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Research Article

An Analysis of the Histopathological Spectrum of Breast Lesions

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Abstract

Introduction: About one-quarter of all malignant tumors and one-third of all malignancies in women are breast cancers. This life-threatening illness not only imposes a financial strain on the patient, her family, and society but also leads to emotional turmoil.

Materials and methods: From October 2024 to October 2025, a retrospective study was conducted at the Department of Pathology, SCPM Multi Super Specialty Hospital. Tissue samples were fixed in 10% formalin for hematoxylin-eosin (H&E) staining, then underwent standard procedures for paraffin embedding and H&E staining. Histopathological features were recorded, and tumors were classified according to the World Health Organization criteria and graded using the modified Bloom-Richardson system.

Results: Among the 50 samples collected, 98% were from women, total 50 samples. The most common age for the onset of breast nodules was approximately 12 years, accounting for 28.6% of the cases. The samples included both malignant and benign lesions. Out of the 42 benign lesions, 12 were identified as fibroadenomas (28.6%), and 10 were classified as inflammatory (23.8%). Of the 8 malignant lesions, 4 were diagnosed as infiltrative duct cell carcinomas, representing 50% of the malignant cases.

Conclusion: The pattern of breast lesions can help determine their clinicopathological characteristics. For effective treatment, it is essential to correlate the clinical and histological diagnoses of a breast nodule.

Keywords: Breast malignancies carcinoma, Fibroadenoma, Infiltrative duct cell Carcinoma

1. Introduction

The breast lesions are a heterogeneous population of pathological entities, which are defined by a different set of histomorphologic features. The need to diagnose breast masses promptly and accurately has become especially urgent in recent years, as the burden of breast neoplasia in the world manifested itself in the rise in the number of deaths and disease rates, which became especially important in the environment of a further awakening of women to breast lumps [1].

Numerous studies of investigation have outlined the range of breast lesions that reveal the variability of the lesions in different geographical regions and in different ethnic groups. Breast lesions commonly appear in a clinical presentation as hard irregular masses that are fixed and trapped in the surrounding tissues. Etiologically, the lesions could either be a result of fibrocystic changes, fibroadenoma, infectious, galactoles, or malignancies. About 10 percent of these masses are malignant [2]. Malignant breast tumours cases constituted 1.38 million cases in the year 2008 according to World Health Organization data which is equivalent to 10.9 per cent of all cancer cases [3]. The second malignant neoplasm that occurs in women, after cervical carcinoma, is breast cancer with an incidence rate of 20 per 100000 women [4,5]. Notably, the largest proportion of the breast lesions is benign [6].

The benign ones include fibroadenoma, phyllodes tumour, gynecomastia, breast abscess and chronic mastitis, whereas the malignant ones are ductal carcinoma, lobular carcinoma, colloid carcinoma and medullary carcinoma. Incidences of benign lesions usually begin in the 2nd decade of life and increase gradually in the 4th and 5th decades, but malignant incidence increases post menopause [7, 8]. The diagnostic assessment of breast lesions cannot be done without histopathological examination as the main reference standard to evaluate the efficacy of therapeutic applications and diagnostic, therapeutic and prognostic decision-making on breast pathology [9]. The main objective of the investigation is to clarify and highlight the histopathologic spectrum and occurrence of the breast lesions.

Aim This study aims to evaluate the prevalence, demographics, and histological features of breast cancer in a tertiary care hospital.

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MATERIALS AND METHODS

This retrospective study took place at the Department of Pathology, SCPM Multi Super Specialty Hospital from October 2024 to October 2025. The study included all mastectomy specimens with suspected neoplastic and non-neoplastic breast lesions that were collected for histopathological analysis during this period. Women with obvious malignancy or those who had previously received cancer treatment were not included in the study. Mastectomy specimens made up a smaller percentage of the 50 specimens, with lumpectomy specimens making up the majority. Information such as clinical presentation, MRI, FNAC, mammography results, and other pertinent details was gathered from the histopathological questionnaire. Clinical data, mammography findings, and related special investigations were documented using a pro forma. With the exception of cystic lesions, fine needle aspiration was performed without the aspiration technique. If the initial aspiration was inconclusive, the procedure was repeated. Tumors were diagnosed using the WHO classification system and graded using the modified Bloom-Richardson classification system after histopathological features were recorded.

RESULTS

Among the 50 samples collected, 98% were from female patients, while 2% were from male patients. [Figure 2]. The incidence of breast tumors was highest in the third decade (36% incidence), followed by the fourth decade (24% incidence) [Figure 1]. Approximately 12 patients were 21 years old, while 4 patients were over 51 years old. The most frequently reported symptom was a breast lump, occurring in 40 cases (80%), followed by nipple discharge, which was noted in 6 cases (12%). Seven patients also reported having both symptoms. [Figure 3]. The samples included both cancerous and non-cancerous lesions. Out of the 42 benign lesions identified, fibroadenoma was found in 12 cases (28.6%), fibroadenosis in 8 cases (19%), fibrocystic disease in 6 cases (14.3%), gynecomastia in 2 cases (4.8%), benign phyllodes in 3 cases, ductal papilloma in 1 case, and inflammatory lesions in 10 cases. In this research, fibroadenoma was the most common benign breast tumor [Table 1 and Figure 4]. The largest benign lesion was 12.4 cm × 10.6 cm, while the smallest was 0.74 cm × 0.54 cm.

Out of the 8 malignant lesions, 4 were identified as infiltrative duct cell carcinoma, accounting for 50% of the cases. Two instances were medullary carcinoma, making up 25%, while invasive papillary carcinoma and apocrine carcinoma each represented 5% with one case each. Among the malignant breast lesions, infiltrating duct cell carcinoma was found to be the most common.

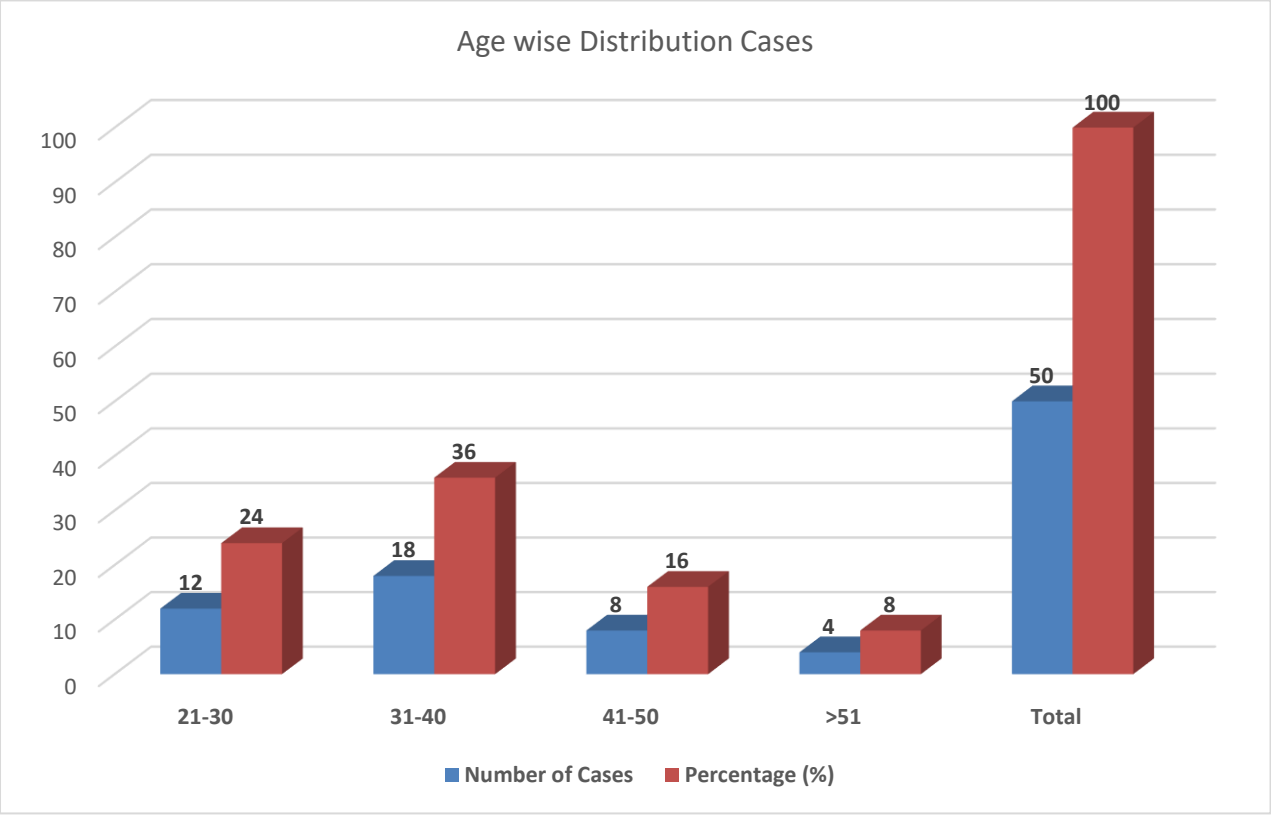

Figure 1: Age-wise Distribution of Cases

Histopathological Diagnosis	**Number of cases of benign breast lesions**	**Number of cases of benign breast lesions Percentage**
Fibroadenoma	12	28.6
Fibroadenosis	8	19
Fibrocystic disease	6	14.3
Inflammatory	10	23.8
Gynecomastia	2	4.8
Benign phyllodes	3	7.1
Duct papilloma	1	2.4
Total	42	100
Histopathological Diagnosis	**Number of cases of Malignant breast lesions**	**Number of cases of Malignant breast lesions Percentage**
Infiltrative duct cell Carcinoma	4	50
Medullary carcinoma	2	25
Invasive papillary Carcinoma	1	12.5
Metaplastic carcinoma	0	0
Apocrine carcinoma	1	12.5
Total	8	100

Table 1: Various histopathological changes in non-cancerous and cancerous breast lesions

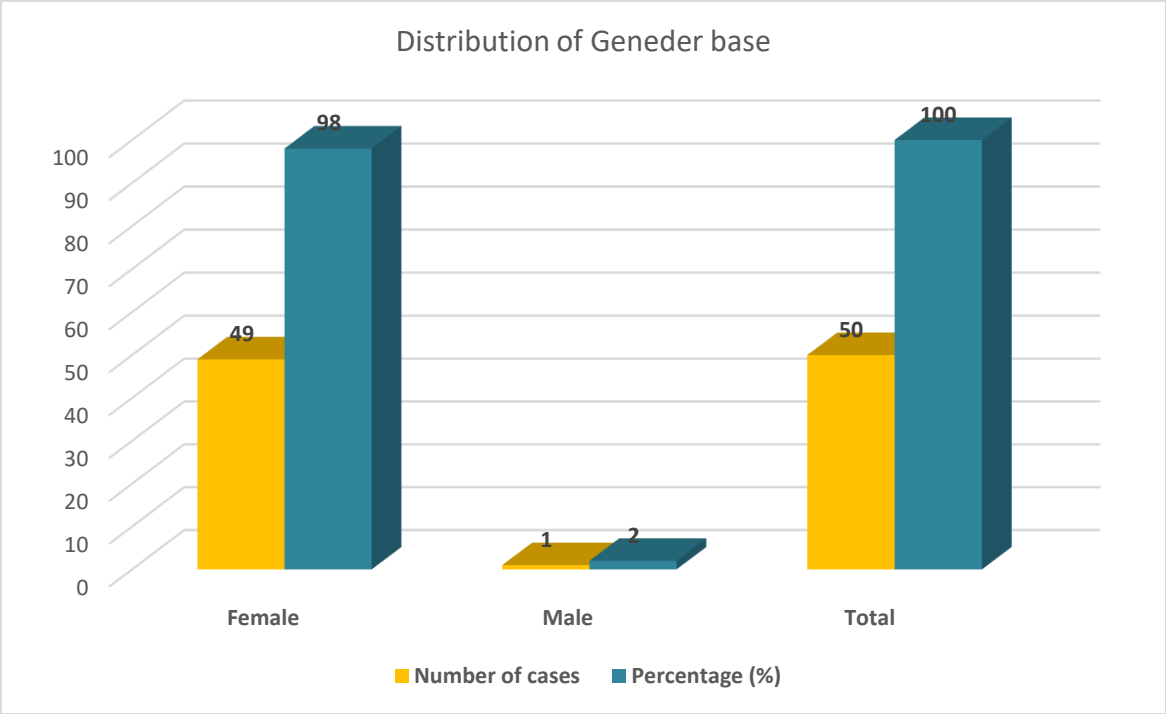

Figure 2: Gender wise distribution

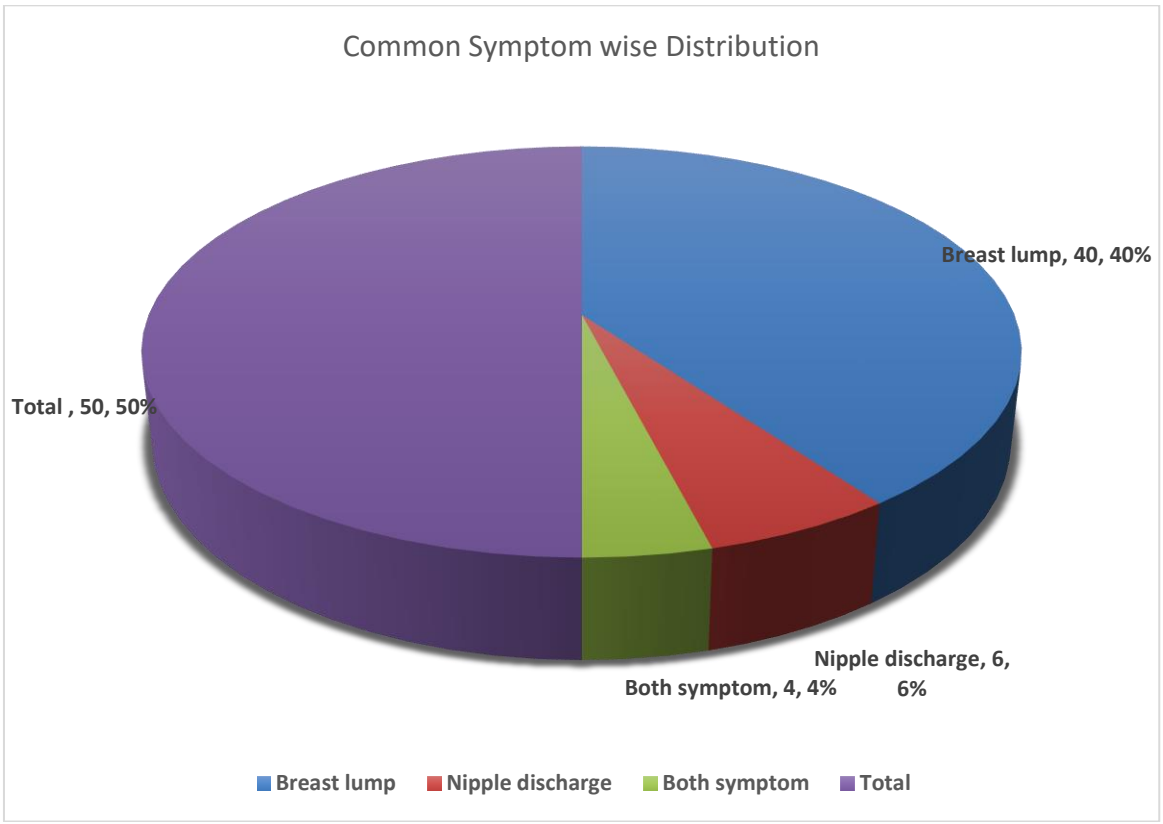

Figure 3: Presenting symptoms

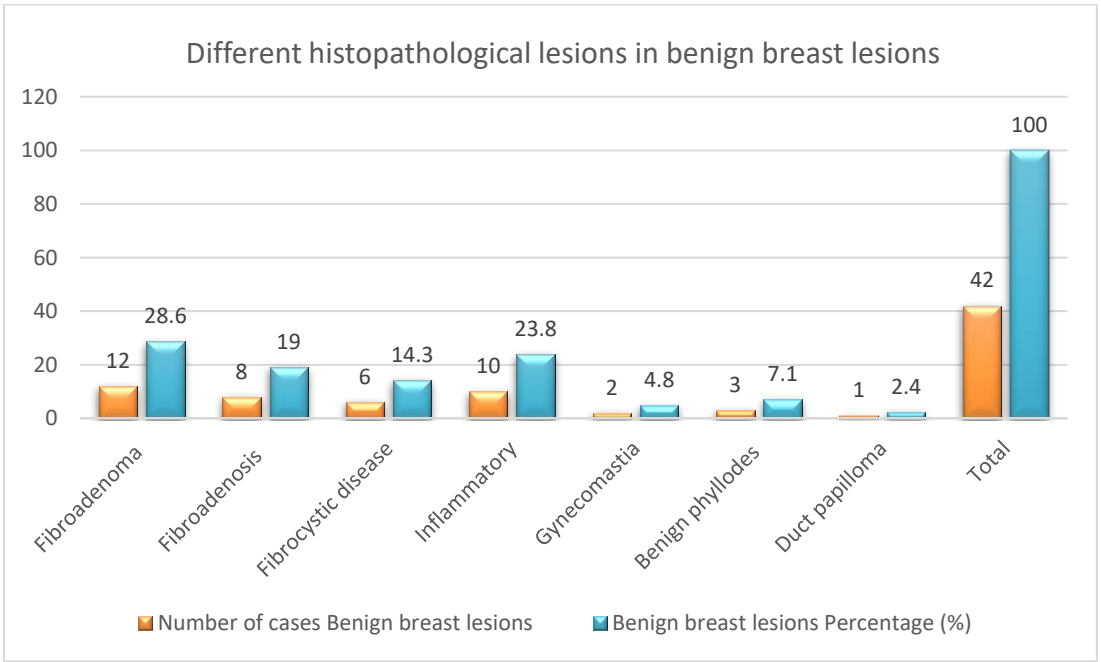

Figure 4: Benign breast lesion variants

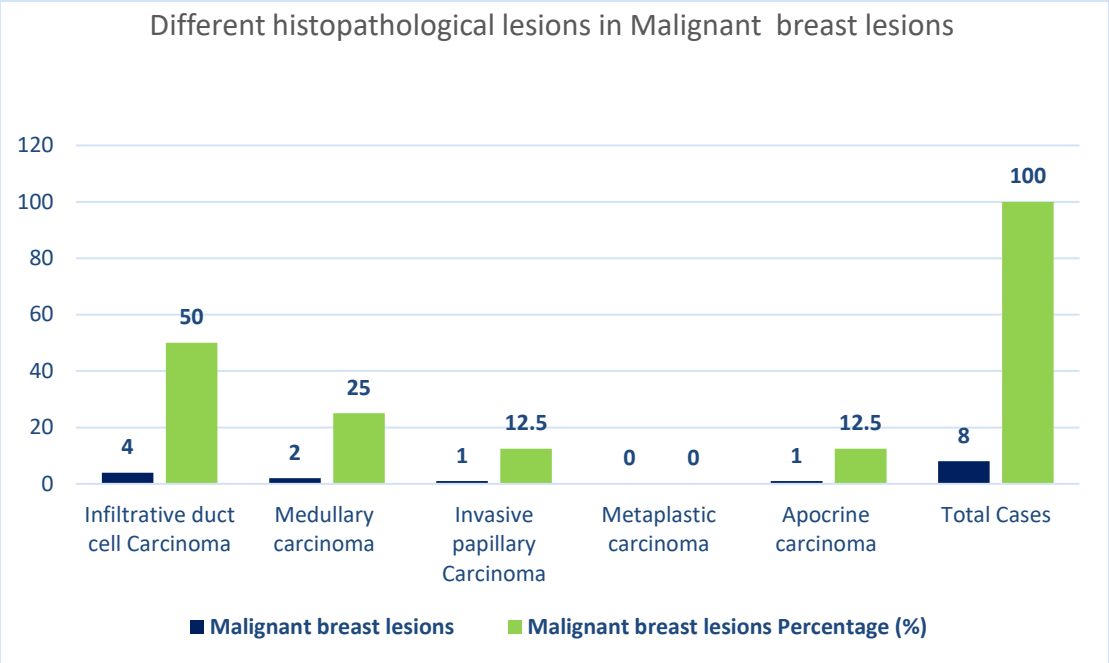

Figure 5: Malignant breast lesion variants

[Table 1]. Of the four instances of infiltrating duct cell carcinoma, 70'% were of Stage I, and 30% were of Stage II. Medullary carcinoma was present in 25 percent of the cases (n 2). The diameter of the tumor varied between less than 2cm in one instance (18%), over 2.2cm in seven (82%) cases. The size of the largest lesion was 11 cm by 10.5 cm and the size of the smallest lesion was 3 cm by 2.5 cm.

DISCUSSION

Breast tissue is made of specialized epithelium and stroma that can be transformed into benign proliferation or malignant proliferation. The mammary gland is formed in six to ten major ductal systems. The cutaneous surface is covered with keratinizing stratified squamous epithelium that extends into the nipple openings and abruptly changes to a bilayer of cuboidal epithelium which extends along the intramammary ducts. The bigger ducts branch and end in terminal duct -lobular units. Luminal epithelial cells are composed of the epithelial cells of the ducts and lobules [10]. Malignant lesions are ductal, lobular, tubular, mucinous, medullary, papillary, or metaplastic carcinoma and benign lesions are fibroadenoma, phyllodes tumor, mastitis, and breast abscess. Breast lesions are more common among female individuals than males, the histopathological spectrum of lesions differs between national and ethnic groups [11]. Malignant lesions usually occur less commonly as compared to benign lesions [12]. The determinants of risk factors of breast lesions include multiparty, less parity, early child birth and late menopause, justifying the role of high levels of circulating estriens [13,14]. Our research showed that out of fifty breast tissue samples, 84 percent were benign lesions and 16 percent were malignant lesions. The rate of malignant lesions in the West and the African environments is usually 10 to 21 percent [15,16]. The most common lesion was fibroadenoma (28.6%), and the most common malignant lesion was infiltrative ductal carcinoma (50) [Figure 5]. Other studies have indicated the same. The irregular growth of stromal and epithelial cells causes the development of fibroadenoma that has its origin in a terminal duct -lobular unit [17,18]. The rapid lesion proliferation may induce a pseudocapsule, which may affect the surrounding tissues. Stromal changes in fibroadenoma may include myxoid degeneration, sclerosis, hyalinization, or calcification but the epithelial compartment may have apocrine metaplasia, ductal hyperplasia, sclerosing adenosis or florid adenosis; which are all regarded as complex proliferative or non-proliferative changes [20,21]. Patients are usually advanced in terms of local disease owing to lack of awareness and poor screening. However, heightened surveillance and the use of mammography have improved the diagnosis of benign and malignant patients [22]. The correlation of benign or pre-malignant lesions and acquired malignancy indicates that it is important to detect lesions at an early stage, and approach the management strategies depending on the type of lesion. The incidence of the

seventeen specimens was infiltrative ductal carcinoma with the 22 malignant cases having an incidence of 77, which was less than that recorded by Malik and Bharadwaj in 2003 and 2009 (88.20 and 84.85, respectively) [18],19]. The second most common benign lesion (23% incidence) is fibroadenosis also known as fibrocystic disease which is marked by painful, nodular or doughy breasts; risk factors include early menarche and subsequent/late/absent pregnancies. Fibroadenosis is a physiological change which is benign and not to be confused with malignant ones[23]. Inflammatory alterations were seen in 7% of the specimens, which can be generally explained by either systemic or organ-specific illnesses in which the breast is a second localization. The percentage of Gynecomastia was 6 and some of them were similar to female lesions. The other benign lesions were the phyllodes tumor (1 in every 1000 of the cohort) and ductal papilloma (1 in every 1000 of the cohort); the former being a fibroepithelial neoplasm (2-3% of all fibroepithelial breast diseases) which presents as large perimenopausal or pre-menarchal tumors with salient intraductal growth and leafy stromal projections [24]. Nipple discharge is most frequently seen in ductal papilloma. About five percent of the cases were invasive ductal carcinoma, a cancer with high mortality rate because of local invasion, involvement of surrounding lymph nodes and distant metastasis and was usually staged as I and 35 as II. Forty seven percent of cases had metastasis. Patient has the uncommon subtype of female breast cancer, apocrine carcinoma, which is androgen receptor positive (ER−/PR−/AR+) and not estrogen or progesterone receptors, with only a few literature data available. Less than one percent of cases (5% in our series) represent metaplastic breast cancer in which both epithelial and mesenchymal components are present. The major symptom of this type of lesion was the appearance of masses in the breast (around 92%), with discharge of the nipples (2.5%). Certain patients experienced both symptoms. The greatest prevalence of these breast lesions was found in young women especially those aged between 21-30. This information underscores the need to diagnose and treat all breast disorders at an early stage and carry out an all-inclusive sensitization measures aimed at enlightening the populations of the world of the dangers posed by breast cancer.

CONCLUSION

The current study classified infiltrating ductal carcinoma as the most common malignant lesion with 50 per cent prevalence, and fibroadenoma as the most prevalent benign lesion with 28.6 per cent prevalence. Infiltrative duct carcinoma was also linked to 50 per cent distant metastasis which also translated to significantly deplorable prognosis. The highest prevalence of benign lesions was put in the age of 31-40, but malignancies had the highest prevalence in the 41-50 years age group. The paper highlights the essential role of differentiating benign lesions and invasive and in situ breast carcinomas in order to initiate therapeutic treatment in a timely manner. The choice of the most suitable treatment regime in every patient hence requires an in-depth evaluation of the risk of breast cancer in every patient. Breast pathology diagnosis and management continue to require that histopathological examination in the context of mammographic, magnetic resonance imaging and fine-needle aspiration cytology data. Breast cancer screening programs and a fundamental training should be immediately adopted in order to convince women to receive medical assessment immediately after detecting a breast lump during self-examination, which could potentially decrease the morbidity and mortality due to breast neoplasia.

8. Conflict of Interest: Nil

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