Section: General Surgery

Original Research Article

A COMPREHENSIVE STUDY OF BREAST LUMPS IN FEMALES BELOW 45 YEARS OF AGE IN TERTIARY CARE CENTRE

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ABSTRACT

Background: Breast lumps in women under 45 years require careful evaluation because both benign and malignant lesions occur in this age group. Younger women may develop aggressive tumours despite a lower overall incidence. This study assessed the clinical, demographic, imaging, and pathological patterns of breast lumps in females below 45 years to identify distribution trends and malignancy-related indicators. **Materials and Methods:** A prospective observational study was conducted on 133 women under 45 presenting with palpable breast lumps at a tertiary care centre over 12 months. Data on demographics, reproductive history, clinical features, ultrasound findings, and cytology or histopathology results were analysed descriptively. **Result:** Most participants were aged 26–45 years, married, and had their menarche at 12–13 years. More than half had two children, and 56.39% had a normal BMI. A total of 93.98% presented with a single lump, predominantly on the right breast (54.14%). Most lumps were mobile (80.45%), non-tender (45.86%), and showed no skin (80.45%) or nipple involvement (82.71%). Ultrasound and clinical findings commonly localised lumps to the upper outer quadrant (32.33%). Final diagnoses revealed fibroadenoma in 51.13%, fibroadenosis in 30.08%, and carcinoma in 18.80% of cases. Warmth and tenderness were present in over half of the patients, while chest wall involvement occurred in 17.29%. **Conclusion:** Benign lesions, particularly fibroadenoma, constitute the majority of breast lumps in younger women, although nearly one-fifth were malignant. These findings emphasise the need for structured clinical examination, ultrasound evaluation, and cytopathological confirmation to ensure accurate diagnosis and guide timely management.

INTRODUCTION

Breast lumps in females under 45 years are an important clinical problem because both benign and malignant causes occur in this age group.[1] Globally, breast cancer is the 2nd most prevalent cancer next to the lungs, and the 4th leading cause of mortality. Among the worldwide estimates, Asia is responsible for 42.9% of the incidences and 47.3% of the mortality rate.[2] Although breast cancer incidence increases with age, younger women also develop malignancy, and they can be influenced by lifestyle, reproductive factors like late childbirth, and genetic mutations.[3] In urban regions, lifestyle factors such as delayed marriage, reduced breastfeeding, and dietary changes influence the breast cancer epidemiology in younger people.[4] Apart from normal lumps, palpable breast lumps require systematic evaluation because they have a high risk of being cancerous and early detection is associated with better outcomes.[5]

Clinical presentations include benign proliferative disorders, malignant neoplasms, inflammatory lesions, and developmental abnormalities. Whereas, fibro adenoma is the most common benign tumour in younger females. It is cytologically characterised by cohesive epithelial clusters, multiple bipolar nuclei, and stromal fragments.[6] Though the benign lesions are frequent in this age group, there is still a high possibility of malignancy, and they require observation and timely evaluation.[7] The possibility of developing breast cancer at the age of 30 is only 0.44% (1 in 228), which is much lower compared to the prevalence in the older age group. However, younger women are associated with aggressive tumours compared to older women or those aged 40 and above.[8]

As for the diagnosis of tumours, ultrasound is preferred in younger women due to increased breast

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density. Mammography may identify microcalcifications, nodules, architectural distortion, or asymmetry, which are common findings in breast cancer cases in this age group.[9] Magnetic resonance imaging can be useful when additional diagnostic clarification is needed. The BI-RADS classification system is commonly used for the malignancy risk stratification. Lesions classified as BI-RADS 4 or 5 require tissue diagnosis because imaging alone cannot reliably distinguish malignant from benign disease. However, advanced disease conditions may present with axillary lymphadenopathy, breast oedema, or skin and nipple changes, indicating the need for a complete clinical assessment.[10]

Fine-needle aspiration cytology (FNAC) is generally used as an initial, minimally invasive diagnostic tool, mostly used in the preoperative assessment of breast lumps.[6] It enables rapid diagnosis and helps in differentiating between benign and malignant tumours, and avoids unnecessary surgical interventions.[5] Histopathological correlation improves diagnostic accuracy and guides clinical management. Core biopsy is useful for indeterminate lesions, including B3 categories, where architectural assessment is essential for treatment planning.[11]

