*IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*
*e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 21, Issue 6 Ser.3 (June. 2022), PP 49-54*
*www.iosrjournals.org*

# Incidence of Breast Cancer in Screening Mammography with Histopathological Correlation

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***ABSTRACT***
***BACKGROUND:*** *Carcinoma of breast is the leading cause of cancer in women globally. It affects around 26% of women in developing countries. One of the leading causes of cancer death in the less developed countries is breast cancer. There has been a decrease in 30 to 40% of mortality from breast cancer as a result of earlier detection via screening mammography, health education, improved and availability of treatment modalities. All detected breast lesions are not malignant and all benign masses will not progress to cancer.*
***MATERIALS AND METHODS:*** *This is a prospective cross-sectional study done over a period of 1 year 3 months between august 2020 to November 2021. 100 asymptomatic women of age more than or equal to 40 years attending the digital mammography unit, department of radiodiagnosis of king George hospital, Visakhapatnam.*
***RESULT:*** *Majority of patients are under the age group of 40 to 45 and 82 % of patients have scattered fibro glandular tissue type of breast composition and only 2% of cases showed architectural distortion. All lesions with irregular shape and spiculated margins are proved to be malignant. Fine pleomorphic and grouped calcifications are suspicious of malignancy. Most of the lesions fall under BIRADS 2 and only 1% of lesions fall under BIRADS 5. Based on histopathological study duct cell ca is seen in 1% of cases and fibroadenoma in 4% of cases.*
***CONCLUSION:*** *Screening Mammography proves to be an excellent tool in diagnosing non palpable, clinically silent breast lesions. It has been found those micro calcifications, mixed glandular and fatty, single lesion, dense, and well-defined margin are commonly found in mammography. There is a definite relation between the presence of a false negative test and the risk of cancer detection in subsequent screening participations. Therefore, it can be concluded that mammography is sensitive, specific tool, easily available and affordable and so a very useful diagnostic tool in detecting and differentiating malignant and benign breast masses.*

Date of Submission: 01-06-2022 Date of Acceptance: 13-06-2022

## I. Introduction:

Cracinoma of the Breast is the leading cause of cancer in women globally. Approximately 1.7 million new cases were recorded worldwide in 2012, accounting for 25% of all new cases of cancer in women. There were over 2 million new cases in the year 2018. It is the 5th most common cause of death from cancer in women. Incidence rates vary widely across the world, from 27 per one lakh in Middle Africa and Eastern Asia to 92 per one lakh in North America. It is the 5th most common cause of death from cancer in women, with an estimated 522,000 deaths (6.4% of the total). It is the most common cause of cancer death in women from regions characterised by lower indices of development and/or income (14.3% of deaths), and the second most frequent from regions characterised by higher indices of development and/or income (15.4% of deaths), after lung cancer[1].

As per Reports from latest national cancer registries for incidence and mortality rates. The age adjusted incidence rate of breast carcinoma was found as high as 41 per one lakh women from Delhi, followed by Chennai (37.9 per one lakh women), Bangalore (34.4 per one lakh women) and Thiruvananthapuram District (33.7 per one lakh women). A statistically significant increase in age adjusted rate over time (1982 to 2014) in all the PBCRs namely Bangalore (annual percentage change: 2.8%), Barshi (1.8%), Bhopal (2%), Chennai (2.4%), Delhi (1.4%) and Mumbai (1.4%) was observed. Mortality to incidence ratio was found to be as high as 66 in rural registries whereas as low as 8 in urban registries. Breast cancer projection for India during time periods 2020 suggests the number to go as high as 1797900. [2]

Breast cancer risk doubles every ten years until the menopause, after which this risk decreases but breast cancer is more common after menopause. Studies of women who migrate from areas of low risk to high

risk areas show that they assume the rate in the host country within one or two generations. This shows that environmental factors are important in the development of the disease[3].

