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INTEGRATED EVALUATION OF BI-RADS CLASSIFICATION, HISTOPATHOLOGICAL FEATURES, AND IMMUNOHISTOCHEMICAL BIOMARKERS IN MALIGNANT BREAST LESIONS

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ABSTRACT
Breast carcinoma is a heterogeneous disease requiring accurate diagnostic evaluation through multiple modalities. Integration of radiological assessment, histopathological examination, and immunohistochemical profiling plays a vital role in improving diagnostic precision and guiding strategies for treatment. To perform an integrated evaluation of BI-RADS classification, histopathological structures, and immunohistochemical biomarkers in malignant breast lesions and to assess their interrelationships. A total of 172 histopathologically confirmed malignant breast lesions were analyzed in this cross-sectional study. Radiological findings were categorized using BI-RADS classification, while histopathological examination and tumor grading were performed using standard criteria. Molecular subtypes were identified by immunohistochemical examination of the progesterone receptor (PR), estrogen receptor (ER), and HER2. The Chi-square test was used for statistical analysis, and $p < 0.05$ was deemed significant. The most common subtype was invasive ductal carcinoma, with the majority of tumors exhibiting intermediate size and moderate differentiation. Most of the patients showed hormone receptor positive, and a sizable portion had HER2 overexpression. The most prevalent molecular subtype was luminal A. No statistically significant correlation was found between BI-RADS classification or immunohistochemical markers and histopathological subtype. However, tumor grade demonstrated a highly significant association. The findings emphasize that radiological and immunohistochemical parameters alone are insufficient predictors of tumor characteristics. An integrated, multidisciplinary approach is essential for accurate diagnosis, prognostic evaluation, and effective management of breast carcinoma.

KEYWORDS: BI-RADS; Histopathology; Breast carcinoma; Immunohistochemistry; Molecular subtypes

1. INTRODUCTION

One of the most common cancers affecting women worldwide is breast carcinoma, which still presents significant difficulties for diagnosis, prognosis, and treatment. The complexity of breast carcinoma is its heterogeneity, which entails a wide spectrum of morphological, molecular and clinical phenotypes. Proper diagnosis and classification is thus necessary in planning the treatment and enhancing the patient outcome. Multidisciplinary approach involving the integration of radiological, histopathological and molecular analysis has increasingly become relevant over the years in understanding tumor behavior and in development of clinical decision making.

Radiological examination, in particular, the Breast Imaging Reporting and Data System (BI-RADS) is one of the main determinants of early diagnosis and risk-adjustment of breast lesions. BI-RADS is a standard scheme of interpreting the outcomes of imaging and classifying lesions based on their potential to become malignant. In a number of studies, the relevance of BI-RADS in clinical practice, including improving diagnostic reliability and biopsy decision-making have been emphasized (Ciurescu et al., 2025). Nevertheless, although it is widely used, radiological assessment alone might not necessarily give background of the underlying histopathological nature of lesions necessitating further correlation with tissue based diagnosis. The gold standard of determining breast carcinoma would be through the use of the histopathological examination. It provides valuable insights into tumor morphology, differentiation and structural features that are valuable in classification and prognostication. It has been demonstrated that the correlation of the histopathological data with the radiological data will be more accurate in the diagnosis and will reduce false interpretations (Aziz et al., 2022). In addition, the combination of cytological and histological evaluation with the outcome of imaging has been reported to play a role in the improvement of the accuracy of lesion characterization particularly in the case of the difficult ones (Farras Roca et al., 2021). Although these advances have been made, there is still variability in the correlation between imaging and pathology, and to address this variability, comprehensive evaluation should be considered.