A proportion of young women present late due to a lack of awareness, social barriers, or limited access to medical care.[7] Young women diagnosed with breast lumps face psychosocial problems like anxiety, depression, fertility/relationship concerns and quality-of-life impacts.[12] These psychological problems lead to poor prognosis; therefore, improving breast health education may increase early detection rates and reduce presentations at advanced stages.[7] A multidisciplinary approach, including clinical examination, imaging, and pathology, supports accurate diagnosis and effective treatment.[9] Previous studies suggest that there is a regional variability in clinical, demographic, and pathological features of breast lumps in women under 45. Though there are several studies analysing these parameters among various parts of the world, there's still a lack of such studies in Tamil Nadu. Therefore, this study aimed to assess clinical, demographic, and pathological patterns of breast lumps in women under 45 years and identify related malignancy risk indicators.

MATERIALS AND METHODS

This prospective observational cross-sectional study was conducted on 133 patients for 12 months in the Department of General Surgery, Government Thiruvarur Medical College, Tamil Nadu. Ethical committee approval was obtained before initiating the study, and written informed consent was obtained from all patients.

Sample size calculation

A sample size of 133 was derived using the formula $n = Z^2pq/d^2$, assuming a prevalence (p) of 58.36% based on prior studies, 95% confidence level (Z = 1.96), 10% allowable error, and a 10% non-response rate. Participants were recruited using consecutive sampling from outpatient and inpatient services.

Inclusion Criteria

Female patients <45 years with palpable breast lumps to the outpatient Department or admitted to the Surgical wards.

Exclusion Criteria

Patients >45 years, and with FNAC-confirmed malignancy, and suspected of malignancy without a palpable breast lump were excluded.

Methods: Clinical history was taken from all participants, followed by a focused breast examination carried out by the treating clinician. Demographic details and presenting symptoms were documented during patient interviews and physical assessment. Ultrasound of both breasts and axilla was performed to describe lump size, margins, and nodal features. All ultrasound examinations were performed by a radiologist using a high-frequency linear transducer (7–12 MHz). Fine-needle aspiration cytology and, where indicated, core biopsy or excision histopathology were used to confirm diagnosis. Information from imaging and laboratory investigations was recorded as part of routine evaluation for each patient. Patients with lesions suggestive of benign pathology underwent FNAC, and excision biopsy was done when confirmation needed. Lesions suspected of malignancy were evaluated with Tru-Cut or incision biopsy to obtain tissue samples for histopathological diagnosis. Diagnostic steps were completed before the planning of definitive treatment.

Primary outcome: cytological/histopathological diagnosis. Secondary outcomes: quadrant location, presenting characteristics, and associated risk factors.

Statistical analysis: Data were analysed using SPSS software (version 25). Categorical variables were summarised as frequencies and percentages. Statistical significance was defined as $p < 0.05$.

RESULTS

A total of 133 eligible patients were included in the final analysis. No exclusions or missing data were noted after enrolment. The most common age group was 36–45 years (37.6%), and nearly half of the participants held an undergraduate qualification (48.1%). Most women were married (73.7%), and the majority reported onset of menarche at 12–13 years (76.7%). More than half had two children (51.1%), and contraceptive use was reported by 38.3% of women. Most participants had a normal BMI (56.4%), and chronic comorbidities such as diabetes (20.3%) and hypertension (18.3%) were less frequent. Prior radiation exposure was reported in only 16.5% of the cases [Table 1].

Most women presented with a single breast lump (93.98%), while the lumps were frequent in the right breast (54.14%) compared to the left (45.11%). The majority showed no skin changes (80.45%), and

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nipple involvement was also uncommon (17.29%). Most lumps were mobile (80.45%), and chest wall involvement was identified in 17.29% of women. Warmth was present in 52.63%, and tenderness in 54.14% of the patients [Table 2].