One of the leading cause of cancer death in the less developed countries is breast cancer. This is because of clinical advances to fight the disease which are not reaching the women living in those regions and also because of lifestyle changes, which is causing an increase in its incidence.[1] All detected breast lesions are not malignant & all benign masses will not progress to cancer. Precision of the final diagnosis is increased by radiological imaging & pathological diagnosis. [4]

Early detection & improved treatment is required to decrease breast cancer related deaths. Also there has been a decrease in 30-40% mortality from breast cancer as a result of earlier detection via screening mammography, health education and improvements and availability of treatment modalities. [5]

The effective diagnosis & management of breast lesions involve multidisciplinary approach to their assessment. Non-invasive techniques like mammography, is a well-defined & widely accepted radiologic procedure to evaluate clinically suspected breast lesions & as a tool to screen for breast cancer.[1] The present study is to evaluate the breast lesions by using mammography with histopathological correlation.

## II. Material And Methods:

This is a prospective cross-sectional study done over a period of 1 year 3 months between august 2020 to November 2021 among 100 asymptomatic women of age more than or equal to 40 years attending the digital mammography unit, department of radiodiagnosis, King George Hospital, Visakhapatnam fulfilling the inclusion and exclusion criteria.

**INCLUSION CRITERIA:**

- All the Asymptomatic (without clinical breast disease) women of age 40 and above.
- Valid informed consent for Mammography/HPE/Annual follow up.

**EXCLUSION CRITERIA:**

- Women of age below 40 years
- Women with known / diagnosed breast disease (who are referred from other medical surgical units).
- Postoperative patients.

## III. Results And Observations:

Majority of the patients belong to the age group of 40-45 years (42%) followed by 46-50 years (37%), >61 years (8%), 51-55 years (7%) and 56-60 years (6%). Mean age was 48.28 $\pm$ 7.48 years. 14% patients had predominantly fatty tissue, 82% patients had scattered fibro glandular tissue, 4% patients had homogenously dense and may obscure vessels. Architectural distortion was present in 2% patients.

Table 1: Distribution of patients based on the age group

| | | Frequency | Percent | Mean $\pm$ SD |
|---|---|---|---|---|
| Age group | 40-45 years | 42 | 42.0% | 48.28 $\pm$ 7.48 |
| | 46-50 years | 37 | 37.0% | |
| | 51-55 years | 7 | 7.0% | |
| | 56-60 years | 6 | 6.0% | |
| | >61 years | 8 | 8.0% | |
| | Total | 100 | 100.0% | |

Shape of the lesion was oval in 3% patients, round in 1% patients and irregular in 1% patients. All oval and round shaped lesions were benign and irregular shaped lesions were malignant. Margins of the lesion were circumscribed in 2% patients, micro lobulated in 2% patients and Spiculated in 1% patients. All circumscribed and micro lobulated lesions were benign and Spiculated lesions were malignant. High-density lesions were present in 3% patients and equal density lesions were present in 2% patients. Among high density lesions, 1 was malignant and 2 were benign. Among equal density lesions, all were benign.

Table 2: Distribution of patients based on the shape of the lesion

| | | Frequency | Percent | NATURE |
|---|---|---|---|---|
| MASS-Shape | Oval | 3 | 3.0% | Benign |
| | Round | 1 | 1.0% | Benign |
| | Irregular | 1 | 1.0% | Malignant |
| | Normal | 95 | 95.0% | - |
| | Total | 100 | 100.0% | - |

Vascular calcification was present in 15% patients, round calcification was present in 27% patients, rim calcification was present in 1% patients, large round like calcification was present in 1% patients and milk of calcium calcification was present in 1% patients. All these calcifications are typically benign. Fine pleomorphic calcification was present in 1% patients which was suspicious in nature. Grouped distribution calcification was present in 1% patients. Nodal enlargement is present in 10% of cases.

