

ORIGINAL RESEARCH

Neoplastic & Non Neoplastic Histopathological Study of Breast Lesions

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ABSTRACT

Background: Breast lesions are a diverse range of lesions made up of various unique entities, each with unique properties. Patients' worry can be reduced and it may even save their lives if lesions are evaluated early and a quick, accurate diagnosis is made. Breast cancer, which affects 25.8 per 100,000 women, is the most frequent malignancy among Indian women.

Materials and Methods: From June 2018 to June 2020, 100 instances of both neoplastic and non-neoplastic breast lesions were assessed and referred to the pathology department at CAIMS, Karimnagar. Specimens were preserved in 10% formalin. Selected regions of the specimen were processed, sectioned, stained with haematoxylin and eosin, and examined under a microscope.

Results: Out of the 120 instances that were analysed, 40 are non-neoplastic and 80 are. Breast abscesses, duct ectasia, fat necrosis, galactocele, accessory breast, and granulomatous mastitis are the most prevalent non-neoplastic lesions. 50 benign and 30 malignant neoplastic breast lesions were found. Fibroadenoma 20, fibrocystic disease 5, sclerosing adenosis 2, benign phyllodes 2, and duct papilloma 1 are the most frequent benign breast lesions, respectively.

Conclusion: ?

Keywords: Histopathology breast, benign breast, malignant breast lesions, Fibroadenoma, Invasive carcinoma.

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INTRODUCTION

A diverse set of lesions developing in the mammary epithelium or in other mammary tissues, benign breast illnesses can also be connected to vascular, inflammatory, or traumatic pathologies. Women typically get benign breast lesions including fibroadenoma, fibrocystic change, breast abscess, etc. Compared to breast cancer, benign breast illnesses are much more prevalent and have a wide range of histological presentation options. The pathologist is challenged by these variations.

However, a quarter of all malignant tumours are breast cancers, and a third of all cancers in women are breast cancers.^[1] According to GLOBOCAN 2020 estimates, there are presently an estimated 2.3 million new cases of breast cancer worldwide, making it one of the most frequently diagnosed malignancies and the fifth leading cause of cancer-related deaths. The WHO estimates that 107.8 million Disability-Adjusted Life Years (DALYs) are associated with malignant neoplasms, of which 19.6 million are associated with breast cancer.^[2,3] 2.26 million new instances of breast cancer will be detected in women worldwide in 2020, making it the most common malignancy among them.^[4] The Breast Health Global Initiative (BHGI)

is currently in charge of developing appropriate policies and strategies to offer the most effective breast cancer control on a global scale.^[5] In addition to being the most prevalent, breast cancer also kills more women from cancer than any other type. Breast cancer caused 684,996 deaths worldwide, with an age-adjusted mortality rate of 13.6 per 100,000.^[4] According to current forecasts, there will be 2.7 million new cases diagnosed annually over the world by 2030, while there will be 0.87 million fatalities.^[6] Due to the westernisation of lifestyles (such as postponed pregnancies, reduced breastfeeding, young menarche age, lack of physical activity, and poor diet), improved cancer registration, and cancer detection, it is anticipated that the incidence of breast cancer will rise further in low- and medium-income countries.^[7] Breast cancer has highly devastating effects in terms of emotional distress and increasing financial burdens on the patient. Malignant tumours are 10 times less frequent than benign tumours. Worldwide, breast cancer-related deaths are quite common and have grown to be a significant health issue. The number one cause of morbidity and mortality among women worldwide is breast lesions. Breast lesions fall within a broad category of lesions that include numerous entities with a variety of traits. Every year, 200,000 new cases of breast lesions are identified.

Breast cancer is the most prevalent malignancy among Indian women, accounting for 25.8/100,000 cases and 12.7/100,000 deaths. Early lesion inspection and prompt, accurate diagnosis might help patients feel less anxious and perhaps save their lives.

In addition to invasive breast cancers, the WHO tumour classification of the breast also includes precursor lesions, lesions with low malignant potential, benign epithelial proliferations, fibroepithelial, myoepithelial, and mesenchymal neoplasms. Age over 40, a history of breast disorders, a history of cancer in first-degree relatives, early menarche, and a late age at which to have a family are the risk factors for breast cancer that are most frequently present. When a patient has a benign lesion, they typically exhibit palpable nodules, thickening, masses, discomfort, and nipple discharge, yet they may also be completely asymptomatic. Cysts, galactoceles, fibroadenomas, other benign tumours, fat necrosis, duct ectasias, papillomas, adenosis, radial scar, sclerosing adenosis, and a range of epithelial hyperplasias with or without atypia are among them.

