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# Quality of Life after Mastectomy with or without Breast Reconstruction and Breast Conserving Surgery in Breast Cancer Survivors; A Cross-Sectional Study at a Tertiary Hospital in GHANA

Josephine Nsaful [*] , Edmund T. Nartey , Florence Dedey , Antoinette Bediako-Bowan , Rita Appiah-Danquah , Kwame Darko , Levi Nii Ayi Ankrah , Cynthia Akli-Nartey , Jessie Yaoteokor Annan , Jessica Dei-Asamoa , George Amanquanor Ahene-Amanquanor , Joe-Nat Clegg-Lamptey

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# Quality of Life after Mastectomy with or without Breast Reconstruction and Breast Conserving Surgery in Breast Cancer Survivors; A Cross-Sectional Study at a Tertiary Hospital in GHANA

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**Abstract:** (1) **Background:** Breast cancer is the leading malignancy worldwide and in Ghana it has a poor overall survival. However, approximately 50% of cases are early stage disease and with advances in breast cancer treatment and improvement in survival, quality of life (QOL) becomes as important as treatment of the disease. (2) **Methodology:** This was a cross-sectional study of survivors who had breast conserving surgery (BCS), mastectomy only (M) and mastectomy with breast reconstruction (BRS) from 2016 to 2020 at a tertiary hospital in Ghana, comparatively assessing their QOL using *EORTC QLQ C-30* and *EORTC QLQ BR-23*. (3) **Results:** The study participants had an overall *Global Health Status* (GHS) median score of 83.3 [IQR: 66.7-91.7] with no significant differences between the surgery types. The BRS group had a statistically significant lower median scores for the *Functional scale* (82.8 and 51.0) and the highest scores for the *Symptomatic scale* (15.7 and 16.5). *Body image* was significantly lowest for the BRS group 83.3 [68.8-91.7] and highest 100 [91.7-100] for the BCS group (p < 0.001). (4) **Conclusion:** There is a need to develop support systems tailored at improving the QOL of breast cancer survivors taking into consideration the type of surgery performed.

**Keywords;** breast cancer; quality of life; EORTC QLQ; mastectomy; breast reconstruction; breast conservation

## 1. Introduction

Breast cancer (BC) is the leading malignancy worldwide. In Ghana; it is the leading malignancy as well as the leading cause of cancer mortality [1]. BC has a 5-year survival rate exceeding 90% in High Income Countries (HICs) and 40% – 66% in Low-to-Middle Income Countries (LMICs)[2].

Ghana has a reported overall 5-year survival of 47.65%, similar to most LMICs. However, those with early-stage disease (Stage 0, I) have a reported 5-year survival of 91.94% [3]. The overall poor survival is attributable to the large proportion of advanced disease; as stage 4 disease in Ghana has survival rates of only 15.09% [3].

With improvement in early reporting, advances in BC treatment and subsequent improvement in survival, quality of life (QOL) becomes as important as treatment of the disease. Treatment of the disease takes a toll on the patient physically, emotionally, socially and in LMICs financially. According to WHO quality of life is "an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns"[4].

The objective assessment of treatment outcomes is important in assessing the impact of the risks versus benefits to the patient. There are various QOL assessment tools available. The European Organisation for Research and Treatment of Cancer core questionnaire EORTC QLQ-C30 is one of the well-known and widely used assessment tools and the EORTC QLQ-BR23 is its BC-specific supplementary module. The EROTC QLQ-C30 assesses global, functional and symptom domains of cancer patients. The EORTC QLQ-BR23 also assesses BC-specific functional and symptom domains [5].

BC treatment can affect a patient's quality of life. Some treatments may have short-term effects on QOL while others may be more long-lasting Surgery in particular can be radical, affecting a woman's body image and self-confidence. There are also long-term side effects such as lymphoedema, shoulder stiffness and chronic pain which may complicate the surgery [6]. With the large numbers of advanced stage disease in Ghana and other LMICs, more mastectomies are done compared to breast conserving surgeries. Stage for stage the choice of surgery does not affect survival outcomes, this rather depends on the various adjuvant therapies [7]. In recent years breast reconstruction as an adjunct procedure to mastectomy has become available, though cost and acceptance of this procedure makes it less commonly done in LMICs [8].