Table 3: Distribution of patients based on the histopathological findings

| | | Frequency | Percent |
|---|---|---|---|
| Histopathology | Duct cell carcinoma | 1 | 1.0% |
| | Fibraoadenoma | 4 | 4.0% |
| | Normal | 95 | 95.0% |
| | Total | 100 | 100.0% |

19% belongs to BIRADS-1, 76% belongs to BIRADS-2, 4% belongs to BIRADS-3, 0% belongs to BIRADS-4 and 1% belongs to BIRADS-5. Histopathological examination revealed that duct cell carcinoma was present in 1% patients and fibroadenomas was present in 4% patients.

Table 4: Sensitivity and specificity values

| **Statistic** | **Value** | **95% CI** |
|---|---|---|
| Sensitivity | 100.00% | 2.50% to 100.00% |
| Specificity | 100.00% | 2.50% to 100.00% |
| Positive Predictive Value (*) | 100.00% | - |
| Negative Predictive Value (*) | 100.00% | - |

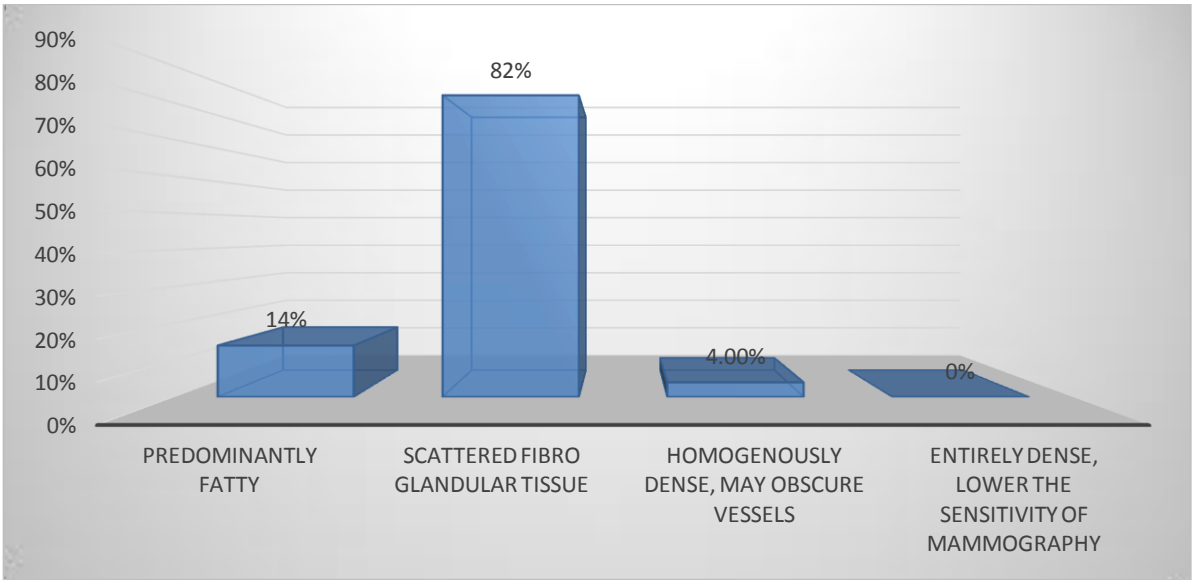
## IV. Discussion:

Mammography is a technique that uses x-rays to give high resolution images of soft tissues of the breast. It has high temporal and spatial resolution film to demonstrate microcalcifications (<100 μm). Its role in early breast carcinoma is signified by the fact that it senses roughly (75%) of breast cancer cases before they can be palpated. Women after forty years of age have the highest prevalence of breast cancer due to hormonal fluctuations. Our work in line with previous researches suggests screening mammography above 35 years.