In addition to morphological analysis, biomarkers of immunohistochemical biomarkers have proved to be important as far as characterisation of breast carcinoma is concerned. ER (estrogen receptor), PR (progesterone receptor) and HER 2 (human epidermal growth factor receptor 2) are the most important markers that can be used to obtain valuable information about the tumor biology, its therapeutic responsiveness and prognosis. The categorization of breast carcinoma into molecular subcategories using these markers has greatly revolutionized clinical management with the ability to provide personalized approaches in treating cancer. It has been demonstrated that immunohistochemical profiling is necessary to identify biologically distinct tumor subgroups with different clinical outcomes (Naznin et al., 2026). The correlation between imaging results and molecular features has also been discussed during the past few years. The studies of radiologic-pathologic correlation indicate that some imaging characteristics can be an indication of underlying tumor biology, such as molecular subtype and proliferative activity (Galati et al., 2022). The use of advanced imaging methods, such as MRI and ultrasound-based biomarkers has shown promise in predicting tumor aggressiveness and biomarkers can be used to guide treatment approaches (Pessoa et al., 2026). Besides, the combination of imaging biomarkers with artificial intelligence and radiomics is a promising area, which offers a better diagnostic accuracy and predictability (Saleh et al., 2023). With these developments, there are still discrepancies in correlating the radiological results with the histopathological and molecular results. Some studies have also found that limited or variable correlation exists between BI-RADS categories and histological subtypes and therefore imaging may not be a reliable predictor of tumor behavior (Mohan et al., 2024). In the same vein, efforts to correlate sonographic appearances with tumor grade and biomarker expression have shown mixed results, further highlighting the complexity of the biology of breast carcinoma (Moradi et al., 2025). Retrospective studies have also indicated discrepancies between imaging classification and final histopathological diagnosis, highlighting the need of integrated evaluation (Vardhan et al., 2026). In recent studies, there has been an emphasis on integrating various diagnostic modalities with the aim of enhancing the accuracy and prognostic evaluation. The combination of imaging properties with histological and immunohistochemical variables has proved to be better in predicting tumor behavior and treatment response (Gu et al., 2021). Also, all-encompassing models with radiomic features, pathological markers, and clinical variables are in the process of development to improve decision-making in the management of breast carcinoma (Elsayed et al., 2023).

Because of the nature of the heterogeneity of breast carcinoma and limitations of individual diagnostic methodology, there is a greater level of interest in a more ample framework combining radiological, histopathological, and molecular data. Such an approach is not only capable of helping to increase diagnostic accuracy, but can also lead to a more comprehensive vision of tumor biology that eventually will lead to better patient outcomes.

Objectives of the Study

1. To evaluate the clinicopathological and histopathological characteristics of malignant breast lesions.
2. To assess the immunohistochemical expression of ER, PR, and HER2 and classify tumors into molecular subtypes.
3. To determine the correlation between BI-RADS classification, histopathological features, and immunohistochemical biomarkers in malignant breast lesions.

2. MATERIALS AND METHODS

2.1 Study Design and Setting

This research was carried out as a cross-sectional observational study that would assess the relationship between radiological findings, histopathological characteristics, and immunohistochemical biomarkers in malignant breast lesions. The research was conducted at the Department of Pathology with the collaboration of the Department of Radiology in one of the tertiary care center and this ensured a multidisciplinary approach to diagnosis and analysis.

2.2 Study Population

A total of 172 cases of malignant breast lesions confirmed by an examination of histopathological samples were included in the study. These cases were picked among the patients who received an evaluation of the radiology and then biopsy or excision. It was believed that the sample size was sufficient to determine patterns of distribution and the correlations between the variables being studied.

2.3 Exclusion and Inclusion Criteria

All the cases involved in the study were histopathologically confirmed malignant lesions in the breast with radiological classification available as well as immunohistochemical profiling of the breast lesion in terms of ER, PR and HER2. Cases that lacked complete clinical information, lacked radiological records or immunohistochemical analysis were not included. The study also eliminated benign breast lesions to preserve a specificity in diagnosis.

2.4 Data Collection

The collection of data was done in a structured format through review of data in hospital records and pathology reports. The obtained data comprised the clinicopathological parameters including the tumor laterality, tumor size, and histopathological type. Radiological observations were recorded as per the BI-RADS, and the immunohistochemical of ER, PR and HER2. All the data were properly organized to enable further statistical analysis.

2.5 Histopathological Examination

The tissue specimens obtained, by either biopsy or surgical excision, were fixed in 10% neutral buffered formalin, processed routinely, and embedded in paraffin. Slices were subjected to staining with hematoxylin and eosin and observed

under light microscopy. Tumors were estimated as per standard histopathological parameters, and grading was done using modified Bloom-Richardson system, and grading was done into Grade I, Grade II, and Grade III according to differentiation.

2.6 Immunohistochemical Analysis
The immunohistochemical staining on formalin-fixed, paraffin-embedded tissue sections was done using antibodies specific to estrogen receptor (ER), progesterone receptor (PR), and human epidermal growth factor receptor 2 (HER2). Expression of ER and PR was evaluated using nuclear staining and reported as positive or negative. The evaluation of HER2 expression was based on the intensity of membrane staining and was scored as 0, 1+, 2+ or 3+, where 0 and 1+ were considered negative and 2+ and 3+ positive.

2.7 Molecular Subtyping
According to immunohistochemical results, it was possible to classify tumors into molecular subtypes. Luminal A tumors were defined as the ER and/or PR positive tumors with the HER2 negative. Luminal B tumors were defined as the ER and/or PR positive tumors that are the HER2 negative. ER and PR negativity with HER2 positivity characterized HER2-enriched tumors, whereas triple-negative tumors did not express ER, PR, and HER2. It was based on this classification to evaluate the biology of tumors and their therapeutic implications.

