

Original Research Article

Clinical and histopathological characteristics of breast cancer and their epidemiological trends in Trichy, Tamil Nadu: a retrospective study

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ABSTRACT

Background: Breast cancer despite being the 2nd most commonly diagnosed, with around 68,50,00 deaths globally in 2020, has only handful of resources on the baseline characteristics, along with clinical features and histopathological findings in India.

Methods: A retrospective study was done among 52 patients who presented with breast cancer proven histologically, having identified nodal status by histopathology. All the data were collected from the medical record department.

Results: The mean age was found to be 42.74 ± 11.8 years ranging from 23 to 72 years. Majority of the patients were more than 51 years old. Invasive ductal carcinoma 73.08% was the most common type observed and majority of the patients presented with stage IIb 30.77% and IIIa 28.85%. The mean size of the tumour was found to be 4.12 ± 2.09 cm and the mean number of nodes involves were 4.60. Luminal A 42.31% was the most common immunophenotype observed followed by 23.08% of luminal B and 23.08% triple negative and rest Her2neu positive. 90.38% of the patients underwent modified radical mastectomy. Breast conservative surgery was done only among patients with stage I and II. Invasive ductal carcinoma (IDC) and invasive lobular carcinoma (ILC) was most commonly observed in right side of the breast compared to left, with upper outer quadrant being the most common site.

Conclusions: Thus, comparing the results of correlation with baseline characters helps in better understanding of the traits and presentation of breast cancer in women from rural environment in Tamil Nadu.

Keywords: Breast cancer, Epidemiology, Histology

INTRODUCTION

Globally 1 in 8 cancers diagnosed tends to be breast cancer, which makes it the most commonly diagnosed cancer. Around 2.3 million women were diagnosed with breast cancer in 2020 and 68,50,00 deaths were reported. Of those diagnosed with breast cancer in past 5 years, 7.8 million women are still alive.^{1,2} Indian Council for Medical Research reported that, breast cancer ranks second among the seven cancers causing for more than 40% disease burden in India. It also stated that there were 26.7 million cases reported in 2021, which will go up to 29.8 million in 2025.³ The International Agency for

Research on Cancer also provided a global review stating the increase in burden of breast cancer by 40%, with more than 3 million cases per year and one million death per year by 2040.²

Nearly 50% of the women with breast cancer has no risk factors identified other than gender (female) and age (above 40 years). Although obesity, usage of alcohol and smoking, history of breast cancer in family, exposure to radiation, reproductive history and postmenopausal hormone therapy are considered to be few factors increasing the risk of breast cancer. Inflammation of the breast or lump, redness, pitting, dimpling or alteration in

size, shape and appearance of the breast or abnormal nipple discharge are some of the common symptoms observed in patients with breast cancer.¹ There are only limited data available regarding the baseline characteristics along with the clinical and histopathological findings of the patients with breast cancer in Tamil Nadu. The purpose of the present study was to report the clinical and histopathological features and the risk factors identified in the patients who presented with breast carcinoma and the treatment followed in our hospital. Acquisition of such knowledge would help in formulating better policy and regulating the modality of early diagnosis and treatment of the patients.

The objective of the study was to determine the clinical features and risk factors in patients with breast carcinoma, to describe histopathological characteristics of the tumor and the type of surgery performed in different stages of the disease over the past 5 year period.

METHODS

A retrospective cross-sectional study was conducted among the breast cancer patients visiting Trichy SRM Medical College Hospital and Research Centre, Tamil Nadu, data was collected over a period of 5 months. The information regarding all the patients who visited the surgery OPD diagnosed with breast cancer for the past 5 years, from September 2020 to March 2022, was retrospectively collected from the medical records department of the institution. Universal sampling method was used to obtain the samples.

