International Journal of Medical and Pharmaceutical Research

Online ISSN-2958-3683 | Print ISSN-2958-3675
Frequency: Bi-Monthly
Available online on: https://ijmpr.in/

Original Article

Clinicopathological Profile of Breast Lumps and Correlation with FNAC/ Histopathology Findings

Dr T Deepak Meher[1], Dr Syam Babu Katuri[2]

[1]MS General Surgery, Department of General Surgery, Katuri Medical College and Hospital, Guntur, Andhra Pradesh, Pin code :522019, India

[2]MS General Surgery, Department of General Surgery, Arundhati Institute of Medical Sciences, Telangana, Pin code: 500043, India.

Corresponding Author:

Dr T Deepak Meher
MS General Surgery, Department of General Surgery, Katuri Medical College and Hospital, Guntur, Andhra Pradesh, Pin code :522019, India.
Email: deepakmeher2012@gmail.com

Received: 26-05-2026
Accepted: 05-06-2026
Available online: 29-06-2026

ABSTRACT

Introduction: Breast lumps are a common clinical presentation among women and may range from benign lesions to malignant tumors. Early and accurate diagnosis is essential for appropriate management and improved outcomes. Fine Needle Aspiration Cytology (FNAC) and histopathological examination (HPE) are key diagnostic tools used to evaluate breast lesions.

Aims: To study the clinicopathological profile of patients presenting with breast lumps and to evaluate the correlation between FNAC and histopathological findings.

Materials and Methods: The present study was conducted in the Department of General Surgery, Katuri Medical College and Hospital over a period of 1 year. The study population included all patients presenting with clinically palpable breast lumps in the outpatient department as well as admitted cases who met the eligibility criteria during the study period. A total of 100 patients were included in the study as the sample size.

Results: In the present study, a total of 100 patients with breast lumps were evaluated. On histopathological examination (HPE), the majority of lesions were found to be benign, accounting for 70 patients (70%). Malignant lesions were observed in 25 patients (25%), while inflammatory lesions were seen in 5 patients (5%).

Conclusion: FNAC is a simple, rapid, and cost-effective diagnostic tool for evaluating breast lumps. However, histopathological examination remains the gold standard for definitive diagnosis. A combined clinicopathological approach improves diagnostic accuracy and patient management.

Keywords*: Breast lump, FNAC, Histopathology, Fibroadenoma, Breast carcinoma, Clinicopathological correlation*

INTRODUCTION

Breast lumps are one of the most frequent clinical presentations encountered in surgical and gynaecological outpatient departments worldwide. They are a major source of anxiety among patients due to the fear of malignancy, although a significant proportion of breast lumps are benign in nature. The clinical spectrum ranges from simple fibroadenomas and cysts to inflammatory lesions and invasive carcinomas, making accurate evaluation essential for appropriate management (1).

The burden of breast disease is increasing globally, particularly in developing countries, where late presentation and lack of awareness contribute to higher morbidity and mortality associated with breast cancer. Breast cancer is now the most commonly diagnosed cancer in women worldwide and remains a leading cause of cancer-related deaths (2). Early detection and accurate diagnosis of breast lumps play a crucial role in improving survival outcomes and guiding therapeutic decisions.

Clinically, the evaluation of a breast lump begins with a thorough history and physical examination. However, clinical assessment alone has limitations in differentiating benign from malignant lesions, particularly in small, non-palpable, or deep-seated masses (3). Therefore, imaging modalities such as ultrasonography and mammography are commonly employed as adjuncts. Despite advances in imaging, tissue diagnosis remains the gold standard for definitive evaluation.

Fine Needle Aspiration Cytology (FNAC) has emerged as a simple, minimally invasive, cost-effective, and rapid diagnostic tool for evaluating breast lumps. FNAC allows for cytological assessment of breast lesions with minimal discomfort to the patient and can often provide a preliminary diagnosis in outpatient settings (4). It is especially useful in distinguishing cystic from solid lesions and benign from malignant pathology. However, FNAC has certain limitations, including inadequate sampling, indeterminate results, and difficulty in distinguishing in-situ from invasive carcinomas (5).

