Journal of Neonatal Surgery
ISSN(Online): 2226-0439
Vol.14, Issue 33s (2025)
https://www.jneonatalsurg.com

OPEN ACCESS

Clinicopathological Correlation of Breast Lesions in Pakistani Women: A Prospective Study

Masroor Hassan[1], Ambreen Anjum[2], Zahid Ali[3], Waseem Khan[4], Gotam Kumar[5], Saima Bashir[6]

[1]Department of Pathology, Northwest School of Medicine, Peshawar, Pakistan

[2]Department of Psychology, Virtual University of Pakistan

[3]Assistant Professor, Department: General Surgery, Ziauddin Hospital, Karachi, Pakistan

[4]Department of Pathology, Saidu Teaching Hospital, Swat, Pakistan

[5]Associate Professor, Peoples Medical and Health Science University for Women (PUMHSW), Nawabshah, Pakistan

[6]Associate Professor, Department of Pathology, Gomal Medical College, DI Khan, Pakistan

Corresponding author:

Saima Bashir,

Associate professor, Department of Pathology, Gomal Medical College, DI Khan, Pakistan

Email ID : doc.saimabashir@gmail.com

.Cite this paper as: Masroor Hassan, Ambreen Anjum, Zahid Ali, Waseem Khan, Gotam Kumar, Saima Bashir, (2025) Clinicopathological Correlation of Breast Lesions in Pakistani Women: A Prospective Study .Journal of Neonatal Surgery, 14, (33s) 495-501

ABSTRACT

Objective: To evaluate the clinicopathological correlation of breast lesions among Pakistani women and to determine the relationship between clinical presentation, histopathological findings, and immunohistochemical profiles.

Methodology: This prospective study was conducted at the department of Pathology over a one-year period from Feb, 2024 to Feb, 2025. A total of 230 female patients presenting with palpable breast lesions were included using a non-probability consecutive sampling technique. Data were collected through a structured proforma documenting demographic details, clinical features, and pathological findings. Fine needle aspiration cytology (FNAC), excision, or Tru-cut biopsy specimens were processed and stained with hematoxylin and eosin, while immunohistochemistry was performed on malignant cases. Data were analyzed using SPSS version 25, applying descriptive statistics and inferential tests, with a p-value <0.05 considered significant.

Results: The mean age of patients was 36.8 ± 11.4 years. Benign lesions (64.8%) predominated, with fibroadenoma being the most frequent (31.3%), followed by fibrocystic disease (17.8%). Malignant lesions accounted for 35.2%, primarily invasive ductal carcinoma (29.1%). Malignant lesions were significantly associated with older age, larger lump size, axillary lymphadenopathy, nipple retraction, and skin changes ($p < 0.05$). Immunohistochemical analysis showed ER positivity in 60.5%, PR positivity in 55.6%, HER2/neu positivity in 27.2%, and triple-negative phenotype in 17.3%.

Conclusion: Benign breast diseases remain more common in Pakistani women; however, invasive ductal carcinoma is the leading malignancy. Clinicopathological correlation remains crucial for timely diagnosis and management, while receptor profiling aids in optimizing individualized therapeutic strategies and improving prognostic outcomes.

.**Keywords**: *Breast lesions, Clinicopathological correlation, Invasive ductal carcinoma, Fibroadenoma*

1. INTRODUCTION

Breast diseases encompass a broad spectrum of lesions ranging from benign proliferative changes to invasive malignancies, representing one of the most significant health concerns among women worldwide.(1) Globally, breast cancer remains the most frequently diagnosed malignancy and the leading cause of cancer-related deaths among women.(2) According to GLOBOCAN 2022, breast cancer accounts for approximately 24% of all new cancer cases and 15% of cancer-related deaths among women.(3) The rising incidence in both developed and developing countries underscores the urgent need for early diagnosis, accurate histopathological evaluation, and appropriate management strategies to improve patient outcomes.(4).

