Breast Cancer in Low - and Middle Income Countries: Persistent Challenges and Insights

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ABSTRACT

Objective To determine the disease burden, patterns of referral, obstacles to surgical treatment and outcome of patients with breast cancer managed at a tertiary care hospital.

Study design Cross sectional observational study.

Place & Duration of study Department of General Surgery, Jinnah Postgraduate Medical Center (JPMC) Karachi, from January 2023 to December 2024.

Methods Records of all the patients managed during the study period were analyzed. The data collected included demographics of the patients, the stage of the disease at diagnosis, referral pattern, comorbid conditions, types of surgery performed and postoperative outcomes. The descriptive statistics were employed to report for characteristics of patients. Chi-square test was used to find associations between categorical variables. The binary logistic regression was used to assess the independent predictors of surgical intervention. These were reported as odds ratios (OR) with 95% confidence intervals (CI).

Results A total of 1500 breast cancer patients were registered at the cancer registry of the hospital. Out of this, 549 (36.6%) underwent surgical intervention. The most common surgical procedure undertaken was modified radical mastectomy (n=310 - 56.5%) followed by lumpectomy (n=120 - 21.9%) with breast-conserving (n=38 - 6.9%) and rarely oncoplasty (n=16 – 2.9%) was done. Important obstacles to surgical intervention were advanced stages III and IV of the disease (n=1065 – 71.0%), delays to referral (n=584 - 38.9%), financial barriers (n=504 - 33.6%) and comorbid conditions (n=395 - 26.3%). The predictive value of the disease being treated in its early stages (OR 2.34), the absence of a comorbid conditions (OR 1.58), direct arrival to outpatient services (OR 1.71) and age of less than 45-years (OR 1.43) were the antecedents of surgical treatment.

Conclusion Late diagnosis and non-availability of the treatment were important factors observed in this study for adverse outcome. About a third of the patients had a surgical procedure done; most common which was modified radical mastectomy. Operative mortality was 2.5%, as fourteen women died in this series.

Key words Breast cancer, Low- and middle-income countries (LMICs), Diagnosis, Health system, Healthcare. Modified radical mastectomy.

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INTRODUCTION:

Breast cancer is a leading malignancy in women overtaking cervical cancer in prevalence all over the world.[1,2] In high-income countries mortality rates related to breast cancer has declined due to improved surveillance programs, early detection and advanced treatment facilities. In contrast, the figures are quite opposite from the low- and middle-income countries.[3-5] In Pakistan, breast cancer has become a significant burden with high incidence and mortality rates, more notably among Asian countries.[6]

In Pakistan, breast cancer is the most common cancer among women, contributing to nearly 30-45% of all malignancies in females. A large hospital-based study reported that most of the patients presented at a mean age of 48 years with advanced stages (II–III). The infiltrating ductal carcinoma was the predominant histologic type.[7] The contributing factors include lack of awareness, health system related issues, as well cultural barriers.[8-10] This study was conducted to find out the burden of the breast cancer in our tertiary care hospital in an urban setup. The findings may help in planning strategies to address the gaps in healthcare awareness as well as health system related services.

METHODS:

Study design, place and duration: This was a cross-sectional observational study conducted in the Department of Surgery, Jinnah Postgraduate Medical Centre Karachi, from January 2023 and December 2024.

Ethical considerations: The Institutional Review Board provided ethical approval (F-2-56/2024-Genl/230/JPMC) and informed consent was taken from the study participants.

Inclusion and exclusion criteria: The study included female patient (>18 years) with histologically confirmed diagnosis of breast cancer (stage 1 –IV) who were eligible for the treatment. Patients with incomplete medical records, comorbid conditions that hindered the surgical and oncological treatment, and pregnancy at the time of diagnosis, were excluded.

Sample size estimation: Given the cross sectional study design a census sampling approach was used. All female patients with histologically confirmed breast cancer who were registered at JPMC cancer registry clinic during the study period and meet the eligibility criteria were included. This resulted in total study population of 1500 patients.

Study protocol: The medical records of all the patients were reviewed and a structured form was used to enter the data. The data included demographic details, comorbid conditions, stage of the disease at the time of presentation, source of referral, surgical procedure performed and the outcomes.

Statistical analysis: All statistical analysis was done using SPSS version 26. Descriptive statistics were used to find out the distributions. Logistic regression was used to determine the age and stage of the cancer comorbid conditions and source of referral as predictors of surgical intervention. Odds ratios with 95 % confidence intervals were calculated. Chi square test was used to find out the associations between different variables. A $p< 0.05$ was considered as significant.

RESULTS:

A total of 1500 patients with breast cancer were included. The mean age of the patients was 40.0±13.4 years. Majority (n=615 – 41%) of the patients were between 30 - 45 years of age. A third of the patients had comorbid conditions that affected the general condition of the women. Only 549 (36.6%) patients underwent surgery. The surgical outcome on the whole was satisfactory with the wound infection, seroma being the most common complications. Thirty women (5.4%) died in this series who underwent surgery. The results are given in table I.

