

PREVALENCE OF MALIGNANT BREAST LESIONS IN PATIENTS PRESENTING WITH PALPABLE LUMPS

Rafia Ahmad¹, Muhammad Shah², Shimee Shahzadi³, Shehzad Akbar Khan⁴

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¹Postgraduate Resident, Surgical A Unit, MTI-Hayatabad Medical Complex, Peshawar

³Assistant Professor, Department of Anatomy, Khyber Girls Medical College Peshawar

⁴Professor, Department of General Surgery, Hayatabad Medical Complex, Peshawar

Correspondence

²Muhammad Shah, Associate Professor, Department of General Surgery, Hayatabad Medical Complex, Peshawar

☎: +92-333-5829224

✉: drmuhammadshah@yahoo.com

ABSTRACT**OBJECTIVES**

This study aimed to estimate the histopathology-confirmed malignancy rate among women presenting with palpable breast lumps and to describe the clinicopathological profile.

METHODOLOGY

The cross-sectional study was conducted from February 23, 2025, to August 23, 2025, in the Surgical Unit of Hayatabad Medical Complex, Peshawar, and enrolled 163 female patients with palpable breast lumps. Each of the women had clinical evaluations, then subsequently underwent either core needle biopsy or excisional or incisional biopsy. Their histopathological diagnosis was done after the biopsy. Demographic characteristics of women, the various tumor characteristics, and each tumor's histopathology were analyzed.

RESULTS

The patient's mean age was 38.7 ± 11.4 years. Of the total number of patients, 46 (28.2%) cases were confirmed malignant on pathology; 117 (71.8%) cases were benign. The majority of malignant cases (82.6%) were invasive ductal carcinoma. Meanwhile, the most commonly diagnosed benign lumps were fibroadenomas (35.6%). It was also noted that the malignancy risk increased with age. It was 7.7% in patients aged less than 30 years, 26.2% in patients aged 31-50, and 48.7% among patients older than 50 years.

CONCLUSION

In this cohort, approximately one-third of the palpable breast lumps were malignant, and there was a predominance of invasive ductal carcinoma. Higher malignancy risks were noted among older women and with larger tumor sizes. In high-burden, resource-limited settings, there is a critical need for prompt biopsy and pathological evaluation of all palpable breast lumps to improve the timeliness and prognosis for optimal care.

KEYWORDS: Breast Lump, Malignancy, Histopathology, Prevalence, Invasive Ductal Carcinoma

INTRODUCTION

Breast lumps are among the most common reasons for women to seek surgical or oncological evaluation, with clinical significance ranging from benign lesions like fibroadenoma to potentially lethal breast cancer.¹ While most palpable breast lumps are benign, a clinically detectable mass can also represent an underlying malignancy and therefore warrants accurate, timely, and risk-stratified assessment.² Breast cancer, in general, is the most common cancer diagnosed in women worldwide, and it also accounts for a major proportion of cancer-related deaths.³ In Pakistan, breast cancer constitutes the most common cancer, with GLOBOCAN 2022 estimating 30,682 new cases and 15,552 deaths in 2022.⁴ Recent national literature reports on breast cancer prevalence in Pakistan describe the country as having one of the highest rates on the

continent, thus highlighting the need for the prompt assessment of symptomatic breast disease in local clinical practice.⁵ Factors such as ethnicity and geography, along with the availability of care and the methods by which it is delivered, can influence the incidence and prevalence of these diseases.⁶ Of the many risk factors, age is paramount. Older patients have a much greater chance of a palpable breast lesion being cancerous than their younger counterparts.⁷ Moreover, even in women younger than 30, mammograms and ultrasound are important for the level of risk determination and for assessing the severity of the disease.⁸ The preferred method for assessing new palpable breast lumps is the triple assessment, which includes clinical history and examination, breast imaging (ultrasound and/or mammogram, depending on the age and risk), and, when necessary, tissue diagnosis.⁹ There is increased

diagnostic certainty and fewer missed malignancies when there is concordance among these components. Though there have been significant advancements in imaging technologies and their impact on risk assessments, follow-up is still warranted for low-suspicion findings (e.g., BI-RADS 3/probably benign lesions) as they continue to pose a small but clinically significant risk for malignancy.¹⁰ This is also true for cases of clinical-radiologic discordance as well as those that evolve on surveillance. Despite the high national burden of breast cancer and the frequent presentation of palpable breast lumps, there remains a need for contemporary, center-specific evidence from Pakistani tertiary care hospitals describing the histopathological spectrum of palpable breast lumps and quantifying malignancy prevalence using histopathology as the reference standard-particularly in regions where delayed presentation is common and diagnostic pathways vary across institutions. Therefore, this study aims to determine the prevalence of malignant breast lesions among women presenting with palpable breast lumps and to describe associated clinical characteristics in our setting.