The concept of QOL has not been adequately explored in our cultural context. This paper compares outcomes in QOL in BC survivors who had mastectomy with or without breast reconstruction surgery and breast conserving surgery using the EORTC QLQ-C30 and EORTC QLQ-BR23 QOL tools.

## 2. Materials and Methods

This was an unmatched cross-sectional study of BC survivors who had surgery from 2016 to 2020, or at least 2 years prior to the study conducted in 2022 at the Korle Bu Teaching Hospital (KBTH), Ghana. KBTH is a tertiary hospital and one of three centres that offer comprehensive cancer care in the country, including diagnostic services (radiology, pathology including immunohistochemistry), surgery (including breast reconstruction), clinical and radiation-oncology services.

A database of patients who had surgery over this period was created from the admission record books of the breast surgical ward. Surgeries included were breast conserving surgery or mastectomy with or without immediate breast reconstruction. Delayed breast reconstruction, male patients and patients on active breast cancer treatment (chemotherapy and radiotherapy) were excluded. Those on long-term hormonal therapy were included. Patients or their next of kin were contacted by telephone and interviews scheduled. Participants were invited to the hospital to be interviewed in-person. Those who could not come to the hospital were given the option of a telephone interview. Written informed consent was taken for in-person interviews and telephone consent script was read out over the phone. Interviews were conducted mostly in English and a few in the dominant Twi local language by the same research assistant to limit variability. A quantitative research approach was utilized to obtain information on the QOL of BC survivors.

The first part of the questionnaire covered data on participant demographics and clinical stage at diagnosis, which was obtained from patients' records. Participants were also asked about satisfaction with the appearance of their breast/chest wall. The second part of the questionnaire was the European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire, EORTC QLQ C-30 and supplementary EORTC QLQ BR-23. The EORTC QLQ C-30 is composed of both multi-item scales and single-item measures. These include five functional scales on physical, role, emotional, social and cognitive functioning; three symptom scales measuring fatigue, pain, and emesis; a global health status (overall QOL) scale, and six single items assessing financial impact and symptoms such as dyspnoea, nausea, vomiting, appetite, diarrhoea, and constipation.

The EORTC QLQ BR-23 covers the functional and symptom scales specific to BC. The functional scale consists of body image, sexual functioning, sexual enjoyment and future perspective. The symptom scale consists of side effects of systemic therapy, breast symptoms, arm symptoms and upset by hair loss.

The parameters were scored 1 to 4 and the scoring manuals of EORTC QLQ C-30 and EORTC QLQ BR-23 were applied to obtain the interpretation. High scores for the functional scales imply a high or healthy level of functioning and high scores for the symptom scale implies a high level of symptomatology or problems.

*Statistical Analysis*

Stata® 14 software was used to analyse the data. Categorical variables were reported as percentages and proportions and were compared using Pearson chi-square statistics.   All the scales and single-item measures range in score from 0 to 100. A high score for a functional scale represents a high/ healthy level of functioning; a high score for the global health status / QOL represents a high QOL, but a high score for a symptom scale / item represents a high level of symptomatology / problems. The raw scores were transformed to scores ranging from 0 to 100 by using the following formula [5,9].

$$Raw\ score = RS = \left( I1 + I2 \dots + \frac{In}{n} \right)$$

The linear transformation is applied to 0-100 to obtain the score S,

$$Functional\ scale: S = \left( 1 - \frac{RS - 1}{range} \right) \times 100$$

$$Symptom\ scale: S = \left( \frac{RS - 1}{range} \right) \times 100$$

Symptom scale:   $S = \left( \frac{RS-1}{range} \right) \times 100$

The calculated median score of the transformed RS was used to compare QOL domains among the surgery groups. Sub-group analysis was done among the surgery groups to determine any relation between type of surgery and QoL. Statistical significance was considered at p-values less than 0.05.

