The pattern of presentation, management and outcome of breast cancer patients at a tertiary health facility in Sierra Leone

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Abstract

Background
Breast cancer is the leading cause of cancer among women globally and the most common cancer amongst women in Sierra Leone. The aim of this study was to evaluate the patterns of clinical presentation, management and outcome among breast cancer patients who presented at the Connaught Teaching Hospital Complex in Sierra Leone.

Method
A retrospective, cross-sectional study was conducted at the specialist outpatient clinic at the Connaught Hospital. The medical records of 253 breast cancer patients were selected through a convenience sampling based on completeness of their data from 2018 to 2021. Patient's socio-demographic, obstetrics-gynaecological history, clinic-pathological characteristics, treatment modalities and outcomes were analysed by SPSS version 24.

Results
Of the 253 breast cancer patients, 246 (97.2%) were female and the mean age of the patients was 47±14 years. The mean age at menarche was 12±3 years and 35 (13.8%) of patients had a family history of breast cancer. The left breast 130 (51.2%) was the most commonly affected; about 119 (47%) of patients presented with stage III B and 35 (13.8%) with metastasis at presentation. With regards to treatment modalities, a combination of surgery, chemotherapy, and hormonal were provided to the patients, with 25.2 (48%) mastectomies, 98 (20.5%) hormonal therapy, 35 (7.3%) palliative care and about 8 (15.2%) refused treatment. The outcomes of breast cancer patients showed the highest mortality was in 2019, 19 (32.8%) and the least was in 2018, 10 (27.8%).

Conclusion
Our study showed that over half of our patients presented in advanced stage and mastectomy was the most common modality of treatment. There is a need to promote public health awareness on early presentation to improve patient’s outcome.

Introduction
Breast cancer is now the most commonly diagnosed cancer and leading cause of cancer death amongst women globally. An estimated 2.3 million new cases of breast cancer occurred globally as recorded by GLOBOCAN in 2020 (1). The incidence of breast cancer has reportedly been on the increase in developing countries, with sub-Saharan Africa having the highest incidence rate in Africa (1–3). The age standardised incidence rates per 100,000 population were 30.4 in Eastern Africa, 26.8 in Central Africa, 38.6 in Western Africa, and 38.9 in Southern Africa (4). The incidence of breast cancer is expected to continue to rise with an estimated 19.3 million cases globally by 2025 with most living in sub-Saharan Africa (1). In Sierra Leone, breast cancer is now the most common cancer among women followed by...
liver, cervical, and colorectal cancer (5), and it is the second most prioritized amongst eight malignant conditions in the country (6).

In Saharan African countries, a diagnosis of breast cancer is usually considered a death sentence (3, 7). Several factors have been attributed to the high mortality rate of these patients. They usually present late at health facilities with advanced disease (8), as they seek care from spiritual centres and traditional healers before visiting health facilities (9, 10). Co-infection with chronic diseases such as HIV and TB also accounts for a high morbidity and mortality amongst breast cancer patients (11). In addition to patient attributable factors, the health sector in many Sub-Saharan countries, have several challenges in providing quality health care services for patients with malignant conditions. Health facilities are poorly equipped with needed resources such as radiotherapy machines, anticancer drugs, and oncology specialists to manage patients with breast cancer (2). Due to competing priorities and lack of political will, there is low funding for non-communicable diseases (NCDs) such as breast cancer compared to communicable diseases such as HIV/AIDS that attract donor support (3). These further compounds the challenges of the quality of services available for breast cancer patients in Sierra Leone.

In a population-based survey done amongst women in Rwanda and Sierra Leone, breast masses were identified in 3.3% of women in Sierra Leone, with low level of education, poverty and consulting traditional healers identified as key factors preventing women from seeking medical care (12). In a study conducted using genetic ancestry using mitochondrial DNA amongst African American, Asian and Caucasian women; African American women with ancestry from Nigeria, Cameroon and Sierra Leone were most at risk of having triple negative breast cancer (13). Previous studies conducted in Sierra Leone on breast cancer were focused on knowledge, awareness and perceived causes (14, 15). The aim of this study was to assess the pattern of clinical presentation, management and outcome of breast cancer patients managed in a pubic referral health facility in Sierra Leone.