2.8 Radiological Assessment (BI-RADS Classification)
Radiological assessment was conducted based on conventional imaging techniques like mammography and/or ultrasound. The results were classified based on the Breast Imaging Reporting and Data System (BI-RADS), which offers a standardized model of evaluating the breast lesions. The BI-RADS types were documented and subsequently compared to histopathological and immunohistochemical results.

2.9 Statistical Analysis
All the data obtained were put into a database and the data analyzed with the help of suitable statistical software. The data was summarized using descriptive statistics, in terms of frequencies and percentages. The Chi-square test was employed to test the relationship between the BI-RADS classification and the histopathological subtypes, immunohistochemical markers and histopathology, and histopathology and prognostic factors such as the tumor grade, size and laterality. The p-value of less than 0.05 was considered as statistically significant.

2.10 Ethical Considerations
The research was carried out following the ethical standards and was endorsed by the Institutional Ethics Committee. Patient confidentiality was ensured and all the data anonymised before analysis. Since this research was a retrospective/ prospective study of the existing records, there was no direct intervention on the patient.

3. RESULTS
3.1 Clinicopathological Characteristics
The present study included 172 histopathologically confirmed malignant lesions in the breast. The clinicopathological examination was done so as to fully evaluate tumor localization, morphologic features and biological dynamics.

3.1.1 Laterality of Breast Lesions: The distribution of the breast lesions of the body was assessed to identify the patterns of laterality and possible asymmetry in the tumor occurrence (Table 1). Clinically, such analysis may be relevant to tumor development since it may be affected by anatomy, hormones or even vascular factors.

Table 1: Distribution of Breast Lesions by Laterality

Laterality	Frequency (n=172)	Percentage (%)
Left	92	53.5
Right	74	43.0
Bilateral	5	2.9
Others	1	0.6

The results show that there was a minor prevalence of left-sided lesions (53.5%) over right-sided lesions (43.0%), whereas bilateral lesions were not common (2.9%). The distribution of breast lesions depends on the laterality as shown in Figure 1.

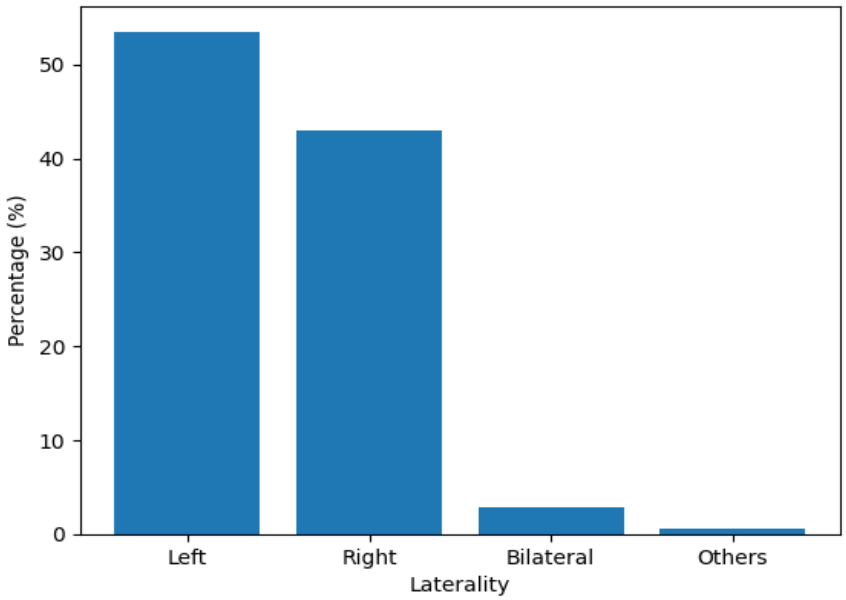

Figure 1: Breast Lesions by Laterality

The asymmetrical distribution shown in the graphical representation in Figure 1 suggests that there is a marginal predominance at the left-hand side in malignant breast lesions in the study sample and this is in line with previously reported results.

3.1.2 Histopathological Subtypes: The histopathological classification was conducted to determine the distribution of the types of malignant tumors. This classification plays a basic role in comprehending the genesis of the tumor, its biological characteristics, and clinical connotations (Table 2).

Table 2: Distribution of Histopathological Subtypes

Histological Type	Frequency	Percentage (%)
Invasive ductal carcinoma (NST)	161	93.6
Mucinous carcinoma	5	2.9
Invasive lobular carcinoma	3	1.7
Papillary carcinoma	3	1.7

The most frequent subtype (93.6%), was invasive ductal carcinoma (NST), and other variants were noticed in small proportions, which proves its predominance in the malignant lesions of the breast. Table 3 in the present study explains the distribution of histopathological subtypes as shown in Figure 2.