## 3. Results

Nine hundred and ninety-four (994) patients had surgery from 2016 to 2020. A total of 494 were not reachable by phone, of which there was no record of telephone numbers for 95 patients, the rest were deactivated or did not respond after 6 attempts. Of the five hundred (500) patients or their next of kin that were contacted; 202 patients were reported dead by their next of kin. Of the remaining 298, 45 did not participate for various reasons including refusal to consent, too ill to talk, travelled out of town or language barrier. A total of 253 survivors therefore consented to participate in the study, giving a response rate of 85% of survivors reached. Of the number interviewed, 164 (64.8%) were interviewed in-person and 89 (35.2%) over the telephone.

*3.1. Sociodemographic and Clinical Characteristics*

The overall mean age of study participants was 55.2 ± 12.7 years with an overall median [IQR] time since surgery of 48.0 [32.0-65.5] months. Of the 253 study participants, 162 (64.0%) had mastectomy without breast reconstruction (M), 24 (9.5%) had mastectomy with breast reconstruction (BRS) and 67 (26.5%) had breast conserving surgery (BCS).

Table 1 shows the socio-demographic and clinical characteristics of participants. The mean ages of the M, BRS and BCS study participants were 52.9 (± 11.8), 40.9 (± 11.3) and 58.6 (± 12.1) years respectively; this was significantly different (p<0.001). Educational level was also significantly different between the three surgery groups with 87.5% (n=21) of the BRS having tertiary education (p<001) (Table 1). A total of 50% (n=12) of the BRS group were pre-menopausal, statistically significant from that of the M and BCS groups (p=0.022) (Table 1). Employment status at diagnosis and monthly income were significantly associated with the type of surgery (p<0.001). Clinical stage of BC was

statistically associated with the type of surgery performed (p<0.001) with 25.4% (n=17) of the BCS group being stage I (Table 1).

**Table 1.** Socio-demographic and clinical characteristics of study participants.

| Characteristic | Mastectomy (M) n, %[1] | Mastectomy (with BRS) n, %[1] | Breast conserving surgery (BCS) n, %[1] | p-value |
|---|---|---|---|---|
| Age, mean (±SD) | 52.9 ± 11.8 | 40.9 ± 11.3 | 58.6 ± 12.1 | ***<0.001*** |
| Marital status | *N=162* | *N=24* | *N=67* | 0.111 |
| Married | 76, (46.9) | 11 (45.8) | 38 (56.7) | |
| Single | 25, (15.4) | 8 (33.3) | 10 (14.9) | |
| Divorced/Separated | 24 (14.8) | 4 (16.7) | 6 (9.0) | |
| Widowed | 37 (22.8) | 1 (4.2) | 13 (19.4) | |
| Educational level | *N=162* | *N=24* | *N=67* | ***<0.001*** |
| Tertiary | 63 (38.9) | 21 (87.5) | 20 (29.9) | |
| Secondary | 54 (33.3) | 2 (8.3) | 32 (47.8) | |
| Primary | 29 (17.9) | 1 (4.2) | 13 (19.4) | |
| None | 16 (9.9) | 0 (0) | 2 (3.0) | |
| Religion | *N=162* | *N=24* | *N=67* | 0.806 |
| Christian | 150 (92.6) | 22 (91.7) | 63 (94.0) | |
| Moslem | 12 (7.4) | 2 (8.3) | 4 (6.0) | |
| Menopausal stage | *N=162* | *N=24* | *N=67* | ***0.022*** |
| Pre-menopausal | 39 (24.1) | 12 (50.0) | 14 (20.9) | |
| Post-menopausal | 123 (75.9) | 12 (50.0) | 53 (79.1) | |
| Employment status at diagnosis | *N=162* | *N=24* | *N=67* | ***<0.001*** |
| Employed | 124 (76.5) | 24 (100) | 41 (61.2) | |
| Unemployed | 38 (23.5) | 0 (0.0) | 26 (38.8) | |
| Monthly income | *N=162* | *N=24* | *N=67* | ***<0.001*** |
| ≤500 GhCedis | 53 (32.7) | 2 (8.3) | 21 (31.3) | |
| 501-1000 GhCedis | 49 (30.3) | 0 (0.0) | 20 (29.9) | |
| 1001-2000 GhCedis | 22 (13.6) | 7 (29.2) | 15 (22.4) | |
| 2001-5000 GhCedis | 31 (19.1) | 13 (54.2) | 10 (14.9) | |
| >5000 GhCedis | 7 (4.3) | 2 (8.3) | 1 (1.5) | |
| Clinical Stage of breast cancer at diagnosis | *N=162* | *N=24* | *N=67* | ***<0.001*** |
| Stage I | 8 (4.9) | 1 (4.2) | 17 (25.4) | |
| Stage II | 51 (31.5) | 5 (20.8) | 32 (47.8) | |
| Stage III | 56 (34.6) | 13 (54.2) | 9 (13.4) | |
| Unknown | 47 (29.0) | 5 (20.8) | 9 (13.4) | |
| Duration since surgery | *N=162* | *N=24* | *N=67* | |
| 25-36 months | 59 (36.4) | 4 (16.7) | 14 (20.9) | |
| 37-48months | 33 (16.7) | 6 (25.0) | 12 (17.9) | |
| 49-60months | 27 (16.7) | 10 (41.7) | 12 (17.9) | |
| ≥61months | 43 (26.5) | 4 (16.7) | 29 (43.3) | |

