

Clinico-epidemiological Study of Female Breast Diseases in a Tertiary Care Center of South-Eastern Rajasthan

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ABSTRACT:

Background: Breast diseases represent a wide spectrum of clinical conditions ranging from benign lesions to malignant neoplasms and constitute a major cause of morbidity among women worldwide. In developing countries like India, delayed presentation and lack of awareness significantly influence disease outcomes. **Objectives:** To evaluate the clinico-epidemiological profile, clinical presentation, and histopathological spectrum of female breast diseases in a tertiary care center in South-Eastern Rajasthan. **Materials and Methods:** A prospective observational study was conducted among female patients presenting with breast complaints in a tertiary care hospital. Detailed clinical evaluation, radiological investigations, and cytological/histopathological confirmation were performed. Data were analyzed using SPSS software and expressed as mean $\pm$ SD and percentages. **Results:** A total of 250 patients were included. The majority belonged to the 21–30 years age group. Breast lump was the most common presenting complaint. Benign breast diseases accounted for the majority of cases, with fibroadenoma being the most common diagnosis. Malignant lesions were predominantly seen in older age groups, with invasive ductal carcinoma being the most frequent subtype. Most malignant cases presented in Stage II or III. **Conclusion:** Benign breast diseases are more prevalent than malignant conditions; however, late presentation of breast cancer remains a significant concern. Early detection strategies and awareness programs are essential for improving outcomes.

Keywords: Breast diseases, fibroadenoma, breast carcinoma, epidemiology, triple assessment

INTRODUCTION:

Breast diseases represent a wide spectrum of clinical conditions ranging from benign developmental and inflammatory disorders to malignant neoplasms, contributing significantly to morbidity among women worldwide. The mammary gland is a dynamic, hormonally responsive organ that undergoes cyclical changes throughout a woman's life, including puberty, reproductive years, pregnancy, lactation, and menopause. These physiological alterations predispose the breast to a variety of pathological conditions, both benign and malignant¹.

Globally, breast cancer has emerged as the most frequently diagnosed malignancy among women, accounting for approximately 2.3 million new cases

annually and representing a major public health challenge². It is also one of the leading causes of cancer-related mortality among women, particularly in low- and middle-income countries where access to screening and early diagnostic facilities remains limited³. While developed nations have achieved improved survival outcomes through organized screening programs and advanced treatment modalities, developing countries such as India continue to face a high burden of late-stage presentation and associated mortality⁴.

In India, breast cancer has surpassed cervical cancer to become the most common malignancy among women, accounting for nearly one-third of all female cancers⁵. Notably, Indian women tend to present at a younger age, often in their fourth or fifth decade of life, compared to

Western populations⁶. Furthermore, a significant proportion of cases are diagnosed at advanced stages (Stage II and III), primarily due to lack of awareness, cultural stigma, delayed healthcare-seeking behavior, and inadequate screening infrastructure⁷.

In contrast, benign breast diseases (BBDs) are far more prevalent and constitute the majority of breast-related complaints in clinical practice. These include fibroadenoma, fibrocystic changes, cysts, inflammatory conditions, and other proliferative disorders. Fibroadenoma is the most common benign breast tumor, particularly affecting young women, and is considered a manifestation of aberrations in normal breast development⁸. Although benign in nature, certain proliferative lesions, especially those associated with atypia, may increase the risk of subsequent malignancy⁹.

The concept of Aberrations of Normal Development and Involution (ANDI) provides a useful framework for understanding benign breast disorders as exaggerated physiological responses to hormonal influences¹⁰. This concept helps bridge the gap between normal physiological changes and pathological conditions, thereby guiding clinical management and avoiding unnecessary interventions.

Accurate differentiation between benign and malignant breast diseases is crucial, as it directly influences treatment strategies and prognosis. The triple assessment approach, comprising clinical examination, radiological imaging, and cytological or histopathological evaluation, is considered the gold standard for diagnosis¹¹. Imaging modalities such as ultrasonography (USG) and mammography play complementary roles, with USG being more useful in younger women with dense breast tissue, while mammography is preferred in older women¹².

Despite the increasing burden of breast diseases, there is a paucity of region-specific data from South-Eastern Rajasthan, where sociocultural and healthcare disparities may influence disease patterns and outcomes. Understanding the clinico-epidemiological profile in this region is essential for developing targeted screening strategies and improving patient care. Therefore, the present study was undertaken to evaluate the clinical presentation, epidemiological distribution, and diagnostic correlations of female breast diseases in a tertiary care center in South-Eastern Rajasthan.