METHODOLOGY

This hospital-based descriptive cross-sectional study was conducted at the General Surgery Department of Hayatabad Medical Complex, Peshawar, a large tertiary referral hospital serving patients from Khyber Pakhtunkhwa and surrounding areas. The study was conducted from February 23, 2025, to August 23, 2025. A consecutive (non-probability) sampling technique was used, and all eligible women presenting for the first time with a newly identified palpable breast lump were enrolled. All eligible patients during the study period consented to participate and completed histopathological evaluation; therefore, there were no refusals and no dropouts. A sample size of 163 was obtained through the use of the single population proportion formula ($n = Z^2 p(1-p)/d^2$), where $Z = 1.96$ (95% confidence level), the expected prevalence of malignancy $p = 0.27$ (based on previous regional estimates), and the absolute precision (margin of error) $d = 0.07$. The prevalence found in this study represents the prevalence of malignancy in hospitals because it is proportional (as a fraction) of the number of symptomatic women who present with palpable breast lumps and not prevalence on a population level. All women attending the outpatient department for the first time with a newly identified palpable breast lump were enrolled following the study's eligibility criteria. Women with a clinically identifiable breast mass, whether discovered by mistake or with symptoms, were included in the study's population. The presentation had

to be original and unaffected by prior therapeutic or diagnostic approaches to be eligible for the study. Exclusion criteria for the study include: previously diagnosed breast cancer females who had undergone breast surgery, or had undergone chemotherapy, hormonal therapy, or radiation, because these factors could alter the tissue structure or complicate the histology. Recurrent lumps, cases with inadequate documentation, and cases where biopsy samples were found to be insufficient for a thorough pathological analysis were also excluded in order to preserve methodological consistency and surgical detail. All eligible women underwent a detailed clinical evaluation performed by senior surgical faculty. A detailed medical history was taken, which included duration of the symptom, rate of progression, associated pain, nipple discharge, previous breast disease, hormonal exposure, lactation history, pregnancy status, age at first menstruation, menopause, and family history of breast and ovarian neoplasms. A breast examination was conducted according to oncology standards, including visual observation in different positions and systematic palpation of the breast and the regional lymphatic basins. Tumor characteristics, including size, laterality, quadrant of origin, contour, fixation, and regional nodal abnormality, were recorded in detail. All participants were required to undergo tissue sampling for histopathology, as this was the method by which the centre determined the gold standard for malignancy. The treating surgical team selected the biopsy method based on clinical indication and lesion characteristics (including size, location, clinical suspicion, and feasibility), and the planned procedure was explained to each participant and performed after informed consent was obtained. The core needle biopsy method using an automated 14-gauge device was favored for its superior diagnostic accuracy, reproducibility, and greater safety. Excisional biopsy was offered in patients with smaller, well-circumscribed lesions where complete removal was clinically appropriate. In contrast, an incisional biopsy was offered for larger or more infiltrative tumors where sampling would be required to plan for the closure of the multilayered surgical technique afterward. All samples were placed in 10% neutral buffered formalin and transferred to the hospital pathology laboratory as quickly as possible to maintain cellular integrity. In the pathology department, each lesion was determined to be either benign or malignant, and malignant tumors were further typed and graded morphologically according to the most recent WHO guidelines. Adequate tissue was obtained for histopathological interpretation in all included cases. Determining the prevalence of malignant breast lesions in women with palpable breast lumps was the primary aim of the study. Secondary analyses included age

stratification, lesion characteristics, and the ratio of malignant to benign pathologies. Data analysis was processed through statistical software (IBM SPSS 25.0). All the variables were summarized using descriptive statistics. Frequencies and percentages were used to summarize the categorical variables, and the mean $\pm$ standard deviation or the median (interquartile range) was used for continuous variables. Where necessary, inferential comparisons were carried out using the Chi-square test (categorical variables) and the independent-samples t-test (continuous variables), with p-values ≤ 0.05 considered significant. The study protocol was reviewed and approved by the Institutional Review Board/Ethics Committee of Hayatabad Medical Complex, Ref No. HMC-QAD-F-00/141-2, Dated:10-02-2022. Written informed consent was obtained from each participant prior to enrolment.