[1]Column percentages; BRS=Breast reconstruction surgery; 1USD = 10.0 GhCedis.

*3.2. Global Health Status*

Table 2 shows the median [IQR] *Global Health Status* (overall QOL) of the study participants. Stratified over the socio-demographic characteristics, the median *GHS* was over 50.0 in all strata and was not significantly different within each socio-demographic characteristic (p>0.05) (Table not shown). Table 2 analysis indicates that the median [IQR] *GHS* of the study participants with current breast metastasis (66.7 [IQR: 37.5-81.3]) was significantly lower compared with study participants without metastasis (*GHS* of 88.3) (p=0.007) (Table 2). Similarly, being satisfied with how breast/chest looks was significantly associated with higher *GHS* score (p=0.009) (Table 2).

**Table 2.** Clinical parameters associated with Global health status.

| Characteristic | | Global health status, median [IQR] | p-value |
|---|---|---|---|
| Age | | | 0.552 |
| | <50 years | 83.3 [66.7-89.6] | |
| | ≥50 years | 83.3 [66.7-91.7] | |
| Clinical Stage of breast cancer | | | 0.061 |
| | Stage I | 83.3 [75.0-91.7] | |
| | Stage II | 75.0 [66.7-91.7] | |
| | Stage III | 75.0 [66.7-91.7] | |
| | Unknown | 83.3 [75.0-91.7] | |
| Surgery same side as dominant hand | | | 0.087 |
| | Yes | 83.3 [66.7-85.4] | |
| | No | 83.3 [66.7-91.7] | |
| Current metastatic status | | | *0.002* |
| | Non-metastatic | 83.3 [66.7-91.7] | |
| | Metastatic | 66.7 [37.5-81.3] | |
| Satisfaction with how breast/chest looks | | | *0.009* |
| | Yes | 83.3 [66.7-91.7] | |
| | No | 70.8 [58.3-83.3] | |
| Time since surgery | | | 0.867 |
| | 24-36months | 83.3 [66.7-91.7] | |
| | 37-48months | 83.3 [66.7-91.7] | |
| | 49-60months | 83.3 [66.7-83.3] | |
| | ≥61months | 83.3 [66.7-91.7] | |

BRS=Breast reconstruction surgery; IQR=Interquartile range.

*3.3. EORTC QLQ*

Table 3 shows the *GHS* and the various QOL scales (both *QLQ-C30 and QLQ-BR23*) of the study participants stratified over the surgery groups. The study participants had an overall *GHS* median score of 83.3 [IQR: 66.7-91.7] with no statistically significant differences between the surgery types (p=0.615) (Table 3).