In Pakistan, breast lesions constitute a major public health issue. Breast cancer is the most common malignancy among Pakistani women, with a reported incidence of 1 in 9 women being affected during their lifetime, the highest rate in Asia.(5) Studies have demonstrated that Pakistani women tend to present at a younger age and with more advanced stages of disease compared to Western populations.(6) The delay in diagnosis is often attributed to limited awareness, lack of screening programs, and sociocultural barriers that discourage women from seeking timely medical attention.(7) Apart from malignancies, benign breast lesions such as fibroadenoma, fibrocystic changes, and inflammatory conditions are also highly prevalent and often mimic malignant processes clinically and radiologically.(8)

Accurate diagnosis of breast lesions requires a multidisciplinary approach integrating clinical examination, imaging, and histopathological evaluation, the so-called "triple assessment."(9) Among these, histopathology remains the gold standard for definitive diagnosis. Clinicopathological correlation provides valuable insights into the biological behavior of breast lesions, guides therapeutic decisions, and improves diagnostic accuracy, especially in resource-limited settings.(10) Establishing such correlations is particularly important in Pakistan, where diverse pathological patterns and age distributions are observed due to genetic, environmental, and reproductive factors.

Despite the high burden of breast diseases in Pakistan, there is limited prospective data correlating clinical presentation with histopathological patterns in local populations. Understanding these correlations can enhance diagnostic precision, facilitate early management, and ultimately reduce morbidity and mortality. Therefore, this study aims to assess the clinicopathological correlation of breast lesions in Pakistani women, providing insight into their frequency, distribution, and diagnostic reliability to aid in the development of evidence-based strategies for breast disease management in the region.

2. METHODOLOGY

This was a prospective cross-sectional study conducted at the Department of Pathology in collaboration with the Department of Surgery, a tertiary care teaching hospital catering to a large population from both urban and rural areas of Pakistan. The study duration was one year, extending from Feb, 2024 to Feb, 2025.

The sample size for this study was calculated using OpenEpi, Version 3, based on the formula for a single population proportion. The estimated prevalence of malignant breast lesions among Pakistani women was taken as 16.2%**,** as reported by previous literature.(11) Using a 95% confidence interval (Z = 1.96) and a 5% margin of error (d = 0.05)**,** the calculated sample size was 209 participants. To account for possible data loss, inadequate biopsy specimens, or non-response, an additional 10% was added, resulting in a final target sample size of 230 participants**.** This sample size was considered adequate to ensure statistical validity and to allow for meaningful clinicopathological correlation of breast lesions in the study population.

A non-probability consecutive sampling technique was employed. All female patients presenting with palpable or clinically suspected breast lesions during the study period and fulfilling the inclusion criteria were enrolled until the required sample size was achieved. Inclusion criteria consisted of all female patients, irrespective of age, presenting with breast lumps, nipple discharge, pain, or skin changes, who underwent fine-needle aspiration cytology (FNAC) or biopsy for histopathological evaluation and provided informed consent. Exclusion criteria included patients with a prior history of breast carcinoma, those currently undergoing treatment for breast cancer, cases of recurrent lesions or inadequate specimens, and patients unwilling to participate.

After obtaining ethical approval from the Institutional Review Board, all eligible women presenting with breast complaints during the study period (n = 230) were approached, and the study purpose was explained to them; written informed consent was obtained from each participant. Data were recorded on a pre-tested, structured proforma that captured demographic details (age, residence, marital status, family history), presenting complaints (lump, pain, nipple discharge, duration of symptoms), clinical examination findings (lump size measured in centimeters with a flexible tape, laterality, breast quadrant, nipple retraction, skin changes, and presence of palpable axillary lymph nodes), and imaging findings when available (mammography/ultrasound reports). Specimens were obtained by FNAC or Tru-cut/excisional biopsy as clinically indicated.