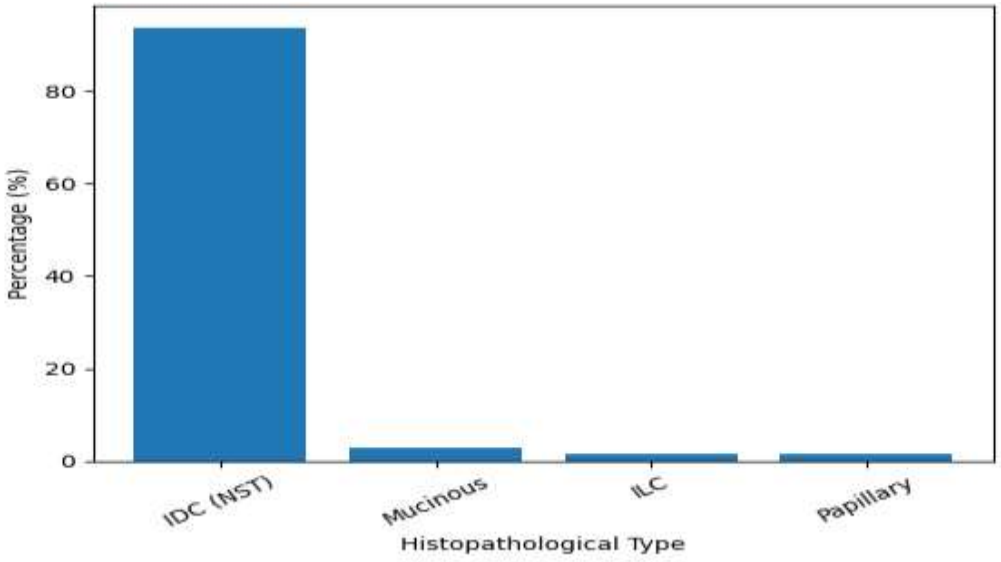

Figure 2: Histopathological Subtype's distribution

As Figure 2 demonstrates, the central role of invasive ductal carcinoma is apparent due to its marked predominance in the clinical practice.

3.1.3 Tumor Grade: The modified Bloom-Richardson system was used to evaluate tumor grading in terms of the degree of differentiation and tumor aggressiveness. The parameter is a vital prognostic parameter (Table 3).

Table 3: Distribution of Tumor Grade

Grade	Frequency	Percentage (%)
Grade I	31	18.0
Grade II	106	61.6
Grade III	35	20.3

Mostly moderately differentiated tumors (Grade II, 61.6%), followed by poorly differentiated (Grade III, 20.3%) and well-differentiated tumors (Grade I, 18.0%), thus showing intermediate tumor aggressiveness. Figure 3 shows the distribution of the tumor grades observed in the population of the study.

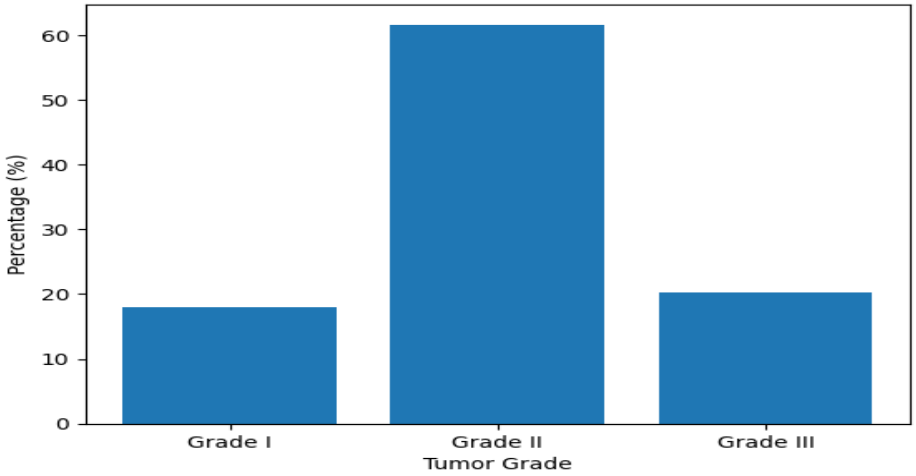

Figure 3: Distribution of Tumor Grades

The moderately differentiated tumors are the most common type, then there are poorly differentiated and well-differentiated tumors as shown in Figure 3. This trend indicates that most cases occur in the middle grade, indicating that there is a balanced distribution of both the lower and higher grades of tumor aggressiveness in the study population.

***3.1.4 Tumor Size Distribution*:** The size of the tumor was classified as per the TNM classification to determine the size of the disease at its initial presentation. One of the factors that affect the staging and prognosis is the tumor size (Table 4).