The patients with breast cancer while initiating the study and who consented for the study were included. Among these, people who had undergone neo-adjuvant therapy for breast cancer in the past, those with inestimable primary tumor size (Tx), metastasis to the breast from other organs, micro residue of primary tumour, questionable diagnosis and those with history of any previous or any other concurrent malignancies were excluded from the study. Thus, a total of 52 patients who fell within the range of inclusion criteria were subjected to the study. The details regarding the age at diagnosis, clinical features including the location of the tumour and other histopathological findings like the type, size of the tumour (diameter) and details regarding immunohistochemistry were obtained from the hospital records. Along with this the status of axillary lymph node and the type of surgery performed were also documented. Only the larger parameter was taken into account in case of multicentric tumour and patients with bilateral presentation were taken into account as one sample size. The pathological findings collected from the patient's record were used for staging of the malignant tumour based on TMN classification of breast cancer.⁴ The collected data was entered in MS excel and SPSS software version 21 was used to analyse the data. The descriptive data were expressed in frequencies and

percentage or mean and standard deviation. Chi square test was used to see the association between variables.

RESULTS

Mean age of the participants was observed to be 42.74 ± 11.8 years. A wide age range was observed, youngest being 23 years old to oldest 72 years. Breast cancer was most commonly observed among those above 51 years of age.

Only 5.76% of the study population had family history of breast carcinoma in first- or second-degree relatives, nulliparity was observed in 4 (7.69%) of the population of which 2 were unmarried and history of infertility was observed 2 patients. In our study majority of the patients had lump on the breast followed by pain, retraction and discharge was seen only in few. The most common location of the tumour was observed to be on the upper outer quadrant.

The mean size of the tumour observed was found to be 4.12 ± 2.09 cm. The mean number of lymph nodes affected in this study population was found to be 4.60. Majority of the study participants were found to have tumour size ranging from 2 cm to 5 cm. 1 to 3 lymph nodes were involved in almost half of the study participants and only one patient was found with metastasis. Majority of the study participants (25.00% and 28.85%) were found to have stage IIB and IIIa of breast cancer respectively. This was followed by stage IIa (19.23%) and IIIC (17.31%).

Of 10 patients who presented with ductal carcinoma *in situ* majority were aged more than 51 years, 8 (80%) had breast lumps, 2 (20%) presented with nipple retraction; tenderness and nipple discharge were seen in 10% each. Majority 60% of these were located on the left side of the breast, almost 90% of the patients had the tumour at either the upper outer, upper inner or the central quadrants. About 90% of these cases were at either stage II or stage III. 50% of the patients presented with luminal A type, followed by luminal B and triple negative 20% each.

Of 38 patients presenting with IDC majority 19 (50%) were >51 years old followed by 41-50 years old 13 (34.21%). Majority 35 (92.11%) of the population presented with breast lump followed by tenderness 5 (13.16%), retraction 2 (5.25%) and discharge 1 (2.63%). Lump on right side 21 (55.26%) was most commonly observed compared to left 17 (44.74%). Almost 20 (52.63%) presented with tumour on upper outer quadrant. 21 (55.26%) patients were diagnosed at stage II of the cancer followed by 16 (42.11%) patients at stage III. The histopathological report revealed 14 (36.84%) presenting with luminal A and 10 (26.32%) presenting with luminal B, followed by triple negative in 9 (23.68%) and HER2 positive in 5 (13.16%).

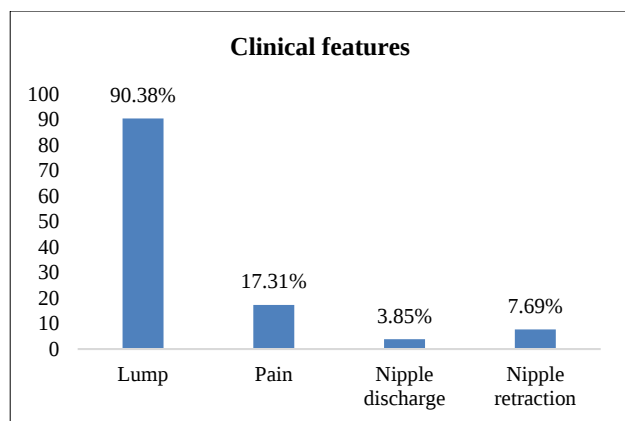


Figure 1: Clinical characteristics of the study participants.

Table 1: Frequency of demographic details and clinical features of the patients.