**Method**

**Study design and setting**

This was a descriptive, retrospective, and exploratory study conducted at the oncology clinic in the Specialist Outpatient (SOP) unit of the Connaught hospital. The Connaught hospital is a 300-bed teaching hospital founded in 1912 and part of the University of Sierra Leone Teaching Hospitals Complex. It is located in the central part of the capital city Freetown and is the largest referral health facility in the country. It provides care in two main disciplines; surgery and medicine and provides both outpatient and inpatient services through various units and departments such as the accident and emergency unit, SOP unit and medical and surgical departments. The hospital provides pathology, radiology, chemotherapy, surgery and palliative care services for patients with breast cancer. It has a special ward dedicated for female breast cancer patients. The SOP unit is the main area within the hospital where patients who require specialists review are seen on an outpatient basis. The oncology clinic was established in 2017 and runs every Friday at the SOP unit. It provides care mainly for patients
with breast cancer referred from other clinics, and hospitals across the country. The study is therefore a fair representation of breast cancer patients in Sierra Leone and the findings are generalizable.

**Study Population and data collection**

This study reviewed the clinical data of all patients with breast cancer visiting the SOP clinic at Connaught hospital between January 2018 and December 2021. Patients diagnosed clinically and histologically with breast cancer and seen during the study period were recruited for this study. Patients with incomplete clinical records and benign breast lesions were excluded. During this study period, we reviewed the clinical records and other hospital records such as the ward charts of all patients that met the study criteria and data related to the study objectives were extracted.

**Data collection instrument**

A specially designed proforma was developed by the researchers for this study based on the available literature in breast cancer, especially in low- and middle-income countries (LMIC) (16). Surgeon Specialists in the department reviewed the proforma for face and content validity. The questionnaire consisted of four sections. The first section looked at patient sociodemographic characteristics such as age, sex, occupation, tribe, religion and co-morbid conditions. The second section consisted of questions on gynaecology/obstetrics related history; such as menarche, menopause, parity, use of contraceptives, as well as family history of breast cancer. The third section looked at clinical presentation, staging and pathological findings. The fourth section looked at treatment modalities such as surgery, chemotherapy, palliative and treatment abroad. This section also looked at outcome, such as metastasis, recurrence, remission, lost to follow up or death. In some cases, additional data were collected from first-degree relatives over the telephone as in the case of charts with few missing data, and to know the outcome of patients lost to follow up.

**Statistical analysis**

Data analysis was performed using the Statistical Package for Social Sciences (SPSS Inc., Chicago, IL, USA) version 24. Descriptive analysis was conducted and expressed in mean and standard deviation (SD) for the continuous variables and frequencies and percentages for the categorical variables. Microsoft Excel for windows, version 10 was used to draw the radar plot.

**Ethical considerations**

The study was approved by the Sierra Leone Ethics and Scientific Review Committee.