The majority of women with abnormalities noted on screening mammograms (around 95%) do not have breast cancer with variability based on multiple factors including the radiologist's assessment and the woman's age. Because the risk of breast cancer increases with age, the likelihood of a woman with an abnormal mammogram result having cancer also increases with age. On the other hand, having a normal mammogram result does not rule out the possibility of having breast cancer, because false-negative mammography examination results do occur. In such cases, either the cancer is not visible on mammography examination or the radiologist fails to notice the lesion prospectively.[6]

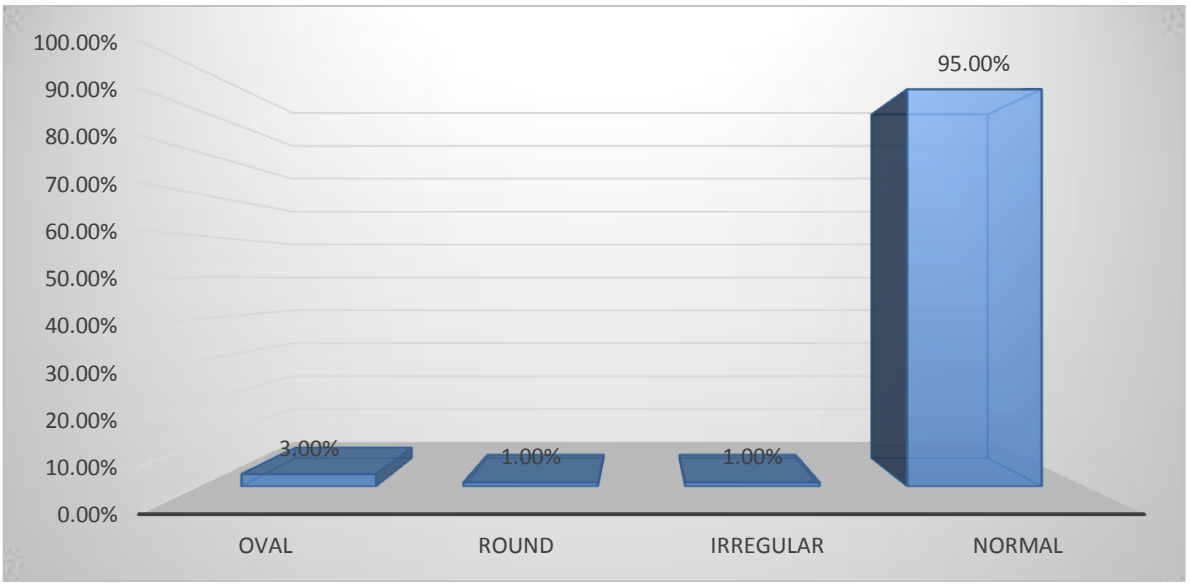
**Age -** Majority of the patients belong to the age group of 40-45 years (42%) followed by 46-50 years (37%), >61 years (8%), 51-55 years (7%) and 56-60 years (6%).

**Breast composition -** 14% patients had predominantly fatty tissue, 82% patients had scattered fibro glandular tissue, 4% patients had homogenously dense and may obscure vessels. In Yesmin L et al., [7] 47.4% patients had predominantly glandular tissue and 52.6% patients had mixed glandular and fatty tissue.