Characteristics		Frequency N (%)
Age category (years)	Less than 40	10 (19.24)
	40-50	16 (30.76)
	More than 51	26 (50)
Family history of breast cancer	Present	3 (5.76)
	Absent	49 (94.24)
Nulli parity	Present	4 (7.69)
	Absent	48 (92.31)
Clinical features	Breast lump	47 (90.38)
	Tenderness	9 (17.31)
	Nipple discharge	2 (3.85)
	Nipple retraction	4 (7.69)
Side of tumour	Right	27 (51.92)
	Left	24 (46.16)
	Bilateral	1 (1.92)
Location of tumour	Upper outer quadrant	25 (48.08)
	Central	9 (17.32)
	Lower outer quadrant	7 (13.46)
	Upper inner quadrant	6 (11.53)
	Lower inner quadrant	5 (9.61)

The 4 patients who presented with ILC was equally distributed among 41-50 years group and >51 years category. All 4 (100%) patients presented with lump on the breast and majority 3 (75%) had pain over the breast. One patient had bilateral tumour, one presented with left and 2 patients had tumour over right side. Tumour was present in upper outer quadrant for 2 patients, 1 at the central and 1 at lower inner quadrant. All the patients belonged stage III of the disease at the time of diagnosis. luminal A was observed in 3 patients and triple negative in 1 patient.

Table 2: Frequency of histopathological characteristics of the tumour.

Characteristics		Frequency N (%)
Tumour size (cm)	T1 (<2)	11 (21.15)
	T2 (2-5)	29 (55.77)
	T3 (>5)	10 (19.23)
	T4 (skin or chest wall involvement)	2 (3.85)
Lymph node involvement	N0	3 (5.77)
	N1	28 (53.85)
	N2	12 (23.07)
	N3	9 (17.31)
Metastasis	Present	1 (1.92)
	Absent	51 (98.08)
Breast cancer staging	Stage I	1 (1.92)
	Stage IIA	10 (19.23)
	Stage IIB	16 (25.00)
	Stage IIIA	13 (28.85)
	Stage IIIB	2 (3.8)
	Stage IIIC	9 (17.31)
Surgery	Stage IV	1 (1.9)
	MRM	47 (90.38)
Types	Breast conservative surgery	5 (9.62)
	Ductal carcinoma In-situ (DCIS)	10 (19.23)
	IDC	38 (73.08)
	ILC	4 (7.69)
Receptors	ER positive	34 (65.38)
	PR positive	22 (42.30)
	HER2/neu positive	18 (34.62)
Immunophenotype	Luminal A	22 (42.31)
	Luminal B	12 (23.08)
	HER2 positive	6 (11.53)
	Triple negative	12 (23.08)

Of all the clinical features identified nipple discharge was only present in 2 patients who presented with stage IIb of breast carcinoma and nipple retraction was observed 50% in stage II and 50% in stage III of breast carcinoma. Presence of bilateral breast carcinoma was found only in 1 patient who presented with stage IIIa. Of all those who underwent breast conservative surgery 20% had stage I and stage II was seen in 80% of the cases while of those who underwent modified mastectomy 22 (46.81%) had stage II disease, 24 (51.06%) had stage III and 1 (2.13%) had stage IV disease and was found to be statistically significant (0.019).

There was only one patient reported with stage I of the disease, aged <40 years, presenting with lump on the

right breast in the upper outer quadrant, with no pain or discharge and had undergone breast conservative surgery. The histopathological report revealed the cancer to be ductal carcinoma in-situ and luminal B type. Of the 10 patients diagnosed at stage IIa of the disease 4 (40%) belonged to <40 years of age and rest of the patients were equally distributed among 41-50 year and >51 year age category. All the patients had breast lump and only one had nipple retraction. 6 (60%) patients had tumor over right side and rest 4 (40%) had over left. The location of the tumour was found to be outer quadrant in 7 (70%)

patients and majority 80% of the patients underwent modified radical mastectomy and conservative breast surgery was done only in 2 patients. 16 patients presented with stage IIb majority 9 (56.25%) were aged more than 41 years and breast lump was the common finding observed in 14 (87.5%) cases. Tenderness and nipple discharge were seen in 2 (12.5%) each, and one patient presented with nipple retraction. Tumour was found in the central quadrant in 4 (25%) of the cases and was distributed equally among other quadrants. Only 2 (12.5%) underwent breast conservative surgery and rest of the 14 (87.5%) had modified mastectomy done.