3.3.1. EORTC QLQ C-30

On the *QLQ-C30 Scales*, the overall *Functional Scale* median score was 91.7 [IQR: 82.5-96.7] and the BRS group had a statistically significant lower score (82.8 [IQR:77.3-91.7]) (p=0.006) compared with the other surgery groups (Table 3). At the sub-scale level, the *Emotional Functioning* median score of 87.5 [IQR: 68.8-91.7] in the BRS group was significantly the lowest among the surgery types (p=0.016) (Table 3)

On the *QLQ-C30 Symptomatic Scale*, the median score of the study participants was 8.6 [IQR: 1.9-17.3] with the BRS group having the significant highest score of 15.7 [IQR: 4.2-25.8] compared with the other surgery groups (p=0.033) (Table 3). On the sub-scale level, the BRS group had significant highest score among the surgery groups for *Pain* (p=0.029) and *Insomnia* (p=0.024) (Table 3).

3.3.2. EORTC QLQ BR-23

On the *QLQ-BR23 Functional scale*, the overall median score for the study participants was 70.8 [IQR: 54.1-83.3] with the BRS group having the statistically significant lowest median score of 51.0 [IQR: 40.1-56.8] compared with the other surgery groups of 75.0 [IQR: 58.3-85.4] (p=0.003) (Table 3). On the sub-scale level, median scores for *Body Image* and *Future Perspective* were similarly lowest in the BRS group and the BCS group had the highest *Body Image* of 100 [91.7-100] compared with the other surgery groups (p<0.001 respectively) (Table 3). Sub-group analysis indicated that the median score for *body image* of the BCS is significantly higher (p=0.004) compared with the M group with 74.6% having the excellent score of 100 for BCS whilst 57.4% had excellent score of 100 for M (data

not shown). Of the 83 study participants with a *Sexual Functioning* score >0, the median *Sexual Enjoyment* score was 66.7 [IQR: 33.3-100] (Table 3).

On the *QLQ-BR23 Symptomatic scale*, the median score was 6.9 [IQR: 2.8-13.5] with the BRS having the statistically significant highest median score of 16.5 [IQR: 7.0-23.2] compared with the other surgery groups (p<0.001) (Table 3). Median scores for *Systemic therapy side effects*, *Arm symptoms*, and *Breast symptoms* were all statistically significantly highest among the BRS compared with the other surgery types (p<0.05) (Table 3).

