the area of your affected breast?	20 (33.3)	17 (28.3)	13 (21.7)	10 (16.7)
21	Was the area of your affected breast swollen?	33 (55.0)	13 (21.7)	7 (11.7)	7 (11.7)
22	Was the area of the affected breast oversensitive?	24 (40.0)	21 (35.0)	9 (15.0)	6 (10.0)
23	Have you had skin problems on or in the area of the affected breast (e.g., itchy, dry, flaky)	27 (45.8)	14 (23.7)	13 (22.0)	5 (8.5)

Table 4: Patients quality of life expressed as transformed scales of the EORTC-BR23

Scales	Mean	Std. Error of Mean	Median	Range	Percentiles		
					25	50	75
Functional scales							
Body Image	72.3611	2.93455	70.8333	83.33	58.3333	70.8333	97.9167
Sexual Function	83.0409	3.64870	100.0000	100.00	66.6667	100.0000	100.0000
Sexual Enjoyment	47.0588	7.03564	66.6667	100.00	33.3333	66.6667	66.6667
Future Perspective	30.0000	4.66720	16.6667	100.00	0.0000	16.6667	66.6667
Symptom scales							
Side Effects of Therapy	47.4603	2.52070	47.6190	85.71	33.3333	47.6190	57.1429
Breast Symptoms	32.6271	3.34869	33.3333	100.00	8.3333	33.3333	41.6667
Arm Symptoms	42.9630	3.88567	44.4444	100.00	11.1111	44.4444	66.6667
Upset by Hair Loss	63.3987	5.30178	66.6667	100.00	33.3333	66.6667	100.0000

Table 5: **Patients responses to the 15-Dimension quality of life items (N=60)**

s/n	**Item**	**Frequency (Percentage)**				
		No problem	**Slight problem**	**Moderate problem**	**Severe problem**	**Complete dysfunction**
1	Walking	39 (65.0)	10 (16.7)	5 (8.3)	5 (8.3)	1 (1.7)
2	Seeing	45 (75.0)	11 (18.3)	3 (5.0)	1 (1.7)	0 (0)
3	Hearing	55 (91.7)	4 (6.7)	0(0%)	1 (1.7)	0 (0)
4	Breathing	46 (76.7)	12 (20.0)	2 (3.3)	0 (0)	0 (0)
5	Sleeping	28 (46)	14 (23.3)	12 (20.0)	6 (10.0)	0 (0)
6	Eating	34 (56.7)	12 (20.0)	11 (18.3)	2 (3.3)	1 (1.7)
7	Speaking	48 (81.4)	6 (10.2)	3 (5.1)	2 (3.4)	0 (0)
8	Excretion, bladder and bowel function	36 (60.0)	10 (16.7)	13 (21.7)	1 (1.7)	0 (0)
9	Performing usual activities	26 (43.3)	15 (25.0)	12 (20.0)	5 (8.3)	2 (3.3)
10	Thinking and memory function	32 (53.3)	16 (26.7)	7 (11.7)	5 (8.3)	0 (0)
11	Physical discomfort	16 (26.7)	24 (40.0)	13 (21.7)	6 (10.0)	1 (1.7)
12	Depression	15 (25.0)	22 (36.7)	18 (30.0)	5 (8.3)	0 (0)
13	Anxious, stressed or nervous	11 (18.3)	17 (28.3	25 (41.7)	7 (11.7)	0 (0)
14	Healthy State	19 (31.7)	18 (30.0)	14 (23.3)	9 (15.0)	0 (0)
15	Sexual activity	31 (51.7)	18 (30.0)	5 (8.3)	3 (5.0)	3 (5.0)

Table 6: Comparison of the 15D QoL utility Scores for Parameters across socio-demographic data

Parameters	Mean	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum	T-test (df)	*p*-value
			Lower Bound	Upper Bound				
Age								
21-30 yrs	0.9778	0.00801	0.9523	1.0032	0.96	0.99		
31-40 yrs	0.8387	0.04414	0.7404	0.9371	0.47	0.96	1.991 (4)	0.109
41-50 yrs	0.7862	0.04097	0.7005	0.8720	0.40	1.00		
51-60 yrs	0.7477	0.03533	0.6735	0.8219	0.35	0.98		
61-70 yrs	0.7559	0.07163	0.5718	0.9400	0.43	0.94		
Total	0.7934	0.02153	0.7503	0.8365	0.35	1.00		
Stage								
Stage 0	0.8350	0.09874	0.4101	1.2598	0.65	0.99		
Stage 1	0.8669	0.03127	0.7981	0.9357	0.72	1.00	8.906 (4)	≤0.001
Stage 2	0.8257	0.02066	0.7836	0.8678	0.56	1.00		
Stage 3	0.6295	0.08009	0.4335	0.8255	0.40	0.98		
Stage 4	0.4592	0.07501	0.1365	0.7819	0.35	0.60		
Total	0.7915	0.02197	0.7475	0.8355	0.35	1.00		
Number of years since diagnosis								
1.00	0.8413	0.03179	0.7752	0.9074	0.40	0.99	3.951 (7)	0.002
2.00	0.8135	0.03262	0.7450	0.8821	0.47	1.00		
3.00	0.8274	0.04573	0.7219	0.9328	0.66	1.00		
5.00	0.5036	0.07200	-0.4112	1.4184	0.43	0.58		
7.00	0.4331				0.43	0.43		
8.00	0.7246				0.72	0.72		
10.00	0.3453				0.35	0.35		
11.00	0.8338				0.83	0.83		
Total	0.7992	0.02253	0.7541	0.8444	0.35	1.00		
Undergone Surgery								
No	0.7632	0.05779	0.6265	0.8998	0.43	0.99		
Yes	0.7980	0.02335	0.7512	0.8449	0.35	1.00	0.300 (1)	0.586
Total	0.7934	0.02153	0.7503	0.8365	0.35	1.00		
Undergone Chemotherapy								
No	0.8101	0.09662	0.5617	1.0585	0.35	0.99	0.066 (1)	0.798
Yes	0.7915	0.02180	0.7478	0.8353	0.40	1.00		
Total	0.7934	0.02153	0.7503	0.8365	0.35	1.00		