Tissue specimens were fixed in 10% buffered formalin, processed in the pathology laboratory, and stained with hematoxylin and eosin. All slides were independently examined by two experienced histopathologists; any discordant diagnoses were resolved by consensus or referred to a third senior pathologist. For malignant cases, immunohistochemistry (ER, PR, HER2/neu) was performed according to standard protocols to determine receptor status; HER2 equivocal cases were further evaluated by in-situ hybridization, where available. All laboratory procedures followed internal quality control measures and standard operating procedures. Completed proformas and pathology reports were anonymized, coded, and entered into an electronic database for analysis. Records with incomplete clinical data or inadequate/insufficient tissue for diagnosis were documented and excluded from specific sub-analyses; overall exclusions were tracked and reported.

Data were analyzed using SPSS version 25.0. Continuous variables such as age and lesion size were examined for normality; normally distributed variables are presented as mean ± standard deviation. Categorical variables (residence, clinical features, histopathological categories, receptor status) are presented as frequencies and percentages. For comparisons between two

groups, Student's t-test was used for continuous variables with normal distribution (e.g., comparing mean age and mean lump size between benign and malignant groups); where distributions deviated from normality, non-parametric alternatives (Mann–Whitney U test) were to be used. Associations between categorical variables were tested using the Chi-square test; Fisher's exact test was applied when expected cell counts were less than five. Reported p-values are two-tailed, and statistical significance was set at $p \leq 0.05$.

3. RESULTS

A total of 230 women were included in the study. The participants ranged in age from 18 to 70 years, with a mean age of 36.8 ± 11.4 years**.** The majority of women were between 21 and 40 years of age**,** representing nearly two-thirds of the study population, while only a small proportion were younger than 20 years or older than 50 years. Most participants were residents of urban areas (57.4%)**,** whereas 42.6% came from rural backgrounds, reflecting a balanced urban–rural representation. The majority of women were married (82.2%)**,** and a smaller proportion were unmarried. A positive family history of breast cancer was reported by 11.3% of the women, while 88.7% had no known familial predisposition to the disease. (Table 1).

Table 1: Demographic Profile of Study Participants (n = 230)

Variable	Category	Frequency (n)	Percentage (%)
Age Group (years)	<20	18	7.8
	21–30	76	33.0
	31–40	68	29.6
	41–50	45	19.6
	>50	23	10.0
Mean ± SD (years)		36.8 ± 11.4	
Residence	Urban	132	57.4
	Rural	98	42.6
Marital Status	Married	189	82.2
	Unmarried	41	17.8
Family History of Breast Cancer	Present	26	11.3
	Absent	204	88.7

The most common clinical presentation among the study participants was the presence of a breast lump, observed in 91.3% of women, making it the predominant complaint leading to clinical evaluation. Breast pain or tenderness was reported by 36.5%**,** while nipple discharge and nipple retraction were noted in 12.2% and 9.6% of cases, respectively. Skin dimpling or ulceration was present in 7.8% of patients, and axillary lymphadenopathy was detected in 17.8%. The mean size of the palpable breast lump was 3.5 ± 1.8 cm, indicating that most patients presented with moderately sized lesions. (Table 2).

Table 2: Clinical Presentation of Patients (n = 230)

Clinical Feature	Frequency (n)	Percentage (%)
Breast lump	210	91.3
Breast pain/tenderness	84	36.5
Nipple discharge	28	12.2
Nipple retraction	22	9.6
Skin dimpling/ulceration	18	7.8
Axillary lymphadenopathy	41	17.8

Mean lump size (cm)	3.5 ± 1.8

Histopathological evaluation of breast lesions revealed that benign conditions were more common, accounting for 64.8% of all cases, while malignant lesions constituted 35.2%**.** Among the benign group, fibroadenoma was the most frequently diagnosed lesion, observed in **31.3%** of patients, followed by fibrocystic disease in 17.8% and breast abscess or mastitis in 8.7%**.** Less frequent benign findings included benign phyllodes tumor (3.9%) and duct ectasia (3.1%). In contrast, invasive ductal carcinoma (IDC) emerged as the predominant malignant lesion, representing 29.1% of all cases and the vast majority within the malignant category. Other malignant types included invasive lobular carcinoma (2.6%)**,** medullary carcinoma (1.7%)**,** mucinous carcinoma (1.3%)**,** and a single case of ductal carcinoma in situ (0.4%)**.** (Table 3).