Histopathological examination (HPE), on the other hand, remains the definitive diagnostic modality for breast lesions. It provides architectural details of tissue, allowing accurate classification of lesions and grading of malignancies. HPE is considered the gold standard against which cytological findings are compared (6). Although it is more invasive and time-consuming than FNAC, its diagnostic accuracy is significantly higher.

The concept of clinicopathological correlation plays a vital role in breast lump evaluation. Correlating clinical findings with FNAC and histopathology improves diagnostic accuracy and reduces false-positive and false-negative rates. Several studies have demonstrated a high degree of concordance between FNAC and histopathological diagnosis, particularly in clearly benign or malignant lesions (7). However, discrepancies may arise in borderline lesions, proliferative breast diseases, and cases with inadequate cytological sampling.

Fibroadenoma is the most common benign breast tumor, particularly affecting young women in the reproductive age group. It typically presents as a painless, mobile, and well-circumscribed lump. In contrast, invasive ductal carcinoma is the most common malignant breast tumor, often presenting as a hard, irregular, and fixed mass with possible skin or nipple changes (8). Differentiating between these entities is crucial for timely intervention.

The accuracy of FNAC depends on multiple factors, including the experience of the cytopathologist, lesion characteristics, and sampling technique. Studies have reported sensitivity ranging from 80% to 95% and specificity exceeding 90% in experienced hands (9). Despite these high values, histopathology remains indispensable, particularly for confirmatory diagnosis and treatment planning.

In resource-limited settings, FNAC serves as an important first-line diagnostic tool due to its affordability and accessibility. When used in conjunction with clinical examination and imaging (the “triple assessment approach”), diagnostic accuracy improves significantly, reducing unnecessary surgical biopsies (10). This integrated approach is widely recommended for the evaluation of breast lumps.

The aim of this study is to evaluate the clinicopathological profile of patients presenting with breast lumps and to assess the diagnostic accuracy of Fine Needle Aspiration Cytology (FNAC) by correlating its findings with histopathological examination (HPE), which is considered the gold standard. The objective is to analyze the distribution of benign and malignant breast lesions, identify the most common pathological patterns, and determine the sensitivity and specificity of FNAC in diagnosing breast lumps. Additionally, the study seeks to assess the degree of concordance between FNAC and histopathology to determine the usefulness of FNAC as a reliable first-line diagnostic tool in the evaluation of breast lesions.

MATERIALS AND METHODS

Study Design: This is a hospital-based observational study
Study Place: The study was conducted in the Department of General Surgery , Katuri medical college and hospital
Study Duration: 1 year
Study Population: The study population included all patients presenting with breast lumps attending the outpatient department and admitted cases who fulfilled the eligibility criteria during the study period.
Sample Size: A total of 100 patients with clinically palpable breast lumps.
Study variables:

- Age group (years)
- Sex
- Type of lesion
- FNAC vs HPE Result
- Site of lump

Inclusion Criteria:
All patients of any age and gender presenting with clinically palpable breast lumps who underwent FNAC and subsequent histopathological examination after surgical intervention were included in the study.

Exclusion Criteria:
Patients who did not consent for the study, cases with inadequate FNAC samples, and patients who did not undergo surgical excision or histopathological examination were excluded from the study.

Statistical Analysis:
For statistical analysis data were entered into a Microsoft excel spreadsheet and then analyzed by SPSS (version 27.0; SPSS Inc., Chicago, IL, USA) and GraphPad Prism version 5. Data had been summarized as mean and standard deviation for numerical variables and count and percentages for categorical variables. Two-sample t-tests for a difference in mean involved independent samples or unpaired samples. Paired t-tests were a form of blocking and had greater power than unpaired tests. A chi-squared test ($\chi 2$ test) was any statistical hypothesis test wherein the sampling distribution of the test statistic is a chi-squared distribution when the null hypothesis is true. Without other qualification, 'chi-squared test' often is used as short for Pearson's chi-squared test. Unpaired proportions were compared by Chi-square test or Fischer's exact test, as appropriate.

Explicit expressions that can be used to carry out various t-tests are given below. In each case, the formula for a test statistic that either exactly follows or closely approximates a t-distribution under the null hypothesis is given. Also, the appropriate degrees of freedom are given in each case. Each of these statistics can be used to carry out either a one-tailed test or a two-tailed test.