According to the subsequent risk of developing breast cancer, benign epithelial lesions are widely divided into three groups: non-proliferative breast lesions, proliferative breast lesions without atypia, and proliferative breast lesions with atypia. The majority of male breast lesions are benign, and the most frequent cause is gynecomastia. Less than 1% of all breast cancer cases in men involve breast malignancies, making them extremely uncommon. On the basis of the results of diagnostic procedures including mammography, ultrasonography, fine-needle aspiration cytology, and core needle biopsy, the therapy of the patient is increasingly planned. A prompt and precise diagnosis will aid in the early care of this disease, reducing the patients' worry and mental stress.

In order to choose the best treatment option for each instance, it is crucial to differentiate benign lesions from in situ and invasive breast carcinomas as well as to determine a patient's risk of developing breast cancer. Breast lesions that are benign rather than malignant are more prevalent in women between the ages of 20 and 40, while the frequency of malignant diseases rises with age. After the age of 20, more than half of women get some kind of benign breast lesion. The majority of benign lesions do not raise the chance of developing later breast cancer, thus these lesions can avoid needless surgical operations.

Table 1: Modifiable and non-modifiable risk factors of breast cancer.^[8]

Non-Modifiable Factors	Modifiable Factors
Female sex	Hormonal replacement therapy

Older age	Diethylstilbesterol DES
Family history (of breast or ovarian cancer)	Physical activity
Genetic mutations	Overweight/obesity
Race/ethnicity	Alcohol intake
Pregnancy and breastfeeding	Smoking
Menstrual period and menopause	Insufficient vitamin supplementation
Density of breast tissue	Excessive exposure to artificial light
Previous history of breast cancer	Intake of processed food
Non-cancerous breast diseases	Exposure to chemicals
Previous radiation therapy	Other drugs

With various types of biopsies, lumpectomy, and mastectomy specimens, this study aims to understand the histological spectrum of different neoplastic and non-neoplastic lesions, their age distribution, and clinical characteristics.

MATERIALS AND METHODS

This observational study was both retrospective and prospective. In this study, we looked at 120 breast pathology cases, including every mastectomies specimen and core needle biopsy specimen that was received in the pathology department over the course of the study. We looked at a thorough examination of each instance. The samples were obtained using a variety of procedures, including simple mastectomy, modified radical mastectomy, excision biopsy, and Tru-Cut biopsy. The biopsy request forms were used to gather the clinical data. Samples were preserved in neutral buffered formalin at 10%. A thorough gross examination was performed. The usual procedures for tissue processing were used. Haematoxylin and Eosin staining was performed on sections that were cut at a thickness of 4 to 5 microns. Every breast lesion was examined for age distribution, specimen type, and histology. Malignancies that had been treated were not included. Neoplastic and non-neoplastic breast lesions were the two main categories. Neoplasms were once more divided into benign and malignant categories. The 2012 WHO classification was used to categorise the malignant lesions. The Bloom-Richardson grading system's Nottingham version was used to rate invasive breast cancer in NST patients. Descriptive statistics were used to analyse the NST data.

RESULTS

In our study, the age range of 21 to 35 years saw the majority of breast lesions, including inflammatory, benign, and malignant lesions, followed by 36 to 45 years. Inflammatory breast lesions peak between the ages of 21 and 30, benign lesions between the ages of 31 and 40, and malignant lesions between the ages of 51 and 60. The patient in this study who was diagnosed with fibroadenoma was 19 years old, and the patient who was diagnosed with invasive ductal carcinoma-NST was 74 years old.

In our investigation, the upper outer quadrant (32%) was the most frequently affected, followed by the upper inner quadrant (16%), the central quadrant (14%), the lower outer (18%), the lower inner (4%), the multiple quadrant (2%) and the diffuse (4%). Patients mostly had unilateral breast lesions (88%) with the exception of 4 cases, 6 of which had bilateral fibroadenomas, and the other 2 cases, which were diagnosed with lobular carcinoma and angiosarcoma of the right breast with potential metastasis to the left breast. The majority of the instances (108 cases) in our study were breast lumps; however, there were also 22 cases of painful breast lumps, 4 cases of breast masses with leaking sinuses, 4 cases of breast

masses with fever, and 8 cases of breast lumps with milky nipple discharge. Eight cases of breast lumps with red nipple discharge and twelve cases of breast lumps with retracted nipples.