**Results**

**Socio-demographic and health related characteristics of patients**
The socio-demographic and health related characteristics of the breast cancer patients are as presented in Table 1. The medical records of 253 patients were reviewed over the four-year study period, with an increase in the total number of patients seen over the years. Majority of the breast cancer patients were female (n = 246, 97.2%). Their age ranges from 16 to 85 years, with mean \( \pm SD \) of 47 \( \pm \) 14 years and a modal age group was 20–39 years, representing about half (n = 124, 49%) of patients. About two-thirds of the patients (n = 139, 62.9%) were married, and a third of the patients (n = 78, 32%) were housewives and traders (n = 92, 37.7%). Most of the patients have no co-morbidity (n = 163 (64.4%), but about a fifth of them were hypertensive (n = 49, 19.4%), and the others presented with diabetes (n = 2, 0.8%), HIV/AIDS (n = 1, 0.4%) and pregnancy-associated breast cancer (n = 6, 2.4%).
<table>
<thead>
<tr>
<th>Variable</th>
<th>Characteristics</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Female</td>
<td>246 (97.2%)</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>7 (2.8%)</td>
</tr>
<tr>
<td>Age</td>
<td>47 ± 14 years</td>
<td></td>
</tr>
<tr>
<td></td>
<td>16–85 years</td>
<td></td>
</tr>
<tr>
<td>Age at menarche</td>
<td>Mean = 12 ± 3 Years</td>
<td></td>
</tr>
<tr>
<td>Tribe</td>
<td>Mende</td>
<td>56(23)</td>
</tr>
<tr>
<td></td>
<td>Temne</td>
<td>55(22.6)</td>
</tr>
<tr>
<td></td>
<td>Limba</td>
<td>17(7.0)</td>
</tr>
<tr>
<td></td>
<td>Krio</td>
<td>37(15.2)</td>
</tr>
<tr>
<td></td>
<td>Fullah</td>
<td>24(9.9)</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>61(32.2)</td>
</tr>
<tr>
<td>Marital status</td>
<td>Single</td>
<td>36(16.3)</td>
</tr>
<tr>
<td></td>
<td>Married</td>
<td>139(62.9)</td>
</tr>
<tr>
<td></td>
<td>Widow</td>
<td>41(18.6)</td>
</tr>
<tr>
<td></td>
<td>Divorced</td>
<td>4(1.8)</td>
</tr>
<tr>
<td></td>
<td>Not recorded</td>
<td>32(12.7)</td>
</tr>
<tr>
<td>Religion</td>
<td>Muslim</td>
<td>117(46.0)</td>
</tr>
<tr>
<td></td>
<td>Christian</td>
<td>136(54.0)</td>
</tr>
<tr>
<td>Occupation</td>
<td>Trader</td>
<td>92(37.7)</td>
</tr>
<tr>
<td></td>
<td>House wife</td>
<td>78(32.0)</td>
</tr>
<tr>
<td></td>
<td>Teacher</td>
<td>11(4.5)</td>
</tr>
<tr>
<td></td>
<td>Unemployed</td>
<td>15(6.1)</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>50(19.7)</td>
</tr>
</tbody>
</table>
Variable | Characteristics | N (%)  
--- | --- | ---  
Clinical Characteristics | None | 163(64.4)  
  | Hypertension | 49(19.4)  
  | Diabetes mellitus | 2(0.8)  
  | HIV/AIDs | 1(0.4)  
  | Pregnancy associated | 6(2.4%)  
  | Others | 3(1.2)  
  | Not recorded | 35(13.8)  
Year | 2018 | 36(14.2)  
  | 2019 | 58(22.9)  
  | 2020 | 75(29.6)  
  | 2021 | 84(33.2)  
Laterality | Left breast | 130 (51.2%)  
  | Right breast | 118 (46.8%)  
  | Bilateral | 5 (2%)  
Metastasis | Lungs | 14(5.5)  
  | Skin | 8(3.2)  
  | Liver | 7(2.8)  
  | Contralateral breast | 7(2.8)  
  | Bone | 2(0.8)  
  | Brain | 1(0.4)  

**Obstetric and Gynaecological History**

About 246 female patients were seen, slightly over a third (n = 91, 36%) were post-menopausal, (n = 80, 31.6%) were pre-menopausal and the median age at menarche was 12 ± 3 years. Only about (n = 35, 13.8%) patients reported having a positive family history of breast cancer. Contraceptive use (oral /injectable) was reported in (n = 76, 30%) of patients. Majority of the patients (n = 214, 84.6%) have at least one child.

**Pattern of Presentation**

A lump in the breast was the most common presentation seen amongst patients with breast cancer at the oncology clinic. Over half of patients (n = 169, 66.7%) presented with locally advanced disease (i.e., skin
and/or chest wall involvement) and (n = 35, 13.8%) patients had metastasis at presentation. Stage III B was the most common stage at presentation (n = 119, 47%). Pulmonary metastasis (n = 14, 5.5%) was the most common site followed by the skin (8, 3.2%), liver (n = 7, 2.8%) and the other breast (n = 7, 2.8%). The brain and bone accounted for 1.2% of the sites for metastasis seen at presentation (see Table 1).