Once a t value is determined, a p-value can be found using a table of values from Student's t-distribution .If the calculated p-value is below the threshold chosen for statistical significance (usually the 0.10, the 0.05, or 0.01 level), then the null hypothesis is rejected in favour of the alternative hypothesis.
P-value ≤ 0.05 was considered for statistically significant.

RESULT

Table 1: Age distribution of patients (n = 100)

Age group (years)	Number (n)	Percentage (%)
0–20	10	10%
21–30	35	35%
31–40	25	25%
41–50	20	20%
>50	10	10%
Total	**100**	**100%**

Table 2: Sex distribution of patients (n = 100)

Sex	Number (n)	Percentage (%)
Female	92	92%
Male	8	8%
Total	**100**	**100%**

Table 3: Distribution of breast lesions (HPE diagnosis) (n = 100)

Type of lesion	Number (n)	Percentage (%)
Benign	70	70%
Malignant	25	25%
Inflammatory	5	5%
Total	**100**	**100%**

Table 4: Correlation between FNAC and HPE findings (n = 100)

FNAC vs HPE Result	Number (n)	Percentage (%)
True Positive	22	22%
True Negative	70	70%
False Positive	5	5%

False Negative	3	3%
Total	**100**	**100%**

Table 5: Site of breast lump (n = 100)

Site of lump	Number (n)	Percentage (%)
Right breast	55	55%
Left breast	40	40%
Bilateral	5	5%
Total	**100**	**100%**

Figure 1 : Correlation between FNAC and HPE findings (n = 100)

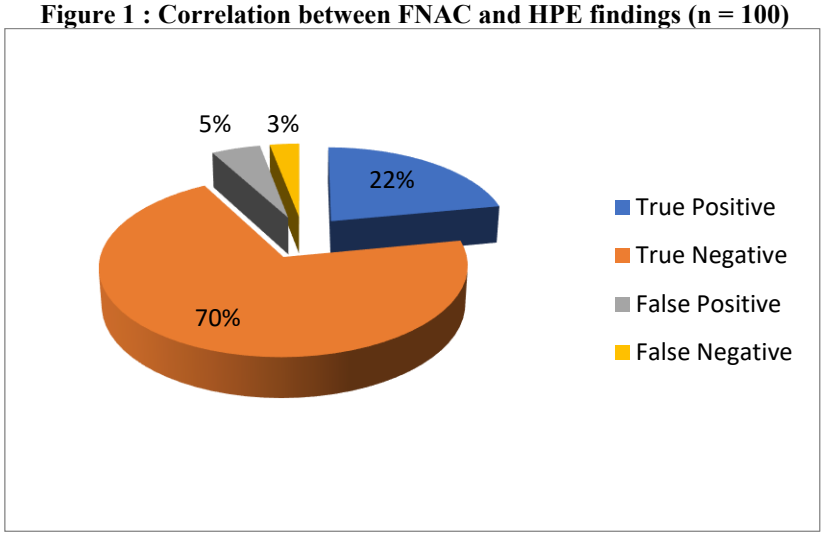
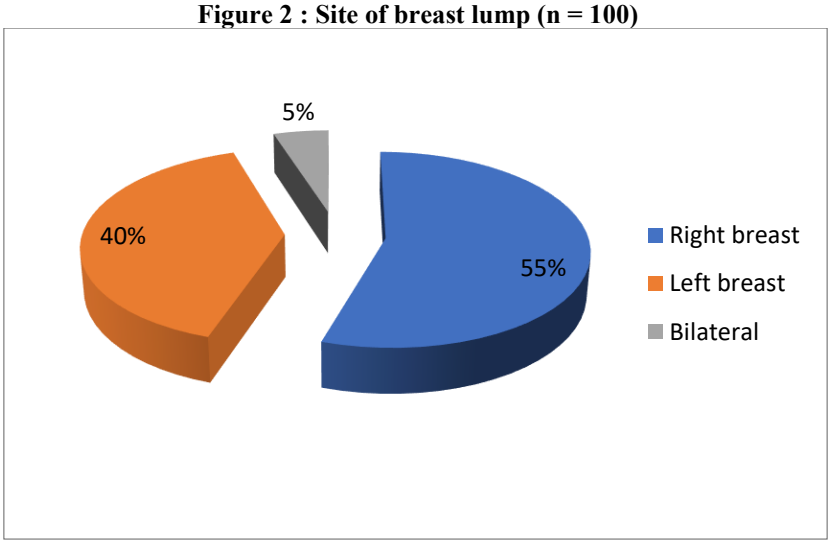


Figure 2 : Site of breast lump (n = 100)



In the present study, a total of 100 patients with breast lumps were evaluated. We observed that the majority of patients belonged to the 21–30 years age group, comprising 35 patients (35%), followed by 31–40 years age group with 25 patients (25%). The 41–50 years age group included 20 patients (20%), while both the 0–20 years and above 50 years age groups had 10 patients (10%) each.