Out of the 120 instances that were analysed, 40 are non-neoplastic and 80 are. Breast abscesses, duct ectasia, fat necrosis, galactocele, accessory breast, and granulomatous mastitis are the most prevalent non-neoplastic lesions. 50 benign and 30 malignant neoplastic breast lesions were found. Fibroadenoma 20, fibrocystic disease 5, sclerosing adenosis 2, benign phyllodes 2, and duct papilloma 1 are the most frequent benign breast lesions, respectively.

Invasive lobular carcinoma, ductal carcinoma in situ, invasive papillary carcinoma, lobular carcinoma in situ, hybrid variant of ductal carcinoma with lobular carcinoma, malignant phyllodes, medullary carcinoma, angiosarcoma, and pleomorphic liposarcoma are the most frequent malignant breast lesions.

Table 2: Nature of breast lesions

Breast Lesions	Non- neoplastic	Neoplastic		Total
		Benign	Malignant	
No of cases	40	30	50	120
Percentage	33%	25%	42%	100%

Out of the 120 cases, 40 were non neoplastic, 30 (25%) were benign and malignant 50 (42%) cases.

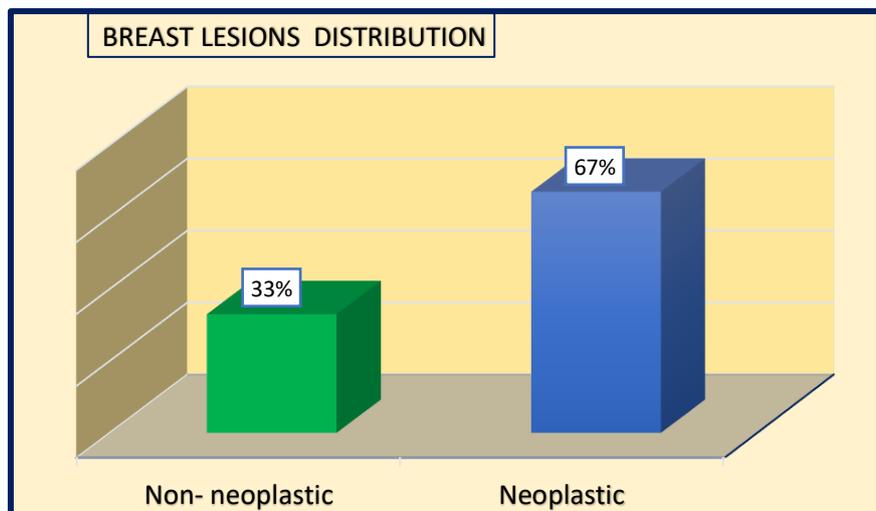


Figure 1: Breast lesions in cases

Table 3: Morphological spectrum of non-neoplastic breast lesions

Non Neoplastic Breast Lesions	Number of cases	Percentage
Breast Abscess	16	40%
Duct Ectasia	4	10%
Fat Necrosis	6	15%
Galactocele	8	20%
Accessory Breast	2	5%
Granulomatous Mastitis	4	10%
Total	40	100%

Out of the 40 non neoplastic lesions breast abscess were 16 (40%), followed by galactocele in 8 cases.

