# Evaluation of Clinical, Sonographical and Histopathological Characteristics of Benign Breast Conditions: A Comparative Study

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**ABSTRACT**
The prevalence of breast cancer is escalating in contemporary society, with 80% of lesions being non-malignant. Traditional clinical examination or investigations lack consistent reliability in detecting Benign Breast Lesions (BBL). However, when clinical examination, breast Ultrasonography (USG) and Fine Needle Aspiration Cytology (FNAC) Histopathological Examination (HPR) are combined, the diagnostic accuracy substantially improves. This study aimed to investigate the roles of these modalities in diagnosing benign breast. 47 female patients with BBL were included. A comprehensive patient history was obtained to identify relevant risk factors and chronological recording of complaints was performed. Subsequently, clinical examination was conducted to assess various presentation forms and USG and FNAC/HPR were carried out. The study revealed a higher incidence of benign lumps in the 11-20 age group. Among the patients, most reported a breast lump, followed by pain and nipple drainage. The majority of these lumps were 3 cm in size, with Fibroadenomas being the predominant pathology. Majority of the lesions were isolated. FNAC, conducted in all patients, yielded a 100% diagnostic rate. While USG effectively distinguished cystic from solid tumors, the typing of the lesion had limitations, although Fibroadenomas could be reliably diagnosed. The integration of clinical examination, USG, and FNAC in the diagnostic process optimizes the accuracy of BBL diagnosis. Employing this triple assessment approach helps in avoiding unnecessary procedures for benign lesions.

## INTRODUCTION

Benign breast diseases encompass a diverse array of non-malignant conditions, constituting a significant health concern in girls across various societies. Breast cancer stands as the most prevalent cancer among women globally, ranking second in cancer-related female fatalities, following lung cancer. In India, the age-adjusted incidence rates for women range from 6.2-39.5 per 100,000. The awareness of breast cancer has amplified, with a detected lump causing considerable physical, emotional and psychological distress to both patients and their families. Therefore, accurately distinguishing between benign and malignant tumors is crucial for effective patient care. Despite the predominant benign nature of breast lesions, noncancerous breast pathology has historically received less attention than breast cancer, even though benign disorders contribute to 90% of clinical presentations related to the breast. Unlike malignant diseases, the occurrence of benign breast lesions begins to rise in the second decade of life, peaking in the fourth and fifth decades. In contrast, the incidence of malignant diseases continues to increase post-menopause at a slower rate[1-3].

Triple assessment, integrating clinical examination, imaging and histological study, is now recognized as the gold standard for diagnosing breast lumps. A definitive diagnosis of a benign lesion not only alleviates unnecessary stress for the patient but also reduces the burden on the healthcare system. Conversely, a confirmed preoperative identification of a malignant lesion provides opportunities for patient counseling and planning for prospective single-stage surgical therapy. Breast cancer may present as a lump or nipple discharge and the triple assessment is employed to evaluate such breast masses, encompassing a comprehensive history, clinical breast examination, imaging modalities and tissue diagnosis. While histological examination of excised material is the final diagnostic step, routine excision of all breast lumps is unwarranted due to the benign nature of up to 80% of these lumps. Thus, a less invasive, cost-effective, accurate and reproducible method is needed to identify the lump without resorting to a more invasive open biopsy. Various diagnostic techniques are available for examining breast lumps, including Ultrasound Doppler scanning, Fine Needle Aspiration Cytology (FNAC), Mammography (MMG), and, more recently, Magnetic Resonance Imaging (MRI) and contrast-enhanced ultrasound. However, due to cost considerations, less expensive methods such as FNAC and Ultrasonography (USG) are recommended[4-6].

Ultrasound imaging of the breast is a radiation-free, noninvasive technique with high accuracy, particularly in diagnosing cystic lesions in dense breast tissue. However, it is operator-dependent, leading to potential interobserver variations. Fine Needle Aspiration Cytology is a straightforward, reliable, valid and reproducible diagnostic technique. It is a less stressful and nearly painless procedure that does not require anesthesia, providing a patient-friendly standard tool for diagnosing breast masses[7,8].

While the individual accuracies of FNAC and USG in identifying breast masses have been investigated in various studies, there is a shortage of evidence comparing the two modalities. Therefore, the objective of this study was to assess and compare the accuracy of USG and FNAC in diagnosing recently identified palpable breast lumps, in comparison to the final Histopathological Examination (HPE) report of the biopsied specimens.

## MATERIALS AND METHODS

47 consecutive female individuals with BBL who sought consultation at an Indian tertiary level hospital were included in this study. All cases clinically diagnosed with BBL, regardless of age, were considered for inclusion in the study. Patients initially categorized as having benign breast disease but later confirmed to have malignancy upon investigation, as well as those with acute inflammatory conditions, were excluded from the study.

A comprehensive patient history was meticulously recorded to identify relevant risk factors and complaints were systematically documented in chronological order. Clinical examination was conducted to ascertain diverse modes of presentation. Subsequently, breast USG and FNAC/HPR were performed. Appropriate statistical tests were employed for the analysis, using SPSS 20.0 software.

## RESULTS

Upon analysis, it was determined that the incidence of Benign Breast Lesions (BBL) was higher in the age group of 11-20 years, followed by the age

Table 1: Age wise number of BBL cases

| Age Group (in Years) | n | % |
|---|---|---|
| 1-10 | 0 | 0.00 |
| 11-20 | 20 | 42.55 |
| 21-30 | 16 | 34.04 |
| 31-40 | 13 | 27.66 |
| 41-50 | 0 | 0.00 |

Table 2: Clinical features of BBL in study population

| Symptoms | n | % |
|---|---|---|
| Breast Lump | 42 | 89.36 |
| Pain | 3 | 6.38 |
| Discharge | 2 | 4.26 |
| **Lump size** | | |
| <3 cm | 28 | 59.57 |
| 3-5 cm | 13 | 27.66 |
| >5 cm | 6 | 12.77 |
| **Diagnosis** | | |
| Fibroadenoma | 34 | 72.34 |
| Fibroadenosis | 6 | 12.77 |
| Mastitis | 5 | 10.64 |
| Ductal papilloma | 0 | 0.00 |
| Galactocele | 2 | 4.26 |

Table 3: Age distribution of BBL cases in study population