Table 3: Distribution of Breast Lesions Based on Histopathology

Histopathological Diagnosis	**n(%)**
Benign Lesions	**149 (64.8%)**
Fibroadenoma	72 (31.3%)
Fibrocystic disease	41 (17.8%)
Breast abscess/mastitis	20 (8.7%)
Benign phyllodes tumor	9 (3.9%)
Duct ectasia	7 (3.1%)
Malignant Lesions	**81(35.2%)**
Invasive ductal carcinoma	67 (29.1%)
Invasive lobular carcinoma	6 (2.6%)
Medullary carcinoma	4 (1.7%)
Mucinous carcinoma	3 (1.3%)
Ductal carcinoma in situ (DCIS)	1 (0.4%)

A significant association was observed between various clinical parameters and the histopathological diagnosis of breast lesions. The mean age of patients with malignant lesions was notably higher (45.8 ± 10.6 years) compared to those with benign conditions (31.4 ± 9.2 years), demonstrating a strong statistical significance ($p < 0.001$). Similarly, the mean lump size was significantly larger among malignant cases (4.5 ± 2.0 cm) than in benign cases (2.6 ± 1.2 cm), also with a p-value < 0.001. Axillary lymphadenopathy was observed in 37.0% of malignant cases versus only 7.4% of benign ones ($p < 0.001$), while nipple retraction and skin changes were more frequently associated with malignancy (23.5% and 17.3%**,** respectively) compared to benign lesions (2.0% and 2.7%**,** respectively). Both findings were statistically significant ($p < 0.001$ and $p = 0.002$, respectively). Interestingly, pain and tenderness were more commonly reported among benign cases (44.3%) than malignant ones (22.2%), with a significant inverse association ($p = 0.003$)**.** (Table 4)

Table 4: Correlation between Clinical Findings and Histopathological Diagnosis

Clinical Parameter	**Benign (n=149)**	**Malignant (n=81)**	**p-value**
Mean age (years)	31.4 ± 9.2	45.8 ± 10.6	<0.001*
Mean lump size (cm)	2.6 ± 1.2	4.5 ± 2.0	<0.001*
Axillary lymphadenopathy	11 (7.4%)	30 (37.0%)	<0.001*
Nipple retraction	3 (2.0%)	19 (23.5%)	<0.001*
Skin changes	4 (2.7%)	14 (17.3%)	0.002*

Pain/tenderness	66 (44.3%)	18 (22.2%)	0.003*
*Statistically significant ($p < 0.05$)			

Immunohistochemical analysis of the 81 malignant breast lesions revealed that estrogen receptor (ER) positivity was present in 60.5% of cases, while progesterone receptor (PR) positivity was observed in 55.6%**.** HER2/neu overexpression was detected in **27.2%** of the malignant specimens. A subset of tumors, comprising 17.3%**,** were classified as triple-negative breast cancers (ER-, PR-, HER2-), representing an aggressive molecular subtype commonly associated with poorer prognosis and limited targeted therapeutic options. (Table 5)

Table 5: Immunohistochemical Profile of Malignant Breast Lesions (n = 81)

Receptor Status	**Frequency (n)**	**Percentage (%)**
ER positive	49	60.5
PR positive	45	55.6
HER2/neu positive	22	27.2
Triple negative (ER-, PR-, HER2-)	14	17.3

4. DISCUSSION

In this prospective series of 230 women with breast lesions, benign conditions predominated (64.8%), with fibroadenoma as the single most frequent diagnosis, while invasive ductal carcinoma (IDC) was the commonest malignant lesion. This distribution is concordant with multiple regional reports which likewise show a predominance of benign pathology and fibroadenoma as the most frequent benign lesion. For example, several single-centre Pakistani and regional studies have reported fibroadenoma as the leading benign lesion and overall benign proportions between ~50–75% depending on referral patterns and study setting.(12, 13)