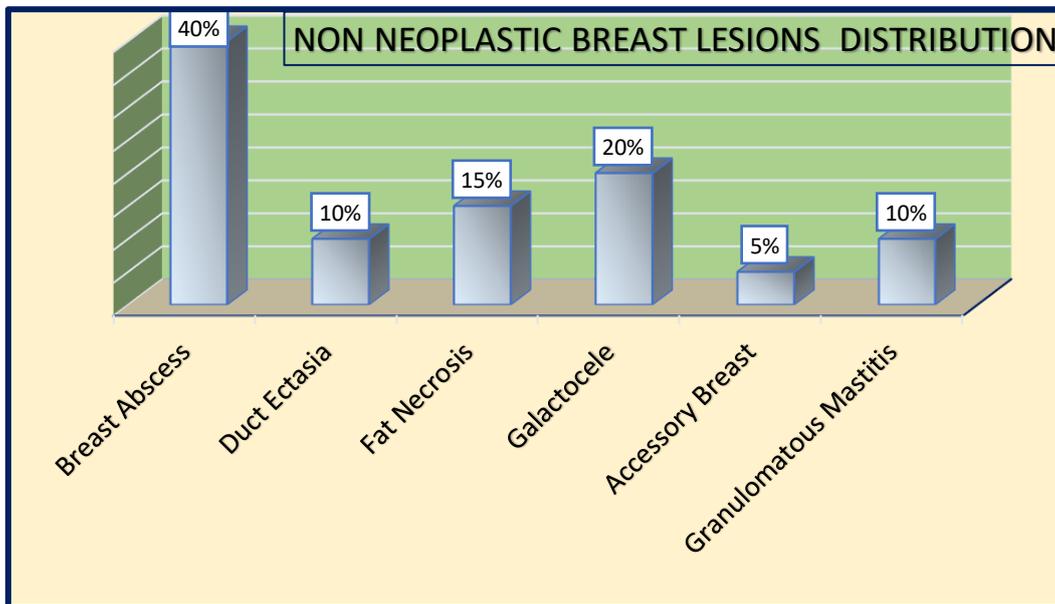


Figure 2: Non Neoplastic Breast lesions in cases

Table 4: Morphological spectrum of benign breast lesions

Benign Breast Lesions	Number of cases	Percentage
Fibroadenoma	20	67%
Fibrocystic disease	5	17%
Sclerosing Adenosis	2	7%
Ductal Papilloma	1	3%
Benign Phyllodes	2	7%
Total	30	100%

Fibroadenoma was the most common benign breast lesion.

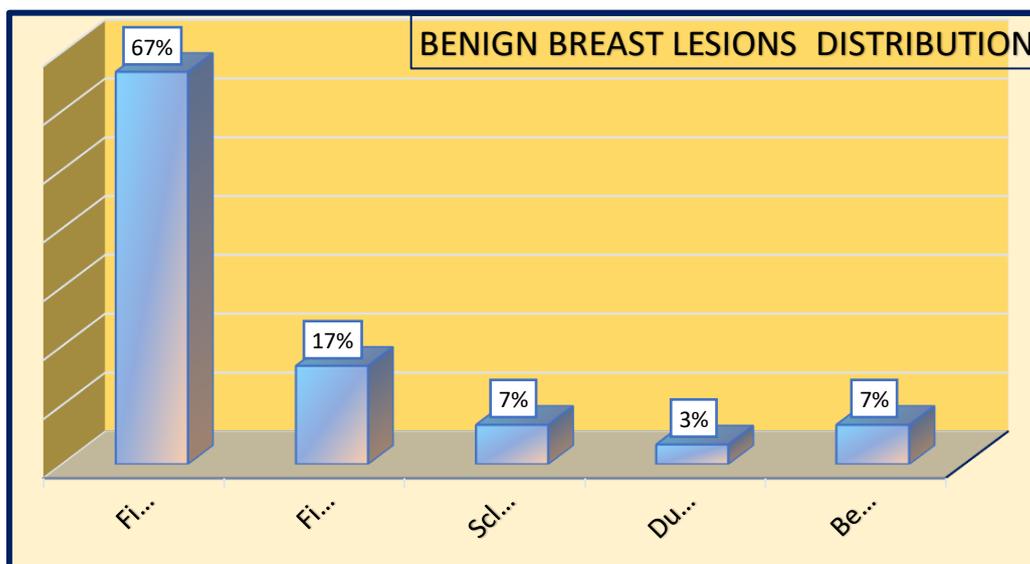
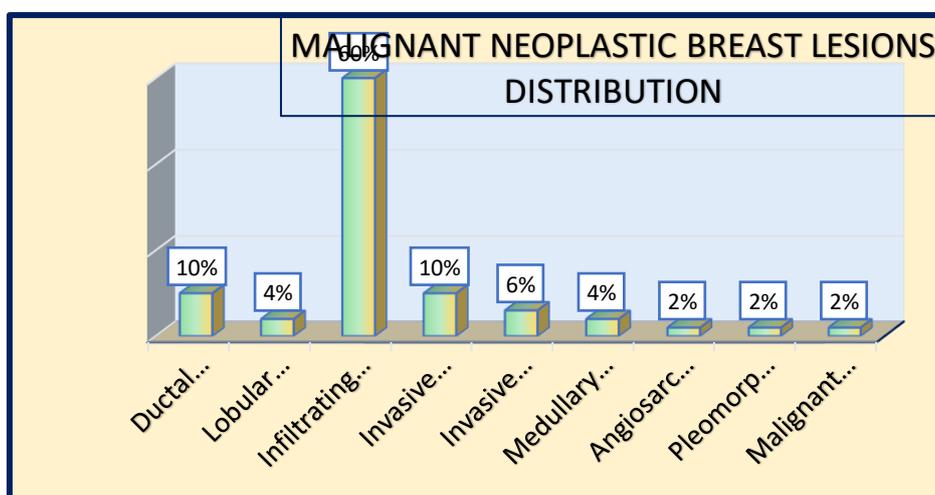