The left breast was most commonly affected (n = 130, 51.2%), followed by the right breast (n = 118, 46.8%) and (n = 5, 2%) of patients presented with bilateral breast cancer. Fine needle aspiration cytology (FNAC) (n = 185, 73.1%) was the most common diagnostic method used in obtaining tissue sample for diagnosis (see Table 2). Histological analysis of tumour started at the Connaught pathology laboratory in 2020. Currently immunohistochemistry analysis is not done due to unavailability of reagents.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Characteristics</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of contraceptives</td>
<td>No</td>
<td>126(49.8)</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>76(30.0)</td>
</tr>
<tr>
<td></td>
<td>Not recorded</td>
<td>51(20.2)</td>
</tr>
<tr>
<td>Family history</td>
<td>No</td>
<td>202(79.8)</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>35(13.8)</td>
</tr>
<tr>
<td></td>
<td>Not recorded</td>
<td>16(6.4)</td>
</tr>
<tr>
<td>Menopause</td>
<td>Pre</td>
<td>80(31.6)</td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>91(36.0)</td>
</tr>
<tr>
<td></td>
<td>Not recorded</td>
<td>82(32.4)</td>
</tr>
<tr>
<td>Having a child</td>
<td>Yes</td>
<td>214(84.6)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>13(5.1)</td>
</tr>
<tr>
<td></td>
<td>Not recorded</td>
<td>26(10.3)</td>
</tr>
<tr>
<td>Diagnostic procedure</td>
<td>FNAC</td>
<td>185(73.1)</td>
</tr>
<tr>
<td></td>
<td>Biopsy</td>
<td>15(5.9)</td>
</tr>
<tr>
<td></td>
<td>Not indicated</td>
<td>53(21.0)</td>
</tr>
</tbody>
</table>
Table 3
The stage of presentation of breast cancer patients

<table>
<thead>
<tr>
<th>Stage</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IIA</td>
<td>8(3.2)</td>
</tr>
<tr>
<td>IIB</td>
<td>16(6.3)</td>
</tr>
<tr>
<td>IIIA</td>
<td>46(18.2)</td>
</tr>
<tr>
<td>IIIB</td>
<td>119(47.0)</td>
</tr>
<tr>
<td>IIIC</td>
<td>4(1.6)</td>
</tr>
<tr>
<td>IV</td>
<td>35(13.8)</td>
</tr>
</tbody>
</table>

Table 4
Treatment regimen among breast cancer patients

<table>
<thead>
<tr>
<th>Types on management</th>
<th>Responses n (%)</th>
<th>Percent of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mastectomy</td>
<td>120(25.2)</td>
<td>48.0%</td>
</tr>
<tr>
<td>WLE</td>
<td>12(2.5)</td>
<td>4.8%</td>
</tr>
<tr>
<td>Refused</td>
<td>38(8.0)</td>
<td>15.2%</td>
</tr>
<tr>
<td>Neoadjuvant</td>
<td>73(15.3)</td>
<td>29.2%</td>
</tr>
<tr>
<td>Palliative</td>
<td>35(7.3)</td>
<td>14.0%</td>
</tr>
<tr>
<td>Adjuvant</td>
<td>84(17.6)</td>
<td>33.6%</td>
</tr>
<tr>
<td>Hormone</td>
<td>98(20.5)</td>
<td>39.2%</td>
</tr>
<tr>
<td>Overseas</td>
<td>14(2.9)</td>
<td>5.6%</td>
</tr>
<tr>
<td></td>
<td>477(100)</td>
<td>190.8%</td>
</tr>
</tbody>
</table>

**Management**

Surgery is the main modality of treatment, \( n = 120, 48\% \) of patients had mastectomy and \( n = 12, 4.8\% \) had wide local excision and axillary clearance for early breast cancer. In \( n = 35, 14\% \) patients, palliative care was initiated on first review, whilst \( n = 38, 15.2\% \) patients did not initiate treatment post breast cancer diagnosis and \( n = 14, 2.9\% \) patients sought medical treatment abroad. Of the patients that had chemotherapy, \( n = 73, 15\% \) had neoadjuvant, and \( n = 84, 17.6\% \) had adjuvant chemotherapy. About \( n = 98, 20.5\% \) of the patients received hormonal therapy mainly Tamoxifen.