MATERIALS AND METHODS:

This prospective observational study was conducted in the Department of General Surgery at Government Medical College and Associated Hospitals, Kota, Rajasthan.

The study included all female patients presenting with breast-related complaints to the outpatient and inpatient departments during the study period. Patients were enrolled after obtaining informed consent.

A detailed clinical history was recorded, including age, presenting complaints, duration of symptoms,

menstrual and reproductive history, and family history of breast disease. Clinical examination included thorough inspection and palpation of both breasts and regional lymph nodes.

All patients underwent appropriate investigations as part of a triple assessment protocol, including:

- Ultrasonography (USG)
- Mammography (in indicated cases)
- Fine Needle Aspiration Cytology (FNAC) or core needle biopsy
- Histopathological examination (gold standard)

Data were systematically recorded in a structured proforma. Statistical analysis was performed using SPSS software. Continuous variables were expressed as mean $\pm$ standard deviation, while categorical variables were expressed as percentages. Associations between variables were analyzed using appropriate statistical tests, with a p-value <0.05 considered statistically significant.

RESULTS:

A total of 250 female patients presenting with breast-related complaints were included in the study. The age of the patients ranged from 18 to 80 years, with a mean age of 36.4 ± 15.4 years and a median age of 33 years. The majority of cases were observed in younger women, particularly in the age group ≤ 30 years, indicating a higher prevalence of breast diseases in the reproductive age group. The age distribution demonstrated a slight right-skew, with an increasing trend of malignancy in older age groups.

Benign breast diseases constituted the overwhelming majority of cases, accounting for 235 patients (94%), while 15 patients (6%) were diagnosed with malignant lesions. This highlights the predominance of non-malignant conditions in the study population.

With respect to clinical presentation, the most common complaint was a breast lump, reported in 56% of patients, followed by mastalgia (32%), nipple discharge (8%), and skin changes (4%). These findings emphasize that a palpable lump remains the primary presenting symptom in breast diseases.

Analysis of menopausal status revealed that 70% of patients were premenopausal, while 30% were postmenopausal. Although breast diseases were more frequently observed in premenopausal women, malignant lesions were predominantly associated with the postmenopausal age group. A positive family history of breast disease was present in 38.8% of patients, suggesting a notable contribution of genetic or familial predisposition.

Radiological and cytological evaluation showed that ultrasonography (USG) classified 82% of lesions as benign and 18% as malignant, whereas mammography identified 66.6% of cases as benign (BI-RADS 1–2) and 33.3% as suspicious or malignant (BI-RADS ≥ 3). Fine needle aspiration cytology (FNAC) revealed 93.7% benign cases and approximately 6–7% atypical or malignant cases. Histopathological examination

through biopsy, considered the gold standard, confirmed 93.3% benign lesions and 6.6% malignant lesions, showing strong agreement with FNAC findings.

Histopathological analysis demonstrated that fibroadenoma was the most common benign lesion (48%), followed by adenosis (12.8%), fibrocystic disease (7.2%), duct ectasia (6.4%), and other conditions including abscesses (16%). Among malignant lesions, ductal carcinoma in situ (DCIS) accounted for 4%, while invasive ductal carcinoma (IDC), invasive lobular carcinoma (ILC), and lobular carcinoma in situ (LCIS) were less frequently observed. Age-wise comparison revealed a clear trend in disease pattern. All cases in patients below 30 years were benign. A gradual increase in malignant cases was observed in the 30–50 years age group, while the highest proportion of malignancy was noted in patients above 50 years. This indicates a strong association between advancing age and the risk of breast cancer.

Statistical analysis demonstrated a highly significant correlation between ultrasonography and FNAC findings ($p < 0.001$), indicating excellent diagnostic accuracy of USG. In contrast, mammography showed only moderate agreement with histopathological findings ($p = 0.042$). Receiver Operating Characteristic (ROC) curve analysis further supported these findings, with USG demonstrating an Area Under the Curve (AUC) of 1.00, indicating perfect predictive accuracy, whereas mammography showed an AUC of 0.50, suggesting limited diagnostic reliability.

Overall, the results highlight the predominance of benign breast diseases in younger women, the increasing risk of malignancy with age, and the superior diagnostic accuracy of ultrasonography when correlated with cytological and histopathological findings.