Figure 3: Benign Breast lesions in cases

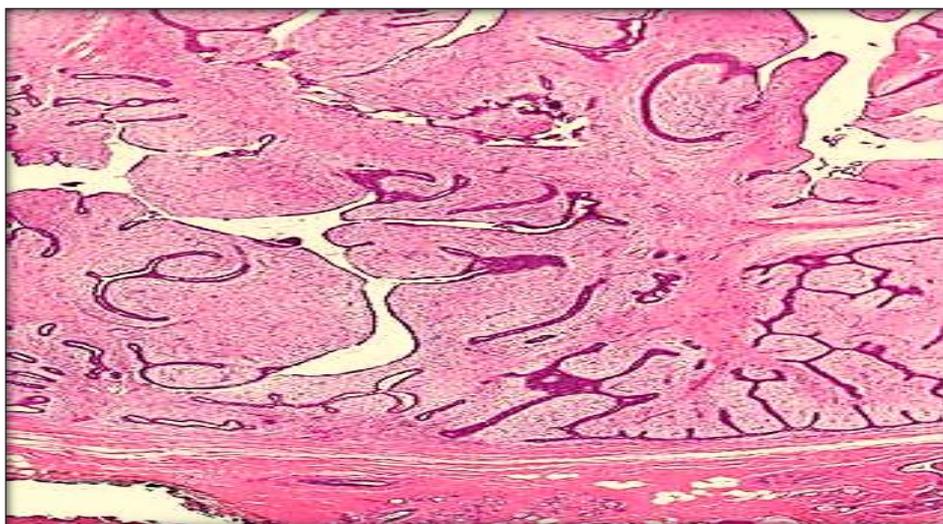
Table 5: Morphological spectrum of malignant breast lesions

Malignant Neoplastic Breast Lesions	Number pf Cases	Percentage
Ductal carcinoma In Situ	5	10%
Lobular carcinoma In Situ	2	4%
Infiltrating Carcinoma – NST (No Special Type)	30	60%
Invasive Lobular Carcinoma	5	10%
Invasive Papillary Carcinoma	3	6%
Medullary Carcinoma	2	4%
Angiosarcoma	1	2%
Pleomorphic Liposarcoma	1	2%
Malignant Phyllodes	1	2%
Total	50	100%

*Infiltrating Carcinoma NST – Infiltrating Carcinoma

**Figure 4: Malignant Breast lesions in cases**

Modified Scarff-Bloom-approach Richardson's has been utilised for histology grading. In this study, Grade 2 (52%) and Grade 1 (35%) were the most prevalent grades of lesions, followed by Grade 3 (13%).