**Table 3.** Type of breast surgery in study participants associated with Global Health Status and QOL domains.

| Characteristic | All Surgery types | Mastectomy (M) | Mastectomy (with BRS) | Breast conservation surgery (BCS) | p-value* |
|---|---|---|---|---|---|
| QLQ-C30 Global Health status, median [IQR] | 83.3 [66.7-91.7] | 83.3 [66.7-91.7] | 79.2[66.7-83.3] | 83.3 [66.7-91.7] | 0.615 |
| QLQ-C30 Functional scale, median [IQR] | 91.7 [82.5-96.7] | 92.7 [83.6-97-3] | 82.8 [77.3-91.7] | 92.3 [83.7-96.7] | *0.006* |
| *Physical functioning* | 93.3 [86.7-100] | 93.3 [80.0-100] | 86.7 [86.7-100] | 93.3 [86.7-100] | 0.423 |
| *Role functioning* | 100 [83.3-100] | 100 [100] | 91.7 [66.7-100] | 100 [83.3-100] | 0.107 |
| *Emotional functioning* | 91.7 [75.0-100] | 100 [83.3-100] | 87.5 [68.8-91.7] | 91.7 [75.0-100] | *0.016* |
| *Cognitive functioning* | 100 [83.3-100] | 100 [79.2-100] | 83.3 [70.8-100] | 83.3 [83.3-100] | 0.302 |
| *Social functioning* | 100 [100] | 100 [100-100] | 100 [66.7-100] | 100 [100-100] | 0.091 |
| QLQ-C30 Symptom scale, median [IQR] | 8.6 [1.9-17.3] | 5.2 [1.2-15.6] | 15.7 [4.2-25.8] | 11.1 [1.9-16.7] | *0.033* |
| *Fatigue* | 11.1 [0.0-22.2] | 0.0 [0.0-22.2] | 22.2 [0.0-41.7] | 11.1 [0.0-22.2] | 0.061 |
| *Nausea and vomiting* | 0.0 [0.0-0.0] | 0.0 [0.0-0.0] | 0.0 [0.0-0.0] | 0.0 [0.0-0.0] | 0.444 |
| *Pain* | 0.0 [0.0-33.3] | 0.0 [0.0-33.3] | 25.0 [4.2-45.8] | 0.0 [0.0-33.3] | *0.029* |
| *Dyspnoea* | 0.0 [0.0-0.0] | 0.0 [0.0-0.0] | 0.0 [0.0-33.3] | 0.0 [0.0-0.0] | 0.382 |
| *Insomnia* | 0.0 [0.0-33.3] | 0.0 [0.0-0.0] | 33.3 [0.0-33.3] | 0.0 [0.0-33.3] | *0.024* |
| *Appetite loss* | 0.0 [0.0-0.0] | 0.0 [0.0-0.0] | 0.0 [0.0-0.0] | 0.0 [0.0-0.0] | 0.539 |
| *Constipation* | 0.0 [0.0-0.0] | 0.0 [0.0-0.0] | 0.0 [0.0-0.0] | 0.0 [0.0-0.0] | 0.519 |
| *Diarrhoea* | 0.0 [0.0-0.0] | 0.0 [0.0-0.0] | 0.0 [0.0-0.0] | 0.0 [0.0-0.0] | 0.321 |
| *Financial difficulties* | 0.0 [0.0-66.7] | 0.0 [0.0-66.7] | 0.0 [0.0-33.3] | 0.0 [0.0-66.7] | 0.836 |
| QLQ-BR23 Functional scale, median [IQR] | 70.8 [54.1-83.3] | 75.0 [58.3-85.4] | 51.0 [40.1-56.8] | 75.0 [54.7-83.3] | *0.003* |
| *Body Image* | 100 [83.3-100] | 100 [75.0-100] | 83.3 [68.8-91.7] | 100 [91.7-100] | *<0.001* |
| *Future Perspective* | 100 [33.3-100] | 100 [66.7-100] | 33.3 [0.0-66.7] | 100 [33.3-100] | *<0.001* |
| *Sexual Functioning* | 0.0 [0.0-33.3] | 0.0 [0.0-33.3] | 33.3 [0.0-50.0] | 0.0 [0.0-16.7] | 0.109 |
| *Sexual Enjoyment (N=83)* | 66.7 [33.3-100] | 66.7 [33.3-100] | 50.0 [25.0-66.7] | 66.7 [16.7-100] | 0.164 |

| QLQ-BR23 Symptom scale, median [IQR] | 6.9 [2.8-13.5] | 6.3 [2.4-11.9] | 16.5 [7.0-23.2] | 7.1 [2.8-14.1] | *<0.001* |
|---|---|---|---|---|---|
| *Systemic therapy side effects* | 4.8 [0.0-14.3] | 4.8 [0.0-14.3] | 11.9 [4.8-27.4] | 9.5 [4.8-19.0] | *0.004* |
| *Upset by Hair Loss* | 0.0 [0.0-0.0] | 0.0 [0.0-0.0] | 0.0 [0.0-0.0] | 0.0 [0.0-0.0] | 0.937 |
| *Arm symptoms* | 11.1 [0.0-22.2] | 11.1 [0.0-22.2] | 22.2 [11.1-44.4] | 11.1 [0.0-22.2] | *<0.001* |
| *Breast symptoms* | 8.3 [0.0-16.7] | 8.3 [0.0-16.7] | 16.7 [8.3-22.9] | 0.0 [0.0-16.7] | *0.012* |

*Kruskal-Wallis equality-of-populations rank test between the surgery groups (M, BRS and BCS); BRS=Breast reconstruction surgery; IQR=Interquartile range.