Statistical analysis showed significant relationships between the stage of disease, comorbid factors, and referral trends to the chance of surgery ($p<0.05$). The probability of the patients with early-stage disease to undergo surgery was most significant in comparison to advanced stages. Surgical intervention was less likely in the presence of comorbid conditions ($p=0.001$). However, referral pattern also played a role in determining surgical rates. Patients who presented directly to outpatient clinic were more likely to get surgery done ($p<0.001$). Logistic regression showed that early-stage disease (OR=2.34, 95% CI 1.72–3.21; $p <0.0001$), absence of comorbidity (OR=1.58; 95% CI 1.12–2.24; $p=0.0097$), direct OPD attendance (OR=1.71; 95% CI 1.21–2.35; $p=0.0015$), and age < 45 years (OR=1.43; 95% CI 1.10–1.87; $p=0.0082$) were independent predictors of surgical intervention.

DISCUSSION:

Breast cancer is the most common cancer in women. In this study we managed a total of 1500 patients who presented with breast cancer in a two-year period at our hospital. This study also showed number of factors that were responsible for delay in detection of the malignancy, as well as late referral of patients. The surgical treatment therefore could be offered to 36.6% of patients in this series. Comorbid conditions also played a significant role as the general health status of the patients was poor. These observations are in line with the results of other studies where the advanced stage of the disease was reported as the most significant barrier to operative treatment.[11,12] A study from Nigeria

Table I: Demographics, Clinical Characteristics, Surgery performed, Barriers, and Outcomes

Section	Variable	Number (n)	Percentage (%)
Demographics	Total	1500	100
	Age <30 years	270	18
	30–45 years	615	41
	46–60 years	510	34
	>60 years	105	07
Stage at Diagnosis	Stage I–II	435	29
	Stage III	660	44
	Stage IV	405	27
Referral and comorbid conditions	Late Referrals	585	39
	Direct presentation	420	28
	Referred from other hospitals	495	33
	Comorbid conditions	480	32
	Modified Radical Mastectomy (MRM)	310	56.5
	Lumpectomy	120	21.9
	Simple Mastectomy	65	11.8
	Breast-conserving surgery (BCS)	38	6.9
	Oncoplastic procedures	16	2.9
Barriers to Surgery	Late stage of the disease (III & IV)	1065	71.0
	Referral delays	584	38.9
	Financial hardship	504	33.6
	Comorbid conditions	395	26.3
Surgical Outcomes	Wound Infection	47	8.6
	Seroma	37	6.8
	Hematoma	15	2.7
	30-day Mortality	30	5.4

reported up to 80% of mastectomies in women with breast cancer. Most of the patients presented late in that series.[13]

Our results through the logistic regression showed that the stage of the disease at presentation to be the significant predictor of surgical intervention and outcome. Similar results are also reported in another study where delayed referral was found as an important factor in relation to the breast cancer outcome. It was mentioned that delay in intervention by four weeks may have a detrimental outcome.[14] These findings emphasize the necessity of more efficient and time-saving cancer referral system in Pakistan and other LMICs.

Other factors that affect the outcome include availability of radiological and pathological services as well as access to surgical facilities. Patients with a complete diagnostic workup were more likely to undergo a surgery. This is in conformity with the observations reported earlier. A well-established pathology department plays a key role in determining the type of treatment to be provided to the patients.[12] Insufficient receptor testing in particular, stands in the way of making timely treatment decisions and restricts accessibility to targeted therapies. Nonetheless, there is growing evidence that alternative models of cheaper diagnosis especially low-cost diagnostics models can produce viable alternatives.[15]

The most frequently performed surgical procedure on patients with breast cancer in our study was modified radical mastectomy. However, a breast-conserving type and oncoplastic surgery were also done but on few patients. In places where access to radiotherapy is limited and surgeons are not trained well, breast conservative surgery can not be performed. These factors may contribute to the morbidity and mortality.[16] Viable solutions to these issues can be identified to enable more patient-

focused cancer care by ensuring improved coordination of care including availability of resources and training of the care providers.[17]

Limitations of the study: This is a cross sectional study from a single-center. Short and long term follow up is not available. However, the sample size of this study can enhance the validity of the research data.

CONCLUSION:

In this study only 36.6% of the patients were treated surgically. Most of them were in the advanced stage of the disease with significant comorbid conditions. Barriers in seeking healthcare and availability of the centers with adequate facilities and expertise were other important observations gathered from this data collection. The most frequently performed procedure was the modified radical mastectomy. The postoperative surgical complications were minimal and easily managed. Overall 0.9% mortality was observed in this series.

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