The age pattern in our data, a younger mean age for benign disease (≈31 years) and older mean age for malignancy (≈46 years), mirrors findings from prior work in Pakistan and neighbouring regions. Earlier prospective and retrospective studies have consistently shown that malignant lesions present at higher mean ages than benign lesions, and that the peak incidence of benign disease is in the second and third decades, while malignancy peaks later (fourth–fifth decades). Our observed age gap and its statistical significance align with these reports and support the continued emphasis on age-stratified clinical suspicion during assessment.(10, 14)

The clinical features that correlated strongly with malignancy in our cohort — larger lump size, axillary lymphadenopathy, nipple retraction and skin changes — are well established red flags in the literature. Multiple comparative studies have demonstrated similar associations: larger tumour size and the presence of clinically palpable nodes significantly increase the likelihood of a histopathological diagnosis of carcinoma, while pain is more commonly reported with benign lesions. The inverse relationship between pain and malignancy in our sample is therefore consistent with prior FNAC–histopathology correlation work.(10, 15)

Our immunohistochemical profile of malignant tumours (ER positivity ~60.5%, PR ~55.6%, HER2 ~27.2%, triple-negative ~17.3%) is broadly in keeping with recent Pakistani series that report a predominance of hormone receptor-positive tumours with a smaller but substantial fraction of HER2-positive and triple-negative cases. Several contemporary regional analyses have reported ER positivity in roughly half to two-thirds of cases and HER2 positivity in about one-quarter to one-third, a distribution similar to our findings and relevant for therapy planning (hormone therapy, anti-HER2 agents). These parallels suggest our sample's molecular profile is representative of patterns reported in tertiary centres in Pakistan.(16, 17)

When comparing the proportion of malignant cases (35.2%) in our cohort to other studies, differences appear driven largely by setting and referral bias. Tertiary oncology centres or surgical services that see preselected suspicious lesions typically report higher malignancy percentages, whereas general pathology audits or community screening-linked series report lower malignant fractions (often <25%). Our intermediate malignancy rate likely reflects a mixed referral population (both surgical referrals and primary evaluations). This heterogeneity in reported malignant proportions across studies underscores the importance of explicitly reporting study setting and sampling method when interpreting incidence figures.(10, 13)

Strengths of our study include prospective data collection, use of standard histopathology with selective IHC confirmation, and a reasonably sized, consecutively recruited cohort which limits selection bias compared with convenience samples. Several limitations should be noted. First, being a single-centre study, generalizability may be limited; referral patterns and local population structure influence lesion mix. Second, although we performed IHC on malignant tumours, complete molecular subtyping (including Ki-67 or routine ISH for all equivocal HER2 cases) was not universally available and could

influence subtype proportions. Third, the cross-sectional design precludes outcome or survival analysis; future longitudinal follow-up would allow correlation of clinicopathological features with stage at presentation and patient outcomes. Finally, resource-related constraints meant that some imaging or advanced molecular assays were not available for every case, which may affect diagnostic granularity and comparisons with resource-rich settings.

In conclusion, results of the present study predominance of benign lesions with fibroadenoma most common, IDC as the leading malignancy, older age and specific clinical signs predicting malignancy, and a majority of hormone receptor–positive cancers, are consistent with published regional literature These converging findings reinforce current clinical practice: thorough triple assessment remains essential, clinical red flags should prompt expedited tissue diagnosis, and receptor testing continues to be critical for treatment planning in the Pakistani context. Future multicentre prospective work with standardized molecular panels and longitudinal follow-up would further refine understanding of clinicopathological patterns and treatment outcomes in this population.

5. CONCLUSION

This prospective study highlights that benign breast lesions, particularly fibroadenoma, remain the most prevalent findings among Pakistani women, while invasive ductal carcinoma constitutes the majority of malignant cases. The analysis demonstrated that older age, larger lump size, axillary lymphadenopathy, nipple retraction, and skin changes were significantly associated with malignancy, underscoring the value of careful clinical evaluation in early detection. Most malignant tumours exhibited hormone receptor positivity, emphasizing the role of receptor testing in guiding targeted therapy.