Table 1: Distribution of demographic, reproductive, and health characteristics

Parameters	Categories	N (%)
Age group (years)	16–25	35 (26.32%)
	26–35	48 (36.09%)
	36–45	50 (37.59%)
Educational status	Primary school	13 (9.77%)
	High school	21 (15.79%)
	Diploma	29 (21.80%)
	Undergraduate	64 (48.12%)
	Postgraduate	6 (4.52%)
Occupational status	Professional	21 (15.79%)
	Teacher	13 (9.77%)
	Labourer	12 (9.02%)
	Homemaker	47 (35.34%)
	Unemployed	40 (30.08%)
Marital status	Married	98 (73.68%)
	Unmarried	35 (26.32%)
Age at menarche (years)	10	4 (3.01%)
	11	20 (15.04%)
	12	60 (45.11%)
	13	42 (31.58%)
	14	7 (5.26%)
Number of children	Nil	36 (27.07%)
	One	17 (12.78%)
	Two	68 (51.13%)
	Three	12 (9.02%)
Contraceptive use duration (years) (n = 51)	<1 year	25 (18.80%)
	1–3	23 (17.29%)
	>3	3 (2.26%)
Radiation exposure	Yes	22 (16.54%)
	No	111 (83.46%)
Comorbidities	Diabetes present	27 (20.30%)
	Hypertension present	24 (18.32%)
BMI category	Normal	75 (56.39%)
	Overweight	56 (42.11%)
	Obese	2 (1.50%)

Table 2: Clinical characteristics of breast lumps

Parameters	Categories	N (%)
Number of breast lumps	One	125 (93.98%)
	Two	7 (5.26%)
	Three	1 (0.75%)
Laterality	Right breast	72 (54.14%)
	Left breast	60 (45.11%)
	Bilateral	1 (0.75%)
Skin changes	Normal	107 (80.45%)
	Abnormal	26 (19.55%)
Nipple involvement	Involved	23 (17.29%)
	Not involved	110 (82.71%)
Mobility	Mobile	107 (80.45%)
	Immobile	26 (19.55%)
Chest wall involvement	Present	23 (17.29%)
	Absent	110 (82.71%)
Warmth	Present	70 (52.63%)
	Absent	63 (47.37%)
Tenderness	Present	72 (54.14%)
	Absent	61 (45.86%)

Most breast lumps were located in the upper outer quadrant (32.33%), followed by the upper inner quadrant (28.57%). Fibroadenoma was the common finding (51.13%), followed by fibroadenosis (30.08%) and carcinoma (18.80%) [Table 3].

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Table 3: Quadrant and diagnosis distribution of breast lumps (n = 133)

Parameters	Categories	N (%)
Quadrant of breast lump	Upper outer quadrant	43 (32.33%)
	Upper inner quadrant	38 (28.57%)
	Lower outer quadrant	30 (22.55%)
	Lower inner quadrant	22 (16.55%)
Final diagnosis	Fibro adenoma	68 (51.13%)
	Fibroadenosis	40 (30.08%)
	Carcinoma	25 (18.80%)

DISCUSSION

Breast lumps are a common clinical presentation in young women and may range from benign conditions to malignant lesions. This study assessed the demographic profile, clinical characteristics, imaging features, and pathological patterns of breast lumps in females below 45 years of age, to identify distribution and the malignancy-related indicators. Most women showed with a single, mobile lump located predominantly in the upper outer quadrant, while fibroadenoma and fibroadenosis were the common benign findings. The study highlights importance of including clinical examination, ultrasound assessment, and cytopathology to confirm accurate diagnosis and timely management of breast lumps in this population.

Most patients were aged 26–45 years, married, and the common age at menarche was between 12 to 13 years. Most had two children and a normal BMI; however, many did not use contraceptives for long, and only a few reported radiation exposures, diabetes, and hypertension. Similarly, Sangma et al. observed that the majority of patients belonged to the 21–40-year age group (75%).[13] Das et al. analysed 364,556 Indian women aged 30–49 years and reported that 75.5% had menarche between 13–15 years, while only 20.16% had early menarche (<13 years). 37% had two live births, and 25% had three, whereas only 6% used oral contraceptive pills. About 57.8% of women had a normal BMI range, and 90.62% of women were married.[14] The systematic review by Maurya & Brahmachari reports that younger menarche (< 13 years), parity, higher age at first childbirth, menopause and breastfeeding duration as important risk factors for breast cancer. Though hormonal risk factors have an association with estrogen receptor-positive tumours, the use of contraceptive pills and abortion was not associated with breast cancer.[15] Though our findings, like age group, marital status, BMI status and number of children, were comparable to previous studies. Some parameters, such as age of menarche and use of contraceptives, were contrast to previous studies; however, most studies did not report the educational or comorbidity status. The variations observed across the findings may be due to the changes in the population and their ideologies among them. Although reproductive and hormonal factors are known to influence breast cancer risk in other studies, the present study was descriptive and did not evaluate causal associations. Therefore, these observations should be interpreted cautiously and warrant further analytical research.