Graph 1: Distribution of patients based on the breast composition

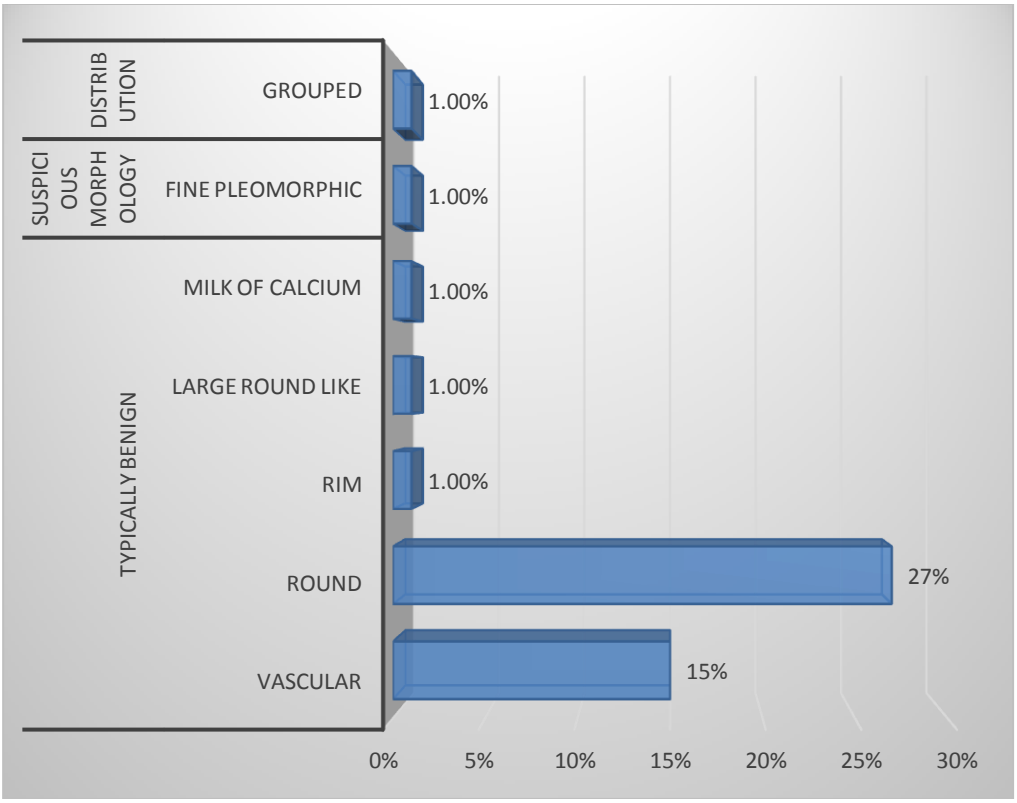
**Architectural distortion** - Architectural distortion was present in 2% patients. In Yesmin L et al., [7] Architectural distortions were present in 19.3% patients.
**Shape** - Shape of the lesion was oval in 3% patients, round in 1% patients and irregular in 1% patients. All oval and round shaped lesions were benign and irregular shaped lesions were malignant. In Rotten D et al., [8] Shape of the lesion was oval in 0.67% (9/1350) patients, round in 0% patients and irregular in 0.3% (4/1350) patients. In Hanif N et al., [9] Shape of the lesion was oval in 73.3% patients & round in 26.7% patients




Graph 2: Distribution of patients based on the shape of the lesion

**Margins** - Margins of the lesion were circumscribed in 2% patients, micro lobulated in 2% patients and spiculated in 1% patients. All circumscribed and micro lobulated lesions were benign and spiculated lesions were malignant. In Rotten D et al., [8] Margins of the lesion were entirely jagged margins in 0.96% (13/1350). In Yesmin L et al., [7] spiculated in 15.8% patients, ill define in 14% patients, lobulated in 1.8% patients and irregular in 5.2% patients.
**Density** - High density lesions were present in 3% patients and equal density lesions were present in 2% patients. Among high density lesions, 1 was malignant and 2 were benign. Among equal density lesions, all were benign. In Yesmin L et al., [7] 98.2% patients had dense lesions and 1.8% patients had radiolucent lesions.
**Calcifications** - Vascular, rim, large round like, and milk of calcium calcifications are found in 27%,15%,1%,1% of individuals respectively. These are of benign type and fine pleomorphic calcifications were found in 1% of cases that are stated as suspicious.

In a study conducted by Wendie et al., [10] showed that pleomorphic calcification seen within a mass was mostly proven on histopathology to be a typically invasive ductal carcinoma. 56% of the breast lesions without any calcification were positive for malignancy from which we could conclude that not all breast malignancies had calcifications. In Durhan G et al., [11] Mammography was applied to 107 patients (81.6%) and on 84.1 % of these images an abnormality was determined. The most common abnormality on mammography was the presence of a mass (41.2%), followed by suspicious micro calcifications (40.2%). In 5 patients, the diagnosis was made based on the presence of microcalcifications on mammography only. The most frequently seen shape on mammography was irregular and the most common margin feature was obscured. Mammography is better in detecting Micro calcifications and early detection of occult malignancy.




Graph 3: Distribution of patients based on the lesion calcification

**BIRADS Score -** 19% belongs to BIRADS-1, 76% belongs to BIRADS-2, 4% belongs to BIRADS-3, 0% belongs to BIRADS-4 and 1% belongs to BIRADS-5,0% belongs to BIRADS-6.

In Alhamami QS et al., [12] Breast Imaging-Reporting and Data System (BIRADS) by mammogram revealed the categories as follows -

0(incomplete) 23(21.9%). 1(negative) 0, 2(benign findings) 12(11.4%). 3(probably benign) 33(31.4). 4(suspicious abnormality) 6(5.7%), 4a(low) 7(6.7%), 4b(moderate) 5(4.8%), 4c(high) 2(1.9%). 5(highly suspicious of malignancy) 9(8.6%). 6 (known biopsy with proven malignancy) 5(4.8%), (Equivocal) 3(2.9%).

**Histopathological examination -** Histopathological examination revealed that duct cell carcinoma was present in 1% of patients and fibroadenoma was present in 4% patients.

In Alhamami QS et al., [12] while examination with mammogram revealed that, 33/105 i.e. (31.4%) were malignant, 40(38.1%) had benign disease, 8(7.6%) normal and in 21(20%) suspicious changes were found and 3(2.9%) undetected. Ductal carcinoma 41.9%, lobular cancer 28.6%, and complex cancer 24.8% were the most common types of breast cancer. Combining the mammography and Sonomammogram, sensitivity was 92.2% and specificity was 98.02% respectively.

Ductal carcinoma was found to be the most common type of breast cancer in other studies carried out in other countries[13,14]

Farokh et al., [15] showed that ultrasonography was a certain diagnostic test for detecting breast cancer in patients with high density breasts (stage 3 and 4), and mammography was more accurate than ultrasonography in determination of the size of tumour before surgery. The sensitivity and specificity of ultrasonography were compared with mammography findings and clinical examination in a study by Shafiee et al., [16] According to that study, the sensitivity and specificity of ultrasonography were higher than mammography examination (25.8%

and 71.9% vs. 5% and 7.1%). Therefore, mammography was not a reliable diagnostic test in diagnosis of breast cancer[59]. Considering the incidence of breast cancer at a comparatively young age and dense breast in these ages, ultrasonography is recommended as an additional test in patients of a lower age group to increase diagnostic sensitivity as compared to mammography[17]

A study by J. Brodersen proved that magnetic resonance imaging is more effective than mammography, ultrasonography, and clinical examination in diagnosis of residual tumors to avoid false positive results of mammogram and ultrasound.

The major merits of breast cancer screening programs are: early diagnosis, sorting out and prevention of risk factors, and timely treatment to lessen the morbidity and reduction in 20% of mortality rate. The major demerits of breast cancer screening are over diagnosis, high cost, ionizing radiation, and their consequences. Worldwide, most countries recommend biennial screening for breast cancer at 50–74 years of age

Mammography can diagnose even impalpable tumors of the breast[18]. Another study from France also corroborated this finding and concluded that mammography is effective in the diagnosis of early breast cancer[19]

## V. Conclusion:

Screening Mammography proves to be an excellent tool in diagnosing non palpable, clinically silent breast lesions. It has been found those micro calcifications, mixed glandular and fatty, single lesion, dense, and well-defined margin are commonly found in mammography.

There is a definite relation between the presence of a false negative test and the risk of cancer detection in subsequent screening participations. The association was much clear in false negatives involving a cytology examination or biopsy, and in women with a family history of breast cancer.

Therefore, it can be concluded that mammography is sensitive, specific tool, easily available and affordable and so a very useful diagnostic tool in the detecting and differentiating malignant and benign breast masses.

It is also useful in guided interventions; follow up of known patients of carcinoma of breast (Second breast or the same breast where breast preserving surgery was done).

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