In the present study, a total of 100 patients with breast lumps were included. We observed a marked female predominance, with 92 patients (92%) being females, while 8 patients (8%) were males.

In the present study, a total of 100 patients with breast lumps were evaluated. On histopathological examination (HPE), the majority of lesions were found to be benign, accounting for 70 patients (70%). Malignant lesions were observed in 25 patients (25%), while inflammatory lesions were seen in 5 patients (5%).

In the present study comprising 100 patients with breast lumps, the diagnostic correlation between Fine Needle Aspiration Cytology (FNAC) and Histopathological Examination (HPE) was evaluated. We observed that True Positive cases were 22 patients (22%), where FNAC correctly identified malignant lesions confirmed on HPE. True Negative cases were 70 patients (70%), indicating concordant benign diagnosis on both FNAC and HPE. False Positive cases were 5 patients (5%), where FNAC suggested malignancy but HPE was benign. False Negative cases were 3 patients (3%), where FNAC failed to detect malignancy which was later confirmed on histopathology.

In the present study including a total of 100 patients with breast lumps, the distribution according to the site of the lesion showed that the majority of cases were located in the right breast for 55 patients (55%). This was followed by the left breast in 40 patients (40%). Bilateral breast involvement was observed in 5 patients (5%).

DISCUSSION

We found that the majority of patients belonged to the 21–30 years age group (35%), followed by 31–40 years (25%), 41–50 years (20%), and 0–20 years and >50 years (10% each). This age distribution suggests that breast lumps are more common in the younger and reproductive age group. A similar observation was made by Ramala Jr SR et al. (11) and Haldar C et al. (12), who reported peak incidence in the second and third decades of life, predominantly due to benign lesions like fibroadenoma. Johansson A et al. (13) also noted that younger women commonly present with benign breast diseases, whereas malignant lesions increase with age.

In the present study, we observed a marked female predominance (92%), with only 8% male patients. This is consistent with the hormonal and anatomical predisposition of females to breast diseases. Similar findings were reported by Hassan MM et al. (14) and Arnold M et al. (15), where female patients accounted for more than 90% of breast lump cases. Shi ZA et al. (16) also highlighted that male breast lesions are rare and mostly gynecomastia-related.

On histopathological examination in our study, benign lesions were most common (70%), followed by malignant lesions (25%) and inflammatory lesions (5%). This pattern is comparable with the findings of Lerwill MF et al. (17) who also reported predominance of benign breast lesions, particularly fibroadenoma, as the most common entity.

In our study, correlation between FNAC and HPE showed True Positive cases in 22%, True Negative in 70%, False Positive in 5%, and False Negative in 3%, indicating good diagnostic accuracy of FNAC. Similar results were reported by Roheen T et al. (18), who demonstrated high sensitivity and specificity of FNAC in diagnosing breast lesions. CHERUKU S et al. (19) also found strong concordance between FNAC and histopathology, although discrepancies were noted in borderline and poorly sampled lesions.

Regarding the site of breast lumps, we observed right-sided predominance (55%), followed by left (40%) and bilateral involvement (5%). Similar findings were reported by Abdou Y et al. (20) who also observed slight right-sided predominance, although the difference was not statistically significant .

CONCLUSION

The present study demonstrates that breast lumps are more commonly seen in the younger age group, particularly in the third decade of life, with a clear female predominance. Most of the breast lesions are benign, with fibroadenoma being the most frequent diagnosis, while invasive ductal carcinoma represents the most common malignant lesion.

Fine Needle Aspiration Cytology (FNAC) shows good diagnostic accuracy with high concordance when compared to histopathological examination (HPE). However, a small number of false-positive and false-negative cases highlight the limitations of FNAC, particularly in borderline and inadequately sampled lesions.