## 4. Discussion

This study provides insight into the QOL of BC patients treated in Ghana who had BCS and M including a small group of patients who had BRS. The study quantitatively assessed the QOL of BC survivors according to the type of breast surgery they had. The findings reveal that there was no difference in the *GHS* of the various surgery groups. Those who had BRS, however, did have a significant difference in the domains of functionality and symptomatology. Body image was found to be better with the BCS group.

The overall mean age of study participants was $55.2 \pm 12.7$ years which falls in line with other publications from Ghana [3,5]. The significant differences in cancer stage between groups reflects the role of staging in the choice of surgery; stages I & II disease are more likely to receive BCS and Stage III disease, mastectomy. The mean age for the surgery groups differed significantly with the BRS group being younger [40.9 years ($\pm$ 11.3)] and the M and BCS groups a decade older [52.9 ($\pm$ 11.8) and 58.6 ($\pm$ 12.1) years respectively]. Similar age differences in surgery groups have been reported in Italy, Korea, Netherlands and USA [6–9]. A goal of BRS is to improve one's self image and self-confidence, therefore younger women who may be more concerned about their body image are more likely to opt for BRS. Similarly, this study like other studies found higher education to be associated with the BRS group [6,7] implying that this group may have a better awareness and appreciation of BRS. Participants in the BRS group were all employed and in a higher income bracket than the M or BCS group. BRS has been associated with higher income groups [6,7] whether covered by health insurance [12] or not [13]. In Ghana, the cost of BRS is currently not covered by the National Health Insurance Scheme and this may be a consideration for lower income earners in their choice of surgery. Complaints about financial difficulties were generally minimal though notably less in the BRS group but not significantly associated with a particular surgery group (Table 3).

The *Global Health Status (GHS)* scores which reflects the overall QOL of the participants were generally high (83.3 [IQR: 66.7-91.7]) for all surgery groups. Some studies utilizing the *EORTC QLQ C-30* and *QLQ BR-23* report lower *GHS* scores [8,10–13], whilst the high scores found in this study is very similar to that reported from the Netherlands [14]. In a community where the general outlook towards BC is rather grim and expected to culminate in death, participants will have higher *GHS* scores because they feel and function better than anticipated. [19]. The *GHS* scores were not found to be associated with any of the sociodemographic factors, clinical stage, side of surgery or time since surgery but were found to be significantly lower in those who had disease progression after surgery to metastatic disease and higher in those who were satisfied with the appearance of their breast/chest (Table 3). *GHS* in other studies however, has been found to be higher in younger women [10,13], higher income and longer time since surgery [16,18]

There was no difference in *GHS* between surgery groups as reported by several others [6,8,9,12,13] which means a good quality of life can be achieved irrespective of the type of surgery one has. A QOL study at the same institution also found no difference in QOL when patients were categorized according to treatment modalities (not type of surgery only) [21]. Some studies however, do report a better QOL for BCS relative to M [22]. Although a study objectively also found no

difference in *GHS*, it was found that post-mastectomy patients were more likely to be dissatisfied with cosmetic outcomes and emotionally disturbed than BCS patients [23].

This study reports a lower *Functional scale* score for the BRS group and this was found to be due to significantly lower *Body Image* (though the median score of 83.3 [68.8-91.7] is reasonably high) and *Future Perspective* scores in the sub-scale analysis.   Median *Body Image* scores for BCS and M were high, implying both groups were very satisfied with their self-image, but the *Body Image* score of BCS was significantly higher compared with that of M.   A meta-analysis found a higher *Body Image* and *Future Perspective* scores associated with BCS as compared to mastectomy [22], though that study did not include BRS. There is a widely held misconception in the Ghanaian community that mastectomy leads to death and that BC is not survivable [19]. Perhaps women who had M in the Ghanaian cultural context, where BC mortality is high among patients reporting with locally advanced disease may not be pre-occupied with body image having survived the disease and surgery.