Table 4: Distribution of Tumor Size

Tumor Size	Frequency	Percentage (%)
T1 (<2 cm)	55	32.0
T2 (2–5 cm)	100	58.1
T3 (>5 cm)	17	9.9

The distribution of tumor sizes was T2 (58.1%), which showed that most of the patients were found to have intermediate-sized tumors. The breakdown of the categories of tumor sizes in the study population is shown in Figure 4.

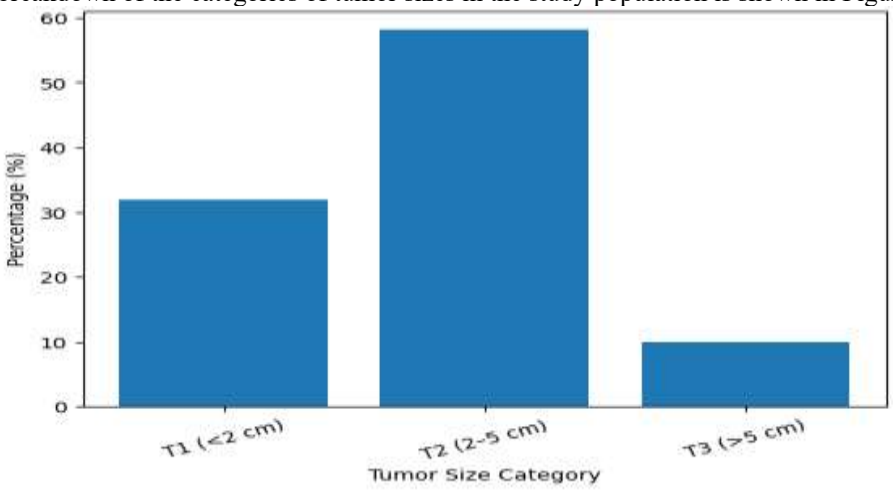

Figure 4: Distribution of Tumor Size

The largest percentage of tumors have intermediate size, then smaller-size tumors, and larger tumors are relatively less common (Figure 4). This distribution is such that the majority of patients present with lesions of intermediate size, and there is no rise or fall in the distribution beyond that range.

3.2 Immunohistochemical Profile

To determine the expression of ER, PR, and HER2 biomarkers, which are critical in understanding tumor biology, as well as to guide targeted therapy, immunohistochemical analysis was conducted.

3.2.1 Estrogen Receptor (ER) Status: ER expression was determined to evaluate the hormonal responsiveness of tumors (Table 5).

Table 5: ER Status Distribution

ER Status	Frequency	Percentage (%)
Positive	96	55.8
Negative	76	44.2

ER-positive tumors (55.8%), were more than half of the tumors, indicating that a substantial percentage of the tumors is hormone responsive. Figure 5 depicts the distribution of the estrogen receptor status of the study population.

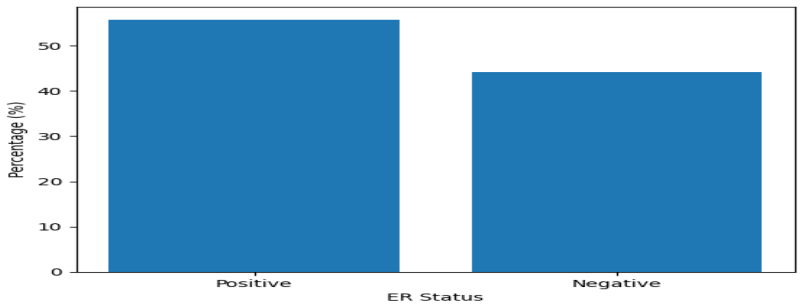

Figure 5: Distribution of Estrogen Receptor (ER) Status

As Figure 5 illustrates, a slightly higher proportion of tumors with positive receptor expression is observed as opposed to receptor-negative cases. This trend shows that predominant tumors in the study group consisted of hormonally responsive tumors, and thus the generalizability of endocrine therapy to a significant proportion of the study population.

3.2.2 Progesterone Receptor (PR) Status: PR expression was considered as a complementary signifier of endocrine functioning (Table 6).

Table 6: PR Status Distribution

PR Status	Frequency	Percentage (%)
Positive	95	55.2
Negative	77	44.8

PR positivity (55.2) was similar to ER status, with uniform expression patterns of hormonal receptors. Figure 6 shows the distribution of progesterone receptor status in the study population.

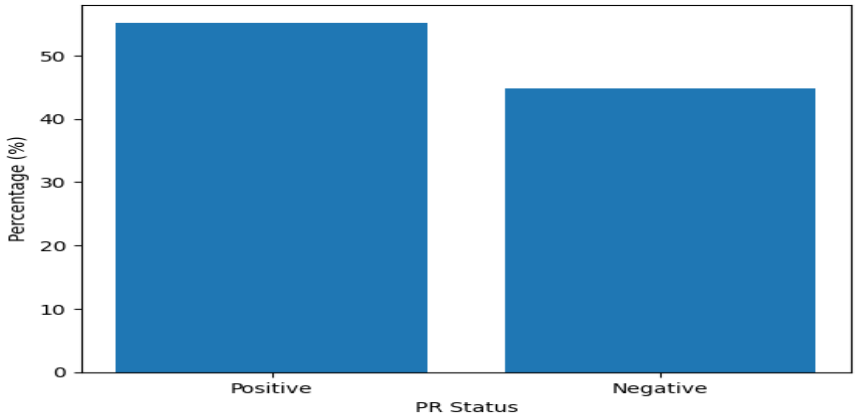

Figure 6: Distribution of Progesterone Receptor (PR) Status

Tumors with positive expression of progesterone receptor are a bit more common than receptor-negative tumors as depicted in Figure 6. This trend aligns with the observed profile of hormonal receptors and speculates that a significant

percentage of cases could present as endocrine sensitive which supports the significance of PR as an aiding biomarker in breast carcinoma diagnosis.

***3.2.3 HER2/neu Status*:** The expression of HER2 was determined to determine tumors with aggressive features and therapeutic consequences (Table 7).

Table 7: HER2 Status Distribution

HER2 Score	Frequency	Percentage (%)
0	102	59.3
2+	19	11.0
3+	51	29.7

A high rate of aggressive tumors was seen in 29.7% of the cases with the HER2 overexpression (3+) (Table 7). Figure 7 shows the distribution of the HER2 expression in malignant lesions of the breast.

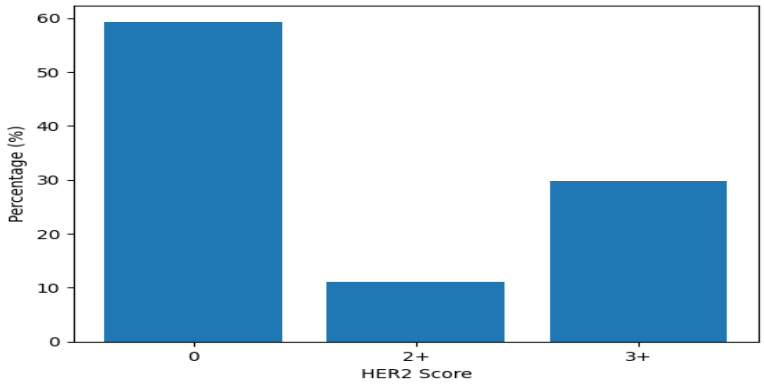

Figure 7: Distribution of HER2 Status

Figure 7 shows that tumors with no HER2 expression make up the largest percentage, with a significant but lesser percentage expressing HER2 strongly.

3.3 Molecular Subtypes of Breast Carcinoma

According to the immunohistochemical expression, molecular subtyping was done to classify tumors into biologically distinct groups (Table 8).

Table 8: Distribution of Molecular Subtypes

Molecular Subtype	Frequency	Percentage (%)
Luminal A	57	33.1
HER2-enriched	43	25.0
Luminal B (HER2+)	27	15.7
Triple-negative	28	16.3
Luminal B (HER2−)	11	6.4
Unclassified	6	3.5

There was a high degree of heterogeneity with the most common subtypes being luminal A (33.1%), HER2-enriched (25.62%), and triple-negative tumors (21.7 percent). Figure 8 provides the distribution of molecular subtypes that was observed in the study population.

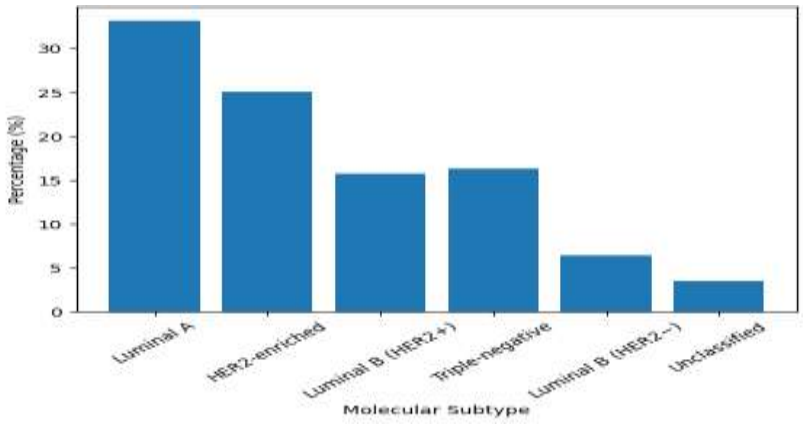

Figure 8: Distribution of Molecular Subtypes

Luminal A tumors are the most common subtype, with HER2-enhanced and other molecular subtypes representing minor subtypes. Triple-negative and luminal B subtypes can also be observed with a smaller percentage of cases remaining unclassified.

3.4 Radiological Assessment (BI-RADS Classification)

Radiological assessment was performed by the use of BI-RADS classification to assess the imaging features and diagnostic classification (Table 9).

Table 9: Distribution of BI-RADS Categories

BI-RADS Category	Frequency	Percentage (%)
I	22	12.8
II	14	8.1
III	1	0.6
IV	13	7.6
V	3	1.7
Others (Missing BI-Rads)	119	69.2

A significant percentage of cases (69.2) were classified as Missing BI-RADS data and were therefore grouped under "Others" Category. The remaining cases were categories I to V, Category I being the most frequently reported. Figure 9 shows the distribution of BI-RADS categories in the study population.

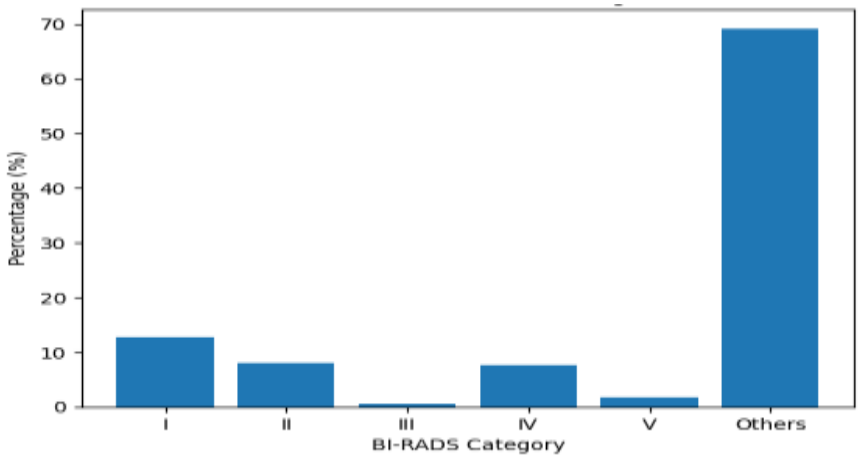

Figure 9: Distribution of BI-RADS Categories

Figure 9 shows that a significant percentage of cases do not belong to the standard BI-RADS categories, and the proportion of cases in the classified groups is lower in the highest-risk groups than in the lowest-risk groups.

3.5 Correlation Analysis

Correlation was conducted to determine the relationships between radiological results, histopathological appearances and immunohistochemical biomarkers.

3.5.1 Correlation of IHC Markers with Histopathology

Table 10: Association Between IHC Markers and Histopathology

Marker	χ^2 Value	p-value	Significance
ER	2.641	0.450	Not Significant
PR	4.045	0.257	Not Significant
HER2	5.505	0.481	Not Significant

It was found that there was no statistically significant correlation between immunohistochemical markers and histopathological subtype.

3.5.2 Correlation of BI-RADS with Histopathology

Table 11: Association Between BI-RADS and Histopathology

Parameter	χ^2 Value	p-value	Significance
BI-RADS Classification	10.929	0.758	Not Significant

There was no significant correlation between histopathological subtype and BI-RADS classification.

3.5.3 Correlation of Histopathology with Tumor Grade

Table 12: Association Between Histopathology and Tumor Grade

Parameter	χ^2 Value	p-value	Significance
Tumor Grade	26.403	<0.001	Highly Significant

Histopathological subtype and tumor grade were found to be interrelated in a highly significant correlation and it is due to its prognostic value.

4. DISCUSSION

The present study aimed to perform an integrated evaluation of BI-RADS classification, histopathological features, and immunohistochemical biomarkers in malignant breast lesions. The results underscore the heterogeneity and complexity of breast carcinoma and the value of a combination of various diagnostic modalities to accurately characterize and manage. The clinicopathological examination showed that the most common histological subtype was invasive ductal carcinoma with majority of the tumors having moderate differentiation and intermediate sizes at the time of presentation. These results indicate that such a high percentage of patients appears at the stage when the early diagnosis and the developed progression are absent, indicating the patterns of diagnosis that are conditioned by the availability of screening tests and the full-fledged progression. The issue of tumor grade was also identified as a critical parameter, thus strengthening the already established status of the tumor grade as a critical prognostic factor in breast carcinoma. The immunohistochemical profile has shown that a large proportion of patients can potentially receive endocrine therapy. The HER2 expression was found in a significant percentage of cases, which is indicative of the existence of aggressive tumor phenotypes and the existence of hormonally responsive tumors. Molecular subtyping also showed the dominance of luminal A subtype, other subtypes like HER2-enriched and triple-negative tumors also made contributions towards the overall heterogeneity. The findings highlight the significance of immunohistochemistry in tumor biology and targeted treatment approaches.

The non-existence of statistically significant correlation between BI-RADS classification and histopathological subtypes was one of the main findings of this study. The implication of this observation is that radiological assessment in itself might not always be effective in predicting the underlying pathological nature of breast lesions. This has been seen in other studies that have utilized advanced imaging techniques where imaging appearances have had a limited capacity of reliably differentiating tumor characteristics without a histopathological validation (Ru et al., 2026). Furthermore, despite the fact that the ultrasound-based vascular and microflow imaging methods have been proved to have higher detectability rates, the association of these methods with the histological parameters is inconsistent (Park et al., 2019; Ternifi et al., 2022).

Increasing application of radiomics and artificial intelligence has demonstrated potential in improving the quality of the diagnostic process, especially in challenging cases like BI-RADS category 4 lesions. The studies conducted by deep learning and radiomic-based methods have demonstrated that such methods can be better used to differentiate between benign and malignant lesions, although further validation of the methods across a variety of clinical settings is still needed (Yang et al., 2024; Hong et al., 2022). Though such progress has been made, current evidence suggests that the more traditional BI-RADS classification might not be as predictive of histopathological outcome. The absence of significant relationships between immunohistochemical staining and histopathological subtype also highlights the complexity of tumor biology. Whereas histopathology indicates the morphological features of the tumor, immunohistochemical markers indicate the molecular and functional aspects of the tumor. These findings resemble previous studies that reported that imaging and molecular biomarkers are not necessarily directly correlated with histological patterns (Guo et al., 2018; Li et al., 2022). This highlights the importance of combined analysis and not using one parameter.

Recent studies have investigated the possibilities of integrating imaging characteristics with molecular and clinical information to enhance predictive accuracy. Multimodal strategies combining the effects of ultrasound parameters, clinical factors, and molecular biomarkers have demonstrated a better capacity to predict subtypes of tumors and treatment response (Li et al., 2025; Ma et al., 2025). Also, BI-RADS-based machine learning-based models have shown promise in predicting molecular subtypes using BI-RADS features, but their routine clinical application is limited (Wu et al., 2019). High-level imaging modalities like diffusion-weighted MRI and elastography have also been explored as a means to determine tumor aggressiveness and metastatic potential. These modalities bring quantitative biomarkers that can be used to complement the traditional diagnostic methods (Meng et al., 2021; Zhang et al., 2022). Moreover, recent studies have highlighted the role of imaging in differentiating HER2 expression patterns, further supporting the integration of radiological and molecular data (Zhou et al., 2025).

There are some limitations of the study. Since the study is carried out in only one center, the results might not be applicable to the general populations. The variability in BI-RADS classification with the presence of high proportion of unclassified cases may be due to inconsistencies in radiological reports. Also, there is no long-term follow-up data which restricts the possibility to evaluate survival rates and treatment adherence. The use of immunohistochemical markers without using advanced methods of molecular detection and analysis can limit the level of biological interpretation as well. To confirm these findings, future studies need to be carried out on multicenter studies with large sample size. Standardization of radiological reporting and incorporation of advanced imaging techniques such as radiomics and artificial intelligence may improve diagnostic accuracy. Further addition of genomic and molecular profiling to images and histopathological data may further improve the knowledge of tumor behavior. Longitudinal studies on the outcomes of treatment and survival would be useful in providing information on the clinical importance of integrated diagnostic methods.

5. CONCLUSION

The current study emphasizes the need of an integrated approach in the assessment of malignant breast lesions by combining radiological, histopathological and immunohistochemical parameters. Invasive ductal carcinoma became the most common histological subtype and most tumors were moderately differentiated with intermediate size at presentation. The biological heterogeneity of breast carcinoma was observed with an excess proportion of hormone receptor-positive tumors and a significant proportion of HER2-positive tumors. Although BI-RADS classification is widely used in clinical practice, no significant correlation was found between the radiological findings and the histopathological subtypes, which reveals the limitations of imaging used alone in making accurate predictions of tumor characteristics. In the same way, the immunohistochemical markers were not found to have a statistically significant relationship with the histopathological patterns. Nevertheless, the tumor grade demonstrated a significant and statistically significant correlation that supports the idea of tumor grade as one of the key prognostic factors. On the whole, it is important to note the results that indicate that no single diagnostic modality can be used to conduct a comprehensive evaluation. In the management of breast carcinoma, an accurate diagnosis, prognostic evaluation and effective treatment planning requires a multidisciplinary and integrated approach.

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