**Outcome of breast cancer patients**
The outcome of breast cancer patients during the period under review (2018–2021) is illustrated in Fig. 1. The highest number of deaths was seen among the cohort of 2019 (n = 19, 32.8%) and the least was seen in 2018 (n = 10, 27.8%).

**Discussion**

In our study, most of the patients were female, with almost half of them between 20–39 years. The age at presentation of breast cancer in West African women is between 35–45 years, unlike Caucasians who present in the fifth and sixth decade (8, 9, 17). Sierra Leone like other West African countries is made of younger population with over 80% under 35 years of age, which accounts for the high number of young women presenting with breast cancer with few old patients living into their 5th or 6th decades (17–21). About 62.9% of patients, were married and 37.7% were involved in some form of trading activity for their main source of income. The left was the most commonly affected breast (n = 130, 51.2%) and bilateral breast cancer was reported in 2% of patients (22–24).

Late presentation with advanced disease was common among patients in this study with Stage III B accounting for nearly half of the cases at presentation (22, 24). Though Shepherd (2004) reported that 96.9% of women in Sierra Leone had some knowledge of breast cancer and were aware that early presentation is key for improved clinical outcome, yet most patients with breast cancer presented with locally advanced disease at our clinic. Similar findings were reported in studies conducted in tertiary health facilities in Nigeria and Ghana where despite a low incidence of breast cancer in these countries, high number of patients presented with advanced disease (7, 22, 25). Ignorance of the disease symptoms, lack of access to quality care and lack of trust of western medicine (9, 26), fear of diagnosis (19) and lack of access to screening services (17, 22) have been found to be among the causes of late presentation of breast cancer patients in Africa. In a previous study conducted in Sierra Leone and Rwanda, Ntirenganya (2014) identified 3.3% of women with breast masses during a community surveillance study. Poor recognition of symptoms and reliance on traditional healers were the barriers identified that prevented women from accessing healthcare services when they felt a mass in their breasts (12).

About 2% of patients in this study presented with bilateral breast cancer and 13.8% presented with metastatic disease at presentation. Pulmonary metastasis was the most common site followed by the skin, liver and the other breast unlike other studies (23, 27). The brain and bone accounted for the least site of metastasis seen at presentation. De novo presentation with metastasis is reported amongst breast cancer patients, with incidence of 14–25% in Asian patients, (23, 28) 3–6% in European patients (29) and 14% in sub-Saharan Africa (22). The aggressive nature of breast cancer is reported amongst black patients with high incidence of triple negative disease (30, 31), high mitotic rate (32), increased tumour size, high grade, positive axillary lymph node status (30) and distinct mutations in BRAC 1 and BRAC 2 (33). The lack of resources in-country, made it difficult to do similar genomic analytic profiling of the breast cancers in Sierra Leone, which make it difficult for evidence-based management of cases.
Breast cancer treatment is multimodal with surgery, chemotherapy, radiotherapy and immunotherapy depending on the tumour histology and stage of the disease at presentation. In our study, almost half of the patients had mastectomy and it was the most common treatment offered. It is also the main modality of treatment in health institutions where patients present mostly with locally advanced disease (7, 23). Mastectomy remains the main modality of treatment for breast cancer patients in Africa (17, 34). This has been attributed to unavailability of adjuvant therapy such as radiotherapy and chemotherapy (9, 34). The proportion of mastectomy in this study was lower than that reported in the sub-region (7). Limited number of breast surgeons, patients concern about removal of their breast for cosmetic reasons, cultural and spiritual beliefs are some of the reasons reported regarding patients refusing mastectomy for breast cancer treatment in sub-Saharan Africa (35, 36). Mastectomy as a treatment option was a major concern of many of our patients and could account for the loss to follow up of some of them after their first visit to the clinic. Advanced stage at presentation and unavailability of radiotherapy services makes breast conserving surgery not a feasible option for many patients in Sierra Leone, and other countries in the sub-region (34). Radiotherapy services are currently not available in Sierra Leone and patients who require it have to travel to neighbouring countries such as Ghana, Nigeria or Senegal. Radiotherapy services is a major challenge in many African countries and amongst those with radiotherapy machines, frequent breakdown is a common problem often reported (16, 19).