Median *Future Perspective* score of 33.3 was extremely low for the BRS group. The question asked was "during the past week, were you worried about your health in the future?" These concerns are most likely due to non-cancer related issues after BRS. Fear of implant related complications, repeat surgical procedures and the implant causing a new cancer are issues dealt with by BRS patients [24,25]. These issues need to be explored qualitatively in the Ghanaian cultural context to understand and address the reasons for such low scores.

The BRS group also had the lowest *Functional scale* score on the *EORTC QLQ C-30* due to lowest scores on *Emotional functioning*. The *Symptomatic Scale* scores were significantly highest implying a poorer QOL also for the BRS group compared with the other surgery groups due to higher *Pain*, *Insomnia*, *Systemic therapy side effects*, *Arm symptoms*, and *Breast symptoms* scores. Notably the BRS group *Sexual Enjoyment* scores were the lowest but not statistically significant.

*Systemic therapy side effects* for the BCS group were higher than for the M group, possibly from the adjuvant radiation therapy received by this group. A meta-analysis however, found a lower *Systemic therapy side effects* associated with BCS [22].

The essence of BRS is to improve QOL. In our setting, like in other LMICs, breast reconstruction is a relatively new procedure with low acceptance and admittedly is not routinely offered to all patients [8]. It is sometimes considered only when the patient has difficulty accepting mastectomy. Such patients are usually perceived to be "emotional". Perhaps pre-existing emotional challenges with accepting diagnosis and surgery may contribute to the lower *Emotional Functioning* and possibly higher *pain* and *insomnia* scores. Indeed, it has been reported that women who have BRS have a lower QOL and more mood disturbances corroborating the findings of this study [26]. However, a limitation of this study is that QOL was not assessed before surgery as a baseline to determine if the differences were due to treatment/surgery or were pre-existing. These findings are of clinical importance and the concerns of the BRS group should not be taken lightly. This group of patients are young, educated, gainfully employed women who need support to overcome challenges not only of a BC diagnosis but in coping with body image, emotions, lingering treatment side effects and future health concerns. Efforts tailored at addressing these concerns will improve their QOL.

This study has attempted to fill the literature gap on QOL outcomes of the various surgical options in LMICs. Based on the findings of BC survivors treated in Ghana, clinicians in discussing surgical options with patients should highlight that a good QOL is achievable irrespective of the choice of breast surgery. Once oncological principles are satisfied decision making should be individualized. This is particularly important in our setting where patients refuse treatment believing that surgery, particularly mastectomy, will maim and deform them leaving them functionless and as social outcasts. These findings will serve as evidence-based decision-making aid for patients and clinicians. There is a need to develop a comprehensive approach in counselling patients before and after surgery; this should include psychological evaluation and support pre-operatively and in the long-term to cater for the differences in certain aspects of QOL taking into consideration individual sociodemographic and clinical peculiarities. Additionally, for those who opt for breast reconstruction, clinicians should identify the peculiar issues underlying the challenges associated with body image, emotional function and future perspective and support programs should teach

coping mechanisms to address these challenges. There is therefore the need for more research qualitatively to understand these outcomes within our cultural contexts and quantitatively using a combination of various assessment tools to comprehensively cover various aspects of QOL. This will shape development of interventions designed to support BC patients, culminating in an improvement of QOL after treatment.

The limitations of this study include possible variation introduced from interviews carried out in the local language. The small sample size, due to the high mortality of the disease in LMICs and challenges in following up patients due to incomplete records, also limits the generalizability of the study findings. The numbers of the BRS group are particularly small; however, this is a reflection of the low patronage of this surgical option. However, we are of the opinion that this study will be of great benefit to clinicians in our setting and the sub-region.

## 5. Conclusions

In summary, this study found no difference in overall QOL between M, BRS and BCS as body image scores were all high. The BRS group, however, had significantly lower functioning due to a relatively lower self-body image and mostly concerns about their future health.   This group also had low emotional function and more post-treatment symptomatology due to pain and insomnia. Self-body image for both M and BCS was high but that for the BCS group was the highest.

There is a need to develop support systems tailored at improving the QOL of breast cancer patients to guide the choice of surgery and help them cope psychologically, emotionally and physically in the long term.

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