In our study, most patients presented with a single breast lump, which was right-sided and a few reported skin changes, chest wall and nipple involvement. Most lumps were mobile, warm and tender. Ahmed et al. reported an equal distribution of right and left-sided lesions (46.6% and 51.6%), 58% did not have pain, and most did not experience nipple involvement, skin involvement or weight loss (88.3%, 80% and 90%).[16] Nezam et al. reported that most benign lumps were mobile and painless in 68% cases, and only 2% had nipple involvement.[17] Thus, the findings suggest that most patients with benign breast diseases usually present with a single lump, which can be either left or right-sided. Most of these lumps are mobile, warm and tender in nature, while a few cases can have skin or nipple involvement. Our findings reaffirm the clinical principle that mobility, absence of skin/nipple changes, and unilateral presentation are more consistent with benign pathology, although these features cannot reliably exclude malignancy.

In our study, most breast lumps were located in the upper outer quadrant, followed by the upper inner quadrant, and fibroadenoma was the predominant diagnosis, with fibroadenosis and carcinoma observed in the rest. These findings are consistent with several published studies. Similarly, Sothu et al. reported that the upper outer quadrant was the most common site of presentation (42%), with fibroadenoma being the common diagnosis (88%).[18] Kumar et al. also observed that fibroadenoma was the common in the 15-25 years age group, whereas fibrocystic disease of the breast was common in the 26-35 years age group.[19] Muneiah et al. analysed 100 breast lump cases and reported that the upper outer quadrant (50.6%) was frequently involved, and 75% were benign lesions, in which 76% were fibroadenoma, while the rest 25% were carcinomas.[20] Thus, indicating that the upper outer quadrant is the most common location for palpable breast lumps. Though fibroadenoma is diagnosed in most women under 45, there is still a high risk of malignancies. Although benign lesions predominated, nearly one-fifth of cases were malignant, emphasising the importance of prompt diagnostic assessment even in younger women.

Our findings show that early evaluation and an appropriate diagnostic approach to breast lumps in women below 45 years can improve the timely identification of both benign and malignant conditions. Clinical management of breast lumps in

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younger females should include breast examination, ultrasound, and cytopathological confirmation for accurate diagnosis and avoid delays in identifying malignancy. This can reduce anxiety, prevent late presentations, and improve overall treatment outcomes.

This study provides region-specific evidence from Tamil Nadu with systematic assessment using clinical examination, ultrasound, and cytopathology in all patients, improving diagnostic validity. Analytical studies assessing risk factor associations and long-term follow-up of younger women with benign lesions are recommended to better understand progression and recurrence patterns.

Limitations

The cross-sectional design does not allow assessment of temporal relationships or risk prediction. As the study was conducted in a single institution, results may not reflect wider populations. Some exposures, including contraceptive use or previous radiation, relied on patient recall and may be imprecise. The lack of follow-up also limits evaluation of treatment outcomes or changes in diagnosis over time.

CONCLUSION

Among women younger than 45 years presenting with breast lumps, solitary and mobile masses were most common, primarily involving the upper outer quadrant. Fibroadenoma constituted the predominant benign finding, while malignant tumours were detected in approximately one-fifth of cases. Although clinical features often suggested benign disease, the occurrence of carcinoma emphasises the importance of timely clinical evaluation, breast imaging, and cytopathological confirmation in this age group. These results add region-specific evidence to the spectrum of breast lump presentations in younger women and highlight the value of accessible early assessment in routine practice. Given the single-centre design and descriptive nature of this analysis, multicentre studies with longitudinal follow-up are recommended to better understand outcomes and disease progression.

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