About a third of our patients received neoadjuvant and adjuvant chemotherapy drugs. Though the anthracyclines are in the essential medicine list in Sierra Leone, yet they are scarcely available and few pharmacies in the capital city stock them or are willing to procure them for patients. High cost, unavailability of some chemotherapy drugs and drug toxicities are major factor limiting drug compliance for breast cancer patients (16, 19).

Immunohistochemistry services is currently not available in the country and specimens are usually flown to South Africa, Ghana or Nigeria for further analysis. Immunotherapy drugs like Herceptin is also not available in Sierra Leone and patients who can afford it procure it abroad. Similar findings were reported in a study reviewing breast cancer facilities in sub-Saharan countries (16, 19).

Patients are placed on hormonal therapy with Tamoxifen and aromatase inhibitors such as Anastrozole post mastectomy and as adjuvant treatment in some cases of inoperable tumours. Hormonal therapy is accessible and affordable especially Tamoxifen. Their use is advocated in low resource settings as they are inexpensive with tolerable side effect (18). It is expected that with improvement of pathology services in the hospital, receptor status and immunohistochemistry services will be available locally and will guide and improve the use of hormonal treatment in our practice. Palliative care plays a key role in patients’ management in our setting as most present with advanced or metastatic disease. Inpatient and outpatient palliative care services are available for patients with breast cancer and other malignancies at the Connaught hospital.

Our study shows a gradual increase in the number of patients managed with breast cancer over the four-year period under review at the Connaught hospital. The incidence of breast cancer continues to rise in
Sierra Leone as in many sub-Saharan countries (34), with an overall increase in the mortality from the disease. The mortality recorded during the four-year period was 21.7%. Similar results were obtained in studies conducted in other tertiary health facilities in Nigeria and Uganda, 23.3% and 23% respectively (19, 37). Though there has been an increase in the number of breast cancer patients managed over the years, yet 15.2% were lost to follow up and did not initiate any form of treatment. Cost of care associated with chemotherapy and fear of losing their breast may account for the loss to follow-up of these patients. Mastectomy is not acceptable to many patients in sub-Saharan Africa (38, 39). In our study, calls to relatives of patients lost to follow-up revealed that most admitted to seeking traditional or spiritual care and confirmed their relatives were now dead. In Sokoto, Nigeria, high cost of care and presumed death of patients were possible causes for loss of follow-up of breast cancer patients managed in a tertiary health facility (7). The number of patients in remission has increased over the years as more patients are now reporting and being managed for the disease. A prospective study will provide more details about the long-term survival outcome of our patients.

Conclusion

Most of our patients presented at a relatively young age, with locally advanced disease and surgery was the main modality of treatment. Some of the patients seen in our clinic did not initiate any form of treatment after they were informed of their diagnosis and others were lost to follow-up. There is a need to improve histological diagnosis of breast cancer especially immunohistochemistry. Further research is needed to know the reason for late presentation of breast cancer patients, the challenges they face, as well as healthcare workers in improving breast cancer care in the country. There is a need to improve public awareness, screening programs and access to affordable treatment for breast cancer.

Declarations

Author Contribution

CCJ conceived of the study and contributed to the study design and writing of the first draft of the manuscript and revising the subsequent manuscript drafts, AJB contributed to the study design, data analysis and interpretation of the results and writing and revision of the manuscripts; IOS, BD and TO contributed to the study design, writing and revision of the manuscript. All authors read and approved the final version of the manuscript.

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Figures
Figure 1

Outcome of breast cancer patients for the individual cohorts
**Figure 2**

Cumulative outcome of breast cancer patients (2018-2021)