REFERENCES

1. Cuthrell KM, Tzenios N. Breast cancer: updated and deep insights. International Research Journal of Oncology. 2023;6(1):104-18.
2. Houghton SC, Hankinson SE. Cancer progress and priorities: breast cancer. Cancer epidemiology, biomarkers & prevention. 2021;30(5):822-44.
3. Cao W, Qin K, Li F, Chen W. Comparative study of cancer profiles between 2020 and 2022 using global cancer statistics (GLOBOCAN). Journal of the National Cancer Center. 2024;4(2):128-34.
4. Iacob R, Iacob ER, Stoicescu ER, Ghenciu DM, Cocolea DM, Constantinescu A, et al. Evaluating the role of breast ultrasound in early detection of breast cancer in low-and middle-income countries: a comprehensive narrative review. Bioengineering. 2024;11(3):262.
5. Nazuk S, Nadeem MS, Malik Z, Faheem MU. A review on the prevalence of breast cancer in Pakistan. Journal of Contemporary Pharmacy. 2024;8(2):142-52.
6. Saeed S, Asim M, Sohail MM. Fears and barriers: problems in breast cancer diagnosis and treatment in Pakistan. BMC women's health. 2021;21(1):151.
7. Sawhney R, Nathani P, Patil P, Bhandarkar P, Veetil DK, Venghateri JB, et al. Recognising socio-cultural barriers while seeking early detection services for breast cancer: a study from a Universal Health Coverage setting in India. BMC cancer. 2023;23(1):881.
8. Malherbe K. Benign Diseases of the Breast. A Mammographers Guide: Radiological and Histopathological Guidelines. 2025:53-86.
9. Muscara F, Benson JR. Symptomatic Triple Assessment. Atlas of Diagnosis and Management of Breast Disease: CRC Press; 2025. p. 10-28.
10. Yadav K, Cree I, Field A, Vielh P, Mehrotra R. Importance of cytopathologic diagnosis in early cancer diagnosis in resource-constrained countries. JCO Global Oncology. 2022;8:e2100337.
11. Mukhtar R, Hussain M, Mukhtar MA, Haider SR. Prevalence of different breast lesions in women of southern Punjab, Pakistan, characterized on high-resolution ultrasound and mammography. Egyptian Journal of Radiology and Nuclear Medicine. 2021;52(1):245.
12. Rahman KMS, Hasan AM, Nahar N, Iqbal M, Yusuf MA, Rahman M. Cytological Evaluation of Palpable Non-Neoplastic Breast Lesions among Women attended from Rural Community of Bangladesh: A Retrospective Cross-Sectional Study. Journal of Monno Medical College. 2024;10(1):07-12.
13. Heda K, Beniwal K, Sharma K, Kasliwal N. Clinicopathological profile of Breast Lesions at tertiary care centre: a study of 602 cases. Indian Journal of Obstetrics and Gynaecology Research. 2017;4(2):127-31.
14. Shah A, Haider G, Abro N, Hashmat S, Chandio S, Shaikh A, et al. Correlation between site and stage of breast cancer in women. Cureus. 2022;14(2).
15. Risaldar AA, Begum Z, Alvi U. Correlation of FNAC with Histopathology of breast lesions. IP Journal of Diagnostic Pathology and Oncology. 2020;5(4):375-80.
16. Adrees U, Shoaib N, Gull S, Imran H, Saleem F, Tahir A, et al. Expression of hormone receptors and human epidermal growth Factor2/Neu in female breast cancer patients. Kuwait Journal of Science. 2024;51(4):100270.
17. Ibrahim EH, Ali TA, Sharbatti S, Ismail MK, Rahamathullah N, Bylappa SK, et al. Histopathological profile of

different breast lesions: a single-center observational study. Cureus. 2024;16(5).