Histopathological examination remains the gold standard for definitive diagnosis and accurate categorization of breast lesions. The study supports that a combined clinicopathological approach, using FNAC along with histopathology and clinical evaluation, significantly improves diagnostic precision.

Thus, FNAC is a reliable, cost-effective, and minimally invasive first-line investigation for breast lumps, but confirmatory histopathology is essential for final diagnosis and appropriate management.

REFERENCE

1. Kumar V, Abbas AK, Aster JC. Robbins and Cotran Pathologic Basis of Disease. 10th ed. Philadelphia: Elsevier; 2020.
2. Sung H, Ferlay J, Siegel RL, et al. Global cancer statistics 2020. CA Cancer J Clin. 2021;71(3):209-249.
3. O'Connell AM, et al. Clinical evaluation of breast lumps. Br J Surg. 2018;105(1):12-20.
4. Zavala J, et al. Role of FNAC in breast lesions. Cytopathology. 2017;28(5):345-352.
5. Field AS, et al. Limitations of fine needle aspiration cytology. Diagn Cytopathol. 2016;44(9):720-728.
6. Rosai J. Rosai and Ackerman's Surgical Pathology. 11th ed. Elsevier; 2018.

7. Ahmed M, et al. Clinicopathological correlation in breast lesions. J Clin Diagn Res. 2019;13(6):EC10-EC14.
8. McDivitt RW, et al. Breast tumor pathology. Cancer. 2017;120(8):1120-1130.
9. Kulkarni AM, et al. Diagnostic accuracy of FNAC in breast lesions. Indian J Pathol Microbiol. 2018;61(2):223-228.
10. NHS Breast Screening Programme. Triple assessment in breast disease. Guidelines Report. 2020.
11. Ramala Jr SR, Chandak S, Chandak MS, Annareddy S. A comprehensive review of breast fibroadenoma: correlating clinical and pathological findings. Cureus. 2023 Dec 5;15(12):e49948.
12. Haldar C. From Fibroadenomas to Phyllodes: Unraveling the Spectrum and Clinical Profile of Benign Breast Diseases. Current Trends in Medicine and Clinical Research. 2025 Aug 28.
13. Johansson A, Christakou AE, Iftimi A, Eriksson M, Tapia J, Skoog L, Benz CC, Rodriguez-Wallberg KA, Hall P, Czene K, Lindström LS. Characterization of benign breast diseases and association with age, hormonal factors, and family history of breast cancer among women in Sweden. JAMA network open. 2021 Jun 25;4(6):e2114716.
14. Hassan MM, Ahamad FU, Khan MA, Fatema MB, Kamal MM, Azam AN, Tani SA. Clinicopathological Evaluation of Breast Lump in Different Age Groups. Journal of Dhaka Medical College. 2022;31(1):107-13.
15. Arnold M, Morgan E, Rumgay H, Mafra A, Singh D, Laversanne M, Vignat J, Gralow JR, Cardoso F, Siesling S, Soerjomataram I. Current and future burden of breast cancer: Global statistics for 2020 and 2040. The breast. 2022 Dec 1;66:15-23.
16. Shi ZA, Xin M. Endocrine hormones and their impact on pubertal gynecomastia. Journal of Clinical Medicine. 2024 Dec 30;14(1):158.
17. Lerwill MF, Lee AH, Tan PH. Fibroepithelial tumours of the breast—a review. Virchows Archiv. 2022 Jan;480(1):45-63.
18. Roheen T, Wattoo F, Saleem K, Javed F, Iqbal F, Aslam S. FNAC–A Valuable Tool in Diagnosing Breast Lesions and its Correlation with Histopathology. Annals of Punjab Medical College. 2022;16(4):243-7.
19. CHERUKU S. Clinicopathological Correlation of Breast Lesions in FNAC and Histopathology. Journal of Contemporary Clinical Practice. 2025 Jun 28;11:842-7.
20. Abdou Y, Gupta M, Asaoka M, Attwood K, Mateusz O, Gandhi S, Takabe K. Left sided breast cancer is associated with aggressive biology and worse outcomes than right sided breast cancer. Scientific Reports. 2022 Aug 4;12(1):13377.