RESULTS

Participants represented a mean age of 38.7 ± 11.4 years with a range of 16-72 years. Most patients were in the age range of 31–50 years (52.1%), while some patients (23.9%) were less than 30 years old, and 24.0% were over 50 years old. The right breast was affected in 54.6% of patients, with the upper outer quadrant being the most commonly involved region (41.7%). The median tumor size at presentation was 3.1 ± 1.6 cm; most (58.3%) tumors were diagnosed within 3 months; however, tumors diagnosed more than 3 months after presentation were larger. 15.3% of the respondents reported a positive family history of breast cancer in first-degree relatives. Table-1

Table 1: Baseline Characteristics of Study Participants (n = 163)

Variable	Frequency	%age
Age Groups		
<30 years	39	23.9
31-50 years	85	52.1
>50 years	39	24.0
Breast Side		
Right	89	54.6
Left	74	45.4
Quadrant Involved		
Upper outer	68	41.7
Upper inner	24	14.7
Lower outer	37	22.7
Lower inner	19	11.7
Central/retroareolar	15	9.2
Symptom Duration		
< 3 months	95	58.3
3-6 months	52	31.9
> 6 months	16	9.8
Family History		
Positive (First-degree)	25	15.3
Negative	138	84.7
Reproductive Factors		
Premenopausal	111	68.1
Postmenopausal	52	31.9
Mean tumor size	3.1 ± 1.6 cm	-

Histopathology confirmed malignancy in 46/163 women (28.2%; 95% CI 21.9%–35.6%). Among malignant lesions (n=46), IDC accounted for 82.6%, followed by invasive lobular carcinoma (8.7%), medullary carcinoma (4.3%), and mucinous carcinoma (4.3%). All histopathological findings are presented in Table 2.

Table 2: Histopathological Findings (n = 163)

Pathology	Frequency	%age
Benign lesions	117	71.8
Fibroadenoma	58	35.6
Fibrocystic disease	31	19.0
Benign phyllodes	07	4.3
Mastitis/abscess	12	7.4
Others	09	5.5
Malignant lesions	46	28.2
Invasive ductal carcinoma	38	23.3
Invasive lobular carcinoma	04	2.5
Medullary carcinoma	02	1.2
Mucinous carcinoma	02	1.2

The rate of malignancy was 7.7% in the participants <30 years, 26.2% in women 31 to 50 years, and 48.7% in women >50 years. The size of the tumors was also associated with the level of malignancy, as tumors >3 cm were determined to yield significantly higher malignancy rates than those <3 cm ($p < 0.05$). Furthermore, malignancy was strongly associated with postmenopausal status (61.5% malignant in postmenopausal women vs. 12.6% in premenopausal women) and a positive family history (52.0% malignant in those with a family history vs. 24.6% in those without). Among the 46 patients with confirmed malignancy, axillary lymph node involvement was observed in 58.7% ($n=27$) of cases. Table-3

Table 3: Age-Wise and Risk Factor Association with Malignancy

Variable	Total Patients	Malignant (n, %)
Age Group		
<30 years	39	03 (7.7%)
31–50 years	85	22 (26.2%)
>50 years	39	19 (48.7%)
Family History		
Positive	25	13 (52.0%)
Negative	138	33 (23.9%)
Menopausal Status		
Premenopausal	111	14 (12.6%)
Postmenopausal	52	32 (61.5%)
Nodal Status (n=46)		
Node-Negative	19	-
Node-Positive	27	-

Tumor size was significantly associated with malignancy. Lesions >3 cm had a higher malignancy proportion than lesions ≤3 cm (47.8% vs 14.6%), and tumor size >3 cm was associated with increased odds of malignancy (OR 5.36; 95% CI 2.56–11.22; $\chi^2 = 19.84$, $df = 1$, $p = 0.0000084$). Table-4

Table 4: Association of Tumor Size with Malignancy (n = 163)

Tumor Size	Malignant (n, %)	Benign (n, %)	Total	Odds Ratio (95% CI)	p-value
>3 cm	32 (47.8)	35 (52.2)	67	5.36 (2.56–11.22)	<0.001
≤3 cm	14 (14.6)	82 (85.4)	96	1.0 (Reference)	

DISCUSSION

This study involved 163 women presenting with breast lumps at a single-center tertiary care hospital. The overall 28.2% prevalence of malignancy found on histopathology is consistent with some regional data, although slightly higher, indicating the significant impact of cancer in this highly symptomatic patient cohort.¹¹ The malignancy rate in this study is comparable to other similar studies from developing countries. For example, a study reported 24.2% malignancy rate among breast lumps.¹² Ibrahim et al also reported a carcinoma rate of 29.3% in women over 30 with palpable lumps from South Punjab.¹³ Such data highlights the presence of a significant cancer burden within palpable breast lumps in Pakistan and other similar developing countries. Our observed prevalence of breast cancer is also in agreement with other studies. Malignancy rate of 26.9% has been recorded among 595 women with palpable masses in a study by Ibrahim et al.¹⁴ The presence of breast lumps in unscreened women populations has a significant risk and broadens the scope for timely interventions. The distribution of histopathological subtypes reflects expected patterns. In our cohort, IDC was the most common malignant lesion, a finding which is universally acknowledged in pathology. This is further corroborated by the literature worldwide, which indicates that invasive ductal carcinoma (IDC) is the most common histological subtype. Among the benign lesions, the most frequently reported was fibroadenoma, again in keeping with the clinico-pathological profile of the larger studies.^{15,16} A cross-sectional series from Karachi reports that 75.3% of breast lesions were benign, with fibroadenoma as the most common subtype.¹⁷ In our cohort, age was the strongest determinant of malignancy, with older patients having a higher proportion of cancer. This age-related gradient is well described in the literature, as Mukhtar et al. reported a higher frequency of malignancy in patients >30 years in South Punjab.¹⁸ This emphasises a well-established clinical tenet in oncologic surgery that older patients deserve the utmost attention and prompt intervention when presenting a breast lump. Besides age, we further revealed that larger tumor size (>3 cm) was highly correlated with

