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Original Research Article

A retrospective study on socio-demographic, clinicopathological, molecular subtypes and comorbidities of women with breast cancer

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ABSTRACT

Background: Breast cancer is a heterogeneous disease influenced by demographic factors, tumor biology, and comorbid conditions. Understanding these characteristics is essential for improving early detection and management strategies.
Methods: We conducted a cross-sectional retrospective study using data from 120 women diagnosed with breast cancer. Demographic data (age, BMI), socioeconomic status, education level, clinical symptoms, radiologic findings, pathology reports, tumor grade, Modified Bloom-Richardson Score, molecular subtypes, comorbidities and presence of metastasis were obtained from patient charts and analysed descriptively.
Results: The majority of breast cancer patients were middle-aged; with the range of 36-55 years old. Many patients had high BMIs. The most common presenting symptom of breast cancer was a palpable breast lump. Histologically, invasive ductal carcinoma was the most common type, and the majority of the tumors were classified as high-grade and had high modified bloom-Richardson scores. The most common molecular subtype of breast cancer in our population was luminal A, followed by triple negative. Hypertension and Type 2 diabetes mellitus were the most common comorbidities in this population.
Conclusions: Breast cancer patients appeared to be diagnosed at a later stage than previously reported and the tumors were highly aggressive. The implications of our findings support increased public awareness, earlier detection, and targeted screening programs, particularly in rural and underserved populations.

Keywords: Breast cancer, Tumor characteristics, Molecular subtypes, Comorbidities, Body mass index, Retrospective study

INTRODUCTION

Among the most common types of malignancy diagnosed in women throughout the world, breast cancer is one of the leading causes of cancer deaths.[1] Based on estimates provided by the GLOBOCAN 2020, breast cancer is estimated at 2.3 million cases each year, and it is noted that cancer is on the rise in low- and middle-income countries.[1,2] Moreover, in developing nations such as India, breast cancer is common at earlier ages and at advanced stages as compared with the situation in the west.[3,4] Some of the contributing factors are lack of awareness, lack of an organized screening programmes, socioeconomic factors and late diagnosis and health seeking behaviours which lead to poorer clinical outcomes.[4,5]

The clinical pathological features, which may be the size of the tumor, nodal involvement, histological subtype, and grade of the tumor, play a key role in prognosis and treatment choice. The most prevalent histological type of breast cancer is invasive ductal carcinoma.[6] Improves in

molecular classification, which is determined by hormone receptor and HER2 status, have further categorize breast cancer, which can be used to predict disease behavior and treatment response better.[7]

The prevalence of the molecular subtypes also differs among populations; as reported by studies conducted in India, triple-negative breast cancer is much more prevalent in India than in Western populations.[8] Moreover, comorbidities, such as hypertension, diabetes mellitus, and obesity, are becoming highly common with breast cancer patients and can determine treatment tolerance, disease progression, and survival rates.[9,10]

A comprehensive understanding of demographic characteristics, clinicopathological features, molecular subtypes, tumor characteristics, and comorbidities is essential for developing population-specific strategies for early detection and optimal management. Therefore, this retrospective study analyzed these parameters in women diagnosed with breast cancer at a tertiary care center. The aim of this is to analyze demographic, clinicopathological, molecular characteristics, and associated comorbidities in women with breast cancer.

METHODS

Study design and setting

A retrospective, cross-sectional descriptive study was conducted at St. Ann's Cancer Hospital, Kazipet for a period of two months from 12-12-2025 to 12-02-2026. A record analysis of data from November 2023 to December 2025, representing a two-year period, was retrieved with prior approval from the institutional Ethical Committee (BIPS/IEC/2025/9).

Study population

A total of 120 patients with histopathologically confirmed breast carcinoma were included. Patient records containing complete information on clinical breast examination, radiological imaging, mammography, ultrasonography, histopathological reports, and hormonal receptor status were included in the study. Incomplete records were excluded.

Data collection

A proforma was prepared to collect data on sociodemographic characteristics, social and family histories, reproductive history, prior surgical history, chief complaints, mode of detection, clinicopathological characteristics, type of breast cancer, tumor characteristics, grading, staging, lymph node involvement, molecular subtypes, receptor status, Breast Imaging-Reporting and Data System (BI-RADS) score, and comorbidities.