Table 3: Association between the baseline characteristics of the patient and the type of breast carcinoma.

Characteristics		DCIS N (%)	IDC N (%)	ILC N (%)	P value
Age category (years)	<40	4 (40)	6 (60)	0 (00)	0.203
	41-50	1 (6.25)	13 (81.25)	2 (12.5)	
	>51	5 (19.25)	19 (73.07)	2 (7.68)	
Family history of breast cancer		1 (33.33)	1 (33.33)	1 (33.33)	0.154
Nulli parity		1 (25)	2 (50)	1 (25)	0.354
Clinical findings	Breast lump	8 (17.02)	35 (74.47)	4 (8.51)	0.382
	Tenderness	1 (11.11)	5 (55.56)	3 (33.33)	0.006
	Nipple discharge	1 (50)	1 (50)	0 (00)	0.513
	Nipple retraction	2 (50)	2 (50)	0 (00)	0.249
Tumour side	Right	4 (14.81)	21 (77.78)	2 (7.41)	0.010*
	Left	6 (25)	17 (70.83)	1 (4.17)	
	Bilateral	0 (00)	0 (00)	1 (100)	
Location of tumour	Upper outer quadrant	3 (12)	20 (80)	2 (8)	0.350
	Central	3 (33.33)	5 (55.59)	1 (11.11)	
	Lower outer quadrant	1 (14.29)	6 (85.71)	0 (00)	
	Upper inner quadrant	3 (50)	3 (50)	0 (00)	
	Lower inner quadrant	0 (00)	4 (80)	1 (20)	
Breast cancer staging	Stage I	1 (100)	0 (00)	0 (00)	0.340
	Stage IIA	1 (10)	9 (90)	0 (00)	
	Stage IIB	4 (25)	12 (75)	0 (00)	
	Stage IIIA	2 (13.33)	10 (66.67)	3 (20)	
	Stage IIIB	2 (22.22)	6 (66.67)	1 (11.11)	
	Stage IV	0 (00)	1 (100)	0 (00)	
Immunophenotype	Luminal A	5 (22.73)	14 (63.64)	3 (13.63)	0.786
	Luminal B	2 (16.67)	10 (83.33)	0 (00)	
	HER2 positive	1 (16.67)	5 (83.33)	0 (00)	
	Triple negative	2 (16.67)	9 (75)	1 (8.33)	

P value <0.05 is considered to be statistically significant.

Table 4: Association between the baseline characteristics of the patient and the staging of the tumor.

Characteristics		Stage IIa N (%)	Stage IIb N (%)	Stage IIIa N (%)	Stage IIIb N (%)	P value
Age category (years)	< 40 years	4 (40)	3 (30)	2 (20)	0 (00)	0.267
	41 yrs – 50 yrs	3 (18.75)	4 (25)	6 (37.5)	3 (18.75)	
	> 51 yrs	3 (11.54)	9 (34.62)	7 (26.92)	6 (23.08)	
Clinical findings	Breast lump	10 (21.28)	14 (29.79)	14 (29.79)	7 (14.89)	0.665
	Tenderness	0 (00)	2 (22.22)	4 (44.45)	3 (33.33)	0.220
Tumor side	Right	6 (22.22)	8 (29.63)	5 (18.52)	6 (22.22)	0.657
	Left	4 (16.67)	8 (33.33)	9 (37.5)	3 (12.5)	
Location of	Upper outer quadrant	3 (12)	3 (12)	12 (48)	6 (24)	0.088

Continued.

Characteristics		Stage IIa	Stage IIb	Stage IIIa	Stage IIIb	P value
tumour	Central	1 (11.11)	4 (44.44)	2 (22.22)	1 (11.11)	
	Lower outer quadrant	4 (57.14)	3 (42.86)	0 (00)	0 (00)	
	Upper inner quadrant	1 (16.67)	3 (50)	0 (00)	2 (33.33)	
	Lower inner quadrant	1 (20)	3 (60)	1 (20)	0 (00)	
Surgery	Breast conservative surgery	2 (40)	2 (40)	0 (00)	0 (00)	0.019*
	Modified Radical Mastectomy	8 (17.02)	14 (29.79)	15 (31.91)	9 (19.15)	

P value <0.05 is considered to be statistically significant.