malignancy, and malignancy was more common in postmenopausal women and those with positive first-degree family history. Moreover, over 50% of malignant cases were clinically involved in the axillary nodes, highlighting the possibility of clinically advanced disease at presentation and the necessity of fast-tracked diagnostic and referral channels for symptomatic individuals. The imaging data can serve as background information in addition to our findings, which are based on histopathology. Imaging was not included as a study variable; therefore, we did not assess either imaging-histopathology concordance or the diagnostic accuracy of mammography/ultrasound in our cohort. However, the published literature supports the use of imaging in the evaluation of palpable breast lumps. For example, studies assessing mammographic BI-RADS categorization have reported that lesions with higher BI-RADS categories have higher malignancy rates, particularly BI-RADS 5 lesions.¹⁹ On the same note, ultrasound performance has been described as good in certain environments; a study published in India reported a sensitivity of 80% and specificity of 97% when ultrasound results were compared with histopathology.²⁰ Taken together, some reports verify the usual methodology of integrating clinical examination, relevant imaging, and tissue diagnosis, and acknowledge that our research, in particular, provides prevalence estimates confirmed by histopathology. Together, our findings support a few important points. First, nearly one in three palpable breast tumors in our surgical outpatient group is malignant. This fact necessitates an immediate pathological examination of the lesions. Second, surgical units in similar settings must maintain a low threshold for performing a biopsy, especially for older patients or those who present with signs or features that are clinically suspicious, because the cancerous lesions found indicate such a high level of the disease. Third, implementing established imaging pathways (e.g., ultrasound in younger women and mammography in older women) can strengthen diagnostic processes. However, this will need to be measured in the future, once systematic data on imaging and histopathology are captured.

LIMITATIONS

There are some limitations for the present study. Cross-sectional designs limit temporal judgments, and because imaging data were not captured, we are unable to comment on the sensitivity or specificity of the imaging modalities in this cohort. Our sample was drawn from a single institution, potentially limiting the extent to which our findings can be applied to other regions, other healthcare settings, or different

combinations thereof. Further research, including standardized imaging and long-term follow-up to assess outcomes, disease stage at diagnosis, and survival, is recommended. Furthermore, studying possible risk determinants, including reproductive and family history and breast density, may provide insight into predictors of malignancy in this population.

CONCLUSIONS

In women who reported palpable breast lumps in our tertiary care surgical outpatient, one out of every four had histopathological evidence of malignancy, of which invasive ductal carcinoma was the most common subtype. Increasing age and large tumor size (>3 cm) were also significant predictors of malignancy, postmenopausal status, and positive first-degree family history. Clinical axillary nodal involvement was reported in more than half of malignant cases, indicating that a significant number of patients present with clinically advanced disease. These findings emphasize the importance of timely evaluation and biopsy-based confirmation in symptomatic breast lumps, particularly in higher-risk presentations, and support strengthening standardized diagnostic pathways that integrate clinical assessment, appropriate imaging where available, and histopathology in resource-limited settings.

CONFLICT OF INTEREST: None

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AUTHORS CONTRIBUTION

Rafia Ahmad - Concept & Design; Data Acquisition; Data Analysis/interpretation; Drafting Manuscript; Critical Revision; Final Approval

Muhammad Shah - Concept & Design; Data Acquisition; Data Analysis/interpretation; Drafting Manuscript; Critical Revision; Supervision; Final Approval

Shimee Shahzadi - Concept & Design; Data Acquisition; Data Analysis/interpretation; Drafting Manuscript; Final Approval

Shehzad Akbar Khan - Concept & Design; Data Acquisition; Data Analysis/interpretation; Drafting Manuscript; Supervision; Final Approval

The authors accept responsibility for all aspects of the work and will ensure that any concerns regarding the accuracy or integrity of any part are properly investigated and resolved.



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