Statistical analysis

The collected data was entered into excel sheet and the data analysis was done i.e.; continuous variables were expressed in terms of means and standard deviation and the categorical variables were expressed in terms of proportions and frequencies.

RESULTS

A total of 120 patients were included in the study. The most frequent age groups were 46–55 years (28.3%) and 36–45 years (27.5%), followed by 56–65 years (21.6%) and 66–75 years (15.8%).

Table 1: Socio-demographic characteristics of the study.

Socio-demographic varaibles	Category	Number of subjects (n)	Percentage (%)
Age (years)	0–25	1	0.83
	26–35	6	5.0
	36–45	33	27.5
	46–55	34	28.3
	56–65	26	21.6
	66–75	19	15.8
	75–85	1	0.8
Body mass index (kg/m²)	<18.5	1	0.8
	18.5–25	24	20.0
	25–30	67	55.8
	30–35	28	23.3
Locality	Rural	67	55.8
	Urban	53	44.1
Education	Illiterate	45	37.5
	Primary	61	50.8
	SSC	11	9.1
	Intermediate	3	2.5
Occupation	Farmer	12	10.0
	Daily wager	52	43.3

Continued.

Socio-demographic varaibles	Category	Number of subjects (n)	Percentage (%)
	Housewife	54	45.0
	Teacher	2	1.6
Comorbidities	Type 2 diabetes mellitus	37	30.8
	Hypertension	42	35.0
	T2DM + HTN	28	23.3
	Asthma + COPD	3	2.5
	CVA	1	0.8
	Epilepsy	1	0.8
	Hypothyroidism	1	0.8
	None	7	5.8
Marital status	Married	119	99.1
	Unmarried	1	0.8
Social history	Tobacco chewing	20	16.6
	Nil	100	83.3
Family history of breast cancer	Yes	28	23.3
	No	92	76.6
Past surgical history	Hysterectomy	20	16.6
	Nil	100	83.3
Menopausal status	Postmenopausal	58	48.3
	Premenopausal	62	51.6

Table 2: Chief complaints and tumor characteristics in patients with breast cancer.

Characteristics	Category	Number of subjects (n)	Percentage (%)
Chief complaint	Mobile lump	50	41.6
	Painful lump	3	2.5
	Tenderness	8	6.6
	Swelling	13	10.8
	Axillary nodes	37	30.8
	Nipple discharge	2	1.6
	Ulceration	7	5.8
Side of involvement	Right	55	45.8
	Left	65	54.1
Quadrant involved	Central	33	27.5
	Upper outer	34	28.3
	Upper inner	29	24.1
	Lower outer	13	10.8
	Lower inner	9	7.5
	All quadrants	2	0.16
BIRADS score	4	27	22.5
	4A	28	23.3
	4B	30	25.0
	4C	20	16.6
	5	14	11.6
	6	1	0.83
Histopathology	Invasive ductal carcinoma	116	96.6
	DCIS	4	3.33
Tumour grade	Grade 2	11	9.16
	Grade 3	101	84.1
MBR score	6	1	0.83
	7	29	24.1
	8	90	75.0
Molecular subtype	Luminal A	64	53.3
	Luminal B	17	14.1

Continued.

Characteristics	Category	Number of subjects (n)	Percentage (%)
	TNBC	35	29.1
	HER2 positive	4	3.33
Metastasis	Present	21	17.5
	Absent	99	82.5

Patients younger than 25 years and older than 75 years comprised (0.8%) each of the study population. The majority of patients were overweight (55.8%) or obese (23.3%), with (20.0%) having a normal body mass index and 0.8% being underweight. Rural residents constituted 55.8% of the study population. Educational attainment was predominantly at the primary level (50.8%) or illiterate (37.5%). Housewives (45.0%) and daily wage workers (43.3%) were the most common occupational groups. The most common comorbidities; Hypertension (35.0%) and type 2 diabetes mellitus (30.8%), and (23.3%) had both conditions. Only (5.8%) had no comorbidities. Nearly all patients were married (99.1%). Tobacco chewing was reported in (16.6%) of participants, and (23.3%) had a positive family history. Postmenopausal women constituted (48.3%) of the study population. A prior hysterectomy was noted in (16.6%). The overall patient's socio-demographics were summarized in Table 1.

A mobile breast lump was the most common presenting symptom (41.6%), followed by axillary lymphadenopathy (30.8%). Left-sided involvement (54.1%) was slightly more prevalent. The upper outer quadrant was most frequently affected (28.3%). Radiological categorization of BIRADS 4B was the most frequent (25.0%). Invasive ductal carcinoma predominated histologically (96.6 %). Grade 3 tumors were observed in (84.1%) of patients, and (75.0%) had an MBR score of 8. Molecular subtyping revealed Luminal A in (53.3%), triple-negative breast cancer in (29.1%), Luminal B in (14.1%), and HER2-positive tumors in (3.3%). Metastasis was present in (17.5%) of patients at diagnosis; overall clinicopathological and tumor characteristics were represented in Table 2.

DISCUSSION

The present study characterized the demographic, clinical, radiological, and pathological profile of 120 patients with breast carcinoma. Breast cancer in India and other South Asian populations tends to present at a younger age**,** often in the fourth and fifth decades of life, compared to Western cohorts where median age at diagnosis is higher.[11,12] The level of obesity was high and most patients were overweight and obese as evidenced by the literature that has shown that adiposity is associated with a high risk of breast cancer through the hormonal and metabolic mechanisms, as evident in the works carried out by Pandey A et al and Luis C et al.[13,14] Almost half of the patients were postmenopausal, which underlines the applicability of the hormonal effects on the disease biology.[13]

The majority of the patients in this research were rural residents who had less educational attainment, which could be a possible cause of delays in crisis and decreased adoption of screening activities, as reported in low- and middle-income areas.[12-15] Moreover, comorbidity disorders, including hypertension and diabetes type 2, are common, which points to the necessity of combining care interventions because of the possible influence of chronic diseases on the prognosis of cancer and its treatment rates.[13] In the present study, the most common presenting symptom was palpable breast lump, which agrees with the study carried out by Nene et al and then, involvement of axillary nodes, implying a late onset of the study.[16] It is likely aided by the limited formal screening programs, as the success of screening uptake is still low, especially in resource-constrained environments and with women who have a lower socioeconomic status.[12-17]

In line with the literature, histopathological profile in this study indicated that the majority of the tumors were high-grade with several of them bearing the aggressive characteristic as indicated by the modified Bloom-Richardson scoring. This observation also augments the observation of advanced presentations of diseases among this population.[18] The subtype analysis based on molecular was that the Luminal A subtype was the most common, and significant percentage of triple-negative breast cancer (TNBC) cases were reported. HER2-positive and Luminal B tumors were less common. The same findings are supported by meta-analyses of India in which Luminal A is the dominant pattern of molecular subtype, succeeded by TNBC, Luminal B and HER2-enriched tumors, with TNBC being prevalent in many Western cohorts.[11-19]

Triple-negative breast cancer is a form of aggressive breast cancer with few targeted therapeutic agents and limited targeted therapies whose prevalence is significantly more in Indian patients than in the Western populace, with a high grade and lymph node positivity on at presentation.[11-20] In this study, metastatic disease was manifested during the diagnosis process in about one-fifth of the patients, which is an indicator of late stage of diagnosis a long-standing problem in low-resource contexts.[15] Radiological evaluation with the help of the BI-RADS categories showed that there were more suspicious results, which required histopathological analysis.[21] Most of the patients in this study had invasive ductal carcinoma (96.6%), just like it is in the research by Neelesh Shrivastava et al, Rathod et al, and Suhani S et al.[17,21,22]

Limitations

There were also limitations in this study. The retrospective nature could have created information and selection bias. The research was carried out in one tertiary care centre,

which may restrict the generalization of the results in the study to a larger population. The subgroup analysis was somewhat limited due to the relatively small sample size especially of less common molecular subtypes. There were no long-term follow-up data regarding treatment response outcomes and survival outcomes. Furthermore, the socioeconomic and lifestyle factors were self-reported and were also open to recall bias.

CONCLUSION

The condition of breast cancer is mostly prevalent among women who have achieved middle age and are often linked with overweight conditions, rurality and low educational attainment. A delayed diagnosis was associated with most patients that reported palpable lumps in the breasts and axillary lymphadenopathy. The prevalent type was invasive ductal carcinoma with high grade histology and high Modified Bloom-Richardson scores. The most common type of molecular subtype was luminal A and then triple-negative breast cancer (TNBC). The percentage of patients with metastatic disease showed a high rate of presentation, which indicates the necessity to develop better strategies of early detection.

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