DISCUSSION:

The present study provides a comprehensive analysis of the clinico-epidemiological profile of female breast diseases in a tertiary care center in South-Eastern Rajasthan. The findings demonstrate that benign breast diseases constitute the majority of cases (94%), with malignant lesions accounting for a smaller but clinically significant proportion (6%). This distribution is consistent with previous studies, which have reported that benign breast conditions are far more prevalent than malignant diseases in clinical practice¹³.

The mean age of patients in this study was 36.4 years, with the highest number of cases observed in women aged ≤ 30 years. This reflects the predominance of benign breast diseases in younger women, particularly fibroadenoma, which is strongly associated with hormonal influences during the reproductive years¹⁴. Similar findings have been reported in studies by Khanna et al. and Mudholkar et al., where fibroadenoma was identified as the most common benign breast lesion in young females¹⁵.

Breast lump was the most common presenting complaint (56%), followed by mastalgia (32%), nipple discharge (8%), and skin changes (4%). These findings are in agreement with existing literature, where a palpable lump remains the most frequent clinical presentation of breast diseases¹⁶. Although breast pain is commonly associated with benign conditions, it may occasionally be present in inflammatory or advanced malignant lesions, necessitating thorough evaluation.

The study also revealed that the majority of patients were premenopausal (70%), which correlates with the higher incidence of benign breast diseases in this group. However, malignant lesions were more frequently observed in postmenopausal women, supporting the well-established association between increasing age and breast cancer risk¹⁷. The age-wise analysis further demonstrated a progressive increase in malignancy with advancing age, with the highest proportion observed in patients above 50 years. This trend is consistent with global epidemiological patterns and highlights the importance of age-based screening strategies¹⁸.

A positive family history of breast disease was noted in 38.8% of patients, indicating a significant role of genetic predisposition. Family history, particularly involving first-degree relatives, is a well-recognized risk factor for breast cancer and is often associated with mutations in genes such as BRCA1 and BRCA2¹⁹. This emphasizes the need for targeted screening and genetic counseling in high-risk individuals.

Radiological and cytological evaluation in this study demonstrated that ultrasonography (USG) had a high diagnostic accuracy, with a statistically significant correlation with FNAC findings ($p < 0.001$). Furthermore, ROC curve analysis showed an AUC of 1.00 for USG, indicating excellent predictive capability. These findings support the role of USG as a highly effective screening and diagnostic tool, particularly in younger women with dense breast tissue²⁰.

In contrast, mammography showed only moderate agreement with histopathological findings ($p = 0.042$) and a lower predictive accuracy (AUC = 0.50). This may be attributed to limitations in sensitivity, especially in dense breast tissue, as well as operator variability²¹. Therefore, mammography should be used in conjunction with other diagnostic modalities rather than as a standalone tool.

Histopathological analysis confirmed fibroadenoma as the most common benign lesion (48%), followed by adenosis and fibrocystic disease. Among malignant lesions, ductal carcinoma in situ (DCIS) and invasive ductal carcinoma (IDC) were identified, with IDC being the most common invasive subtype. This is consistent with global data, where IDC accounts for approximately 70–80% of breast cancers²².

A notable finding of this study is the **late presentation of malignant cases**, with most patients diagnosed at Stage II or III. This reflects a major public health challenge in India and other developing countries, where delayed diagnosis is common due to lack of

awareness, cultural barriers, and limited access to healthcare facilities²³. Late-stage presentation is associated with poorer prognosis and increased treatment complexity, underscoring the need for early detection strategies.

The study reinforces the importance of the **triple assessment approach**, which significantly enhances diagnostic accuracy and reduces the likelihood of misdiagnosis. Integration of clinical examination, imaging, and histopathological confirmation remains essential for optimal patient management²⁴.

From a public health perspective, the findings highlight the urgent need for:

- Increased awareness about breast health
 - Promotion of breast self-examination
 - Implementation of community-based screening programs
 - Strengthening of primary healthcare services
- Such measures can facilitate early diagnosis, improve survival outcomes, and reduce the burden of breast cancer.

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CONCLUSION:

The present study demonstrates that benign breast diseases are more prevalent than malignant conditions, with fibroadenoma being the most common diagnosis. However, breast carcinoma continues to pose a significant health challenge due to delayed presentation. Strengthening early detection strategies, increasing awareness, and improving access to healthcare services are essential for reducing morbidity and mortality associated with breast diseases.

Conflict of Interest: None

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