Of 15 patients who presented with stage IIIa only 2 were under 40 years of age. 14 (93.33%) presented with breast lump, 4 (26.67%) had complaints of pain and nipple retraction was present in 1 patient. Majority of these tumour was on identified on left breast. Upper outer quadrant was the most common 12 (80%) location in which the tumour was located. All 15 patients underwent modified radical mastectomy. 6 (66.67%) out of 9 patients who presented with stage IIIb were >51 years old. 7 (77.78%) patients presented with breast lump, 3 (33.33%) with tenderness and 1 (11.11%) had nipple retraction. Majority 6 (66.67%) of these were observed to be on right breast. The tumour was located in the upper outer quadrant in 6 (66.67%) patients, 20 (22.22%) patients had it on upper inner quadrant and only one had it at the central quadrant. All these patients underwent MRM. Stage IV was observed in only one patient who presented with lump on the right breast at the central quadrant and underwent toilet mastectomy.

DISCUSSION

In our study majority of the participants (50%) were aged >51 years followed by 30.76% belonging to the age group of 41 to 50 years and 19.24 under 40 years of age. Though the study done by Obeidat et al in Jordan showed majority (46.6%) of the participants to be 40-55 years old followed by 42.3% of the participants aged more than 55 years; a study done by Afsharfard et al showed majority 33.18% were 41-50 years and few other Indian studies done by Sandhu et al and Surakasula et al showed similar results as our study.⁵⁻⁸ The mean age was found to be 42.74±11.8 years which was almost similar to the study done by Missaoui et al in Tunisia, Afsharfard et al in Iran, Sandhu et al and Surakasula et al having the mean values of 48 years, 49.35±13.1 years, 47.39±10.90 years and 47.7 respectively.⁶⁻⁹ Our results were mildly lower than few studies which had participants with mean age of 51.6±12.6 in a study done by Ozmen et al in Turkey and 52.6±10.5 years in a study done by Takalkar et al in west part of India.^{10,11} In our study the age range was 23 to 72 years, which was almost similar to other studies ranging 28 years to 85 years and 24 and 80 years respectively.^{8,11} 15.2% and 14.81% of the study participants were found to be nulliparous but our study showed only 7.69% which was similar to a study showing 6.92% of nulliparity.^{7,9,11} He also observed family history of breast cancer in 1.5%

of the study population, whereas 5.76% of our study participants were found to have positive family history, though there was nil family history observed in the study done by Sandhu et al.⁷

In our study presence of tumor on the right breast 51.92% was slightly higher than those on left 46.16% which was similar to the Indian study showing 51% on right and 49% on left.⁸ But other studies showed slight higher incidence on left 51%, 50.77% and 51.6% compared to right 48%, 49.23% and 47.4%.^{6,7,9,11} In our study with majority of the tumor located in the upper outer quadrant 48.08% which was almost similar to the studies showing 31.7% and 52.6%.^{6,9} Our study showed breast lump in 90.38% of the patients which was similar to 87.9% and all patients in Takalkar et al study.^{7,11} A slight lower 67% was observed in a study which also showed 20% presenting with pain which was found to be similar to 17.31% in our study.⁸

DCIS was observed in 19.23% of the participants in our study compared to 2.4% in a study done by Missaoui et al which also showed the IDC to be the most common one which was similar to 73.08 observed in our study, 74.3%, 79.5%, 80.4%, 85% and 99.24% observed in other studies.^{5,6,8-11} Though ILC was observed only in 4.8% of study participants in a study, our study showed 7.69 presenting with ILC similar to 7.4% in turkey and 8% in a study done in India.^{5,8,10}