**Figure 5: Phyllodes Tumor Breast**

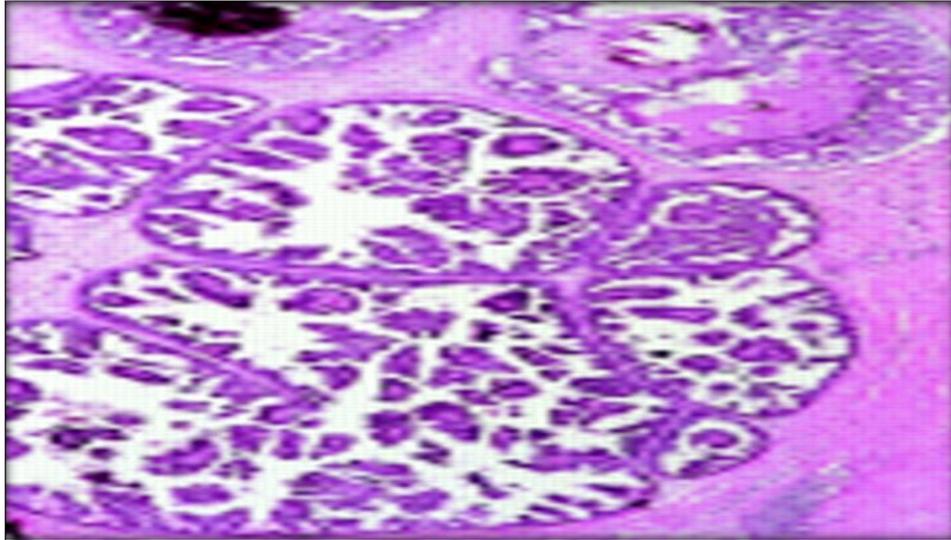


Figure 6: Ductal Carcinoma in SITU

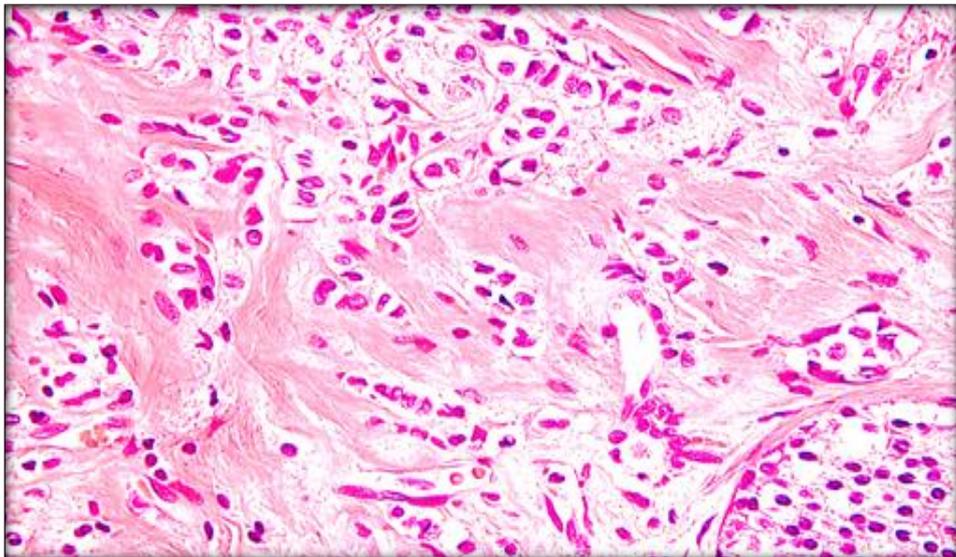


Figure 7: Lobular Carcinoma in SITU

DISCUSSION

Due to the numerous diseases and lesions that might develop from it, the female breast is currently the tissue that is biopsied most frequently. Many benign lesions are significant because they can mimic cancer, but not all benign lesions are risk-free. The mimicking of

cancer by sclerosing adenosis is important clinically. Physical examination, mammography, and gross examination may confuse it with cancer. According to the majority of researchers, people who have atypical ductal and atypical lobular hyperplasia are more likely to get cancer. A select number of other studies have also demonstrated that women with atypical ductal hyperplasia, atypical lobular hyperplasia, and in situ carcinomas were tracked for an average of 17.5 years with a 90% success rate of follow-up.

Compared to Reddy et al., Jadhav Dnyaneshwar S. et al., where the mean age of presentation was 33.63 years and 36.75 years, the mean age of presentation in our study is 34.23 years. The upper outside quadrant was more frequently implicated in the current investigation, which is also underlined in Mudholkar et al.^[9] The findings of our study, which are consistent with those of studies by Oluwle et al,^[10] and Pai S et al,^[11] show that benign diseases are more prevalent than malignant diseases. Out of the 120 cases, 40 were non neoplastic, 30 (25%) were benign and malignant 50 (42%) cases. In 67 % Cases of benign fibroadenoma is the most prevalent lesion; this conclusion is close to that of the research by Sree ND et al,^[12] (46.35%), Amr et al,^[13] (30.7%), and Malik et al. (41%).^[14]

Table-6- Frequency distribution in different benign breast tumours (Comparison with other similar studies)

S. No	Benign tumours	Mudholka r et al (2012), ^[9]	Gaikwa d SL et al (2018), ^[15]	This study
1	Fibroadenoma	111 (87.40%)	118 (90%)	67%
2	Benign phyllodes tumour	8 (6.29%)	6 (4.58%)	7%
3	Tubular adenoma	3 (2.36%)	2 (1.5%)	2 (1.5%)
4	Lactating adenoma	-	2 (1.5%)	-
5	Lipoma	1 (0.78%)	1 (0.76%)	2 (1.5%)
Total no. of benign tumours in study		127	131	131

In our study, benign and non-neoplastic breast lesions made up 65% of all lesions, while malignant lesions made up 35%. Reddy et al,^[16] and Iraj Harirchi et al,^[17] all emphasised this same finding. Due to the fact that most breast abscesses are drained rather than biopsied, there were 18 cases of inflammatory breast lesions and 8% of cases were breast abscesses. In his investigations, Awatif A. Jamal had a lower percentage of inflammatory lesions (11%), with a similar rationale.

In contrast to Kiran H. S et al., who found that fibrocystic disease was the most common lesion (41%) and that fibroadenoma was the second-most common lesion (28%), fibroadenoma is the most prevalent benign breast lesion in our study, accounting for 67% of cases. However, fibroadenoma was a frequent benign lesion in other investigations as well, appearing in 37.26% and 59% of Nandam et al,^[18] and Sulhyan et al.^[19]

A set of hyperplastic breast lobules known as aberrations of normal development and involution are hypothesised to constitute fibroadenoma.

The most frequent malignant lesion in our study, accounting for 60% of all cases, is invasive carcinoma, no special kind, which is comparable to Nandam et al,^[18] Mudholkar et al,^[9] Nazeer et al,^[20] and Geetanjali et al.

Table 7: Comparison of incidence of non-neoplastic, benign and malignant lesions

	Reddy et al, ^[16]	Lakhani S et al, ^[21]	Iraj Harirchi et al, ^[17]	Present study
Non neoplastic	7.1%	3.64%	2.4%	33%
Benign	76.9%	67.88%	60.9%	25%
Malignant	16%	28.46%	36.7%	42%

Table 8: Comparison of most common non neoplastic, benign and malignant lesions of breast in various studies

Most common lesion	Awatif A. Jamal, ^[22]	Sulhyan et al, ^[19]	Nandam et al, ^[18]	Present study
Non-Neoplastic	Chronic Mastitis (3.2%)	Acute/chronic Mastitis (7.45%)	Chronic Inflammatory pathology (4.5%)	Breast Abscess (40%)
Benign	Fibro-adenoma (25%)	Fibroadenoma (37.26%)	Fibroadenoma (59%)	Fibroadenoma (67%)
Malignant	IDC-NST (24.7%)	IDC-NST (26.7%)	IDC-NST (16.6%)	IDC-NST (60%)

Similar to the findings of Mudholkar et al,^[9] Sharma k et al,^[1] and Gaikwad et al,^[15] the majority of the malignant lesions in our study occur in the fifth and sixth decades.

In our analysis, invasive ductal carcinoma, which accounts for 70 cases (95% of all malignant cases), is the most prevalent malignant tumour. Ayadi et al (83.8%),^[23] Sree ND et al (79.41%), and Raina V et al (92.8%) studies. Medullary carcinoma was present in 2 (4%) of the 50 malignant cases in our investigation; this finding contrasts with the one case of medullary carcinoma out of 28 malignant cases in the study by Shanti v et al. Results from the study by Sree ND et al et al did not agree with our results, which revealed 11.76% of medullary cancer.

Table-9- frequency distribution in malignant breast tumours (Comparison with other similar studies)

Sl no	Malignant tumours	Mudholkar et al (2012)	Gaikwad SL et al (2018), ^[15]	This study
1	Invasive ductal carcinoma	110 (88%)	43 (89.5%)	30 (60%)
2	Medullary carcinoma	1 (0.75%)	2 (4.17%)	2 (4%)
Total no. of malignant tumours of study		125	48	50

CONCLUSION

Compared to other cancer sites, breast cancer is more than twice as common. The foundation of a precise and confirming diagnosis is the ability to distinguish between benign, in-situ, borderline, and malignant breast lesions, which is assisted by histopathological analysis. This aids in determining a patient's risk of acquiring cancer so that the best treatment option can be selected for each individual case.

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