In a study the mean size of primary tumor was 3.94±2.47cm which was almost similar to our observation of 4.12±2.09 cm of mean size, with 21.15% <2 cm, 55.77% having 2-5 cm and 23.08% having >5 cm of size which was almost similar to the study done by Obeidat et al.^{5,6} In our study the mean number of lymph nodes involved were 4.60 compared to 11.9%.⁶ Though other studies showed majority 36.6% and 50% of participants having no lymph nodes involved, our study had majority 53.85% with 1-5 nodes involve and only 5.77% with no lymph node involvement which was similar to the Indian study 1.7%.^{6,7,10} The most common stage of presentation observed in our study was IIB 30.77%, similar to 27% in a study done by Afsharfard et al.⁶

Our study showed 65.38% were positive for ER, 42.30% were positive for PR and 34.62% were positive for

HER2, the three biomarkers which was important for the modality of the treatment received post-surgery. Almost similar results were obtained from the study done by Obeidat et al and Ozmen et al which also showed majority falling under luminal A category followed by luminal B, triple negative and HER2 positive similar to our study.^{5,10} 90.38% of our study participants underwent MRM similar to other studies showing 79.8, 80.6% and 92%.⁷⁻⁹ Though there were other studies showing only 48.8% undergoing MRM.⁶

The limitation of this study was that it was performed with only limited number of data obtained and lack of details on certain factors like menopausal state.

CONCLUSION

In our study the incidence of breast carcinoma was more in those aged >51 years and majority presented with lump on the breast with IDC and underwent MRM. With the data available the association with baseline characteristics were established. More studies should be conducted on these aspects with adequate data in order to serve as a baseline to set up national policies for adequate preventive measures and treatment modalities.

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REFERENCES

1. WHO. Fact sheet: Breast cancer. Available at: <https://www.who.int/news-room/fact-sheets/detail/breast-cancer>. Accessed on 20 December 2022.
2. WHO. Fact sheet: Current and future burden of breast cancer: global statistics for 2020 and 2040, 2022. Available at: <https://www.iarc.who.int/news-events/current-and-future-burden-of-breast-cancer-global-statistics-for-2020-and-2040/>. Accessed on 20 December 2022.
3. Mint. Fact sheet: India's cancer burden to rise to 29.8 million in 2025: ICMR report. Available at: <https://www.livemint.com/science/health/indias-cancer-burden-to-rise-to-29-8-million-in-2025-icmr-report-11652382169284.html>. Accessed on 20 December 2022.
4. Cancer.Net. fact sheet: Breast cancer-stages. Available at: <https://www.cancer.net/cancer-types/breast-cancer/stages#:~:text=Using%20the%20TNM%20system%2C%20the,a%20standard%20pen%20or%20pencil>. Accessed on 20 December 2022.
5. Obeidat F, Ahram M, AlKhader A, Battah K, Alchalabi M, Melhem JM, et al. Clinical and histopathological features of breast cancer in Jordan: experience from a tertiary care hospital. JPMA. 2017;67(1206).
6. Afsharfard A, Mozaffar M, Orang E, Tahmasbpour E. Trends in epidemiology, clinical and histopathological characteristics of breast cancer in Iran: results of a 17 year study. Asian Pac J Cancer Prevent. 2013;14(11):6905-11.
7. Sandhu DS, Sandhu S, Karwasra RK, Marwah S. Profile of breast cancer patients at a tertiary care hospital in north India. Ind J Cancer. 2010;47(1):16.
8. Surakasula A, Nagarjunapu GC, Raghavaiah KV. A comparative study of pre-and post-menopausal breast cancer: risk factors, presentation, characteristics and management. J R Pharm Pract. 2014;3(1):12.
9. Missaoui N, Jaidene L, Abdelkrim SB, Abdelkader AB, Beizig N, Yaacoub LB, et al. Breast cancer in Tunisia: clinical and pathological findings. Asian Pac J Cancer Prev. 2011;12(1):169-72.
10. Özmen V. Breast cancer in Turkey: clinical and histopathological characteristics (analysis of 13.240 patients). J Breast Health. 2014;10(2):98.
11. Takalkar UV, Asegaonkar SB, Kulkarni U, Kodlikeri PR, Kulkarni U, Saraf M, et al. Clinicopathological profile of breast cancer patients at a tertiary care hospital in marathwada region of Western India. Asian Pac J Cancer Prevent. 2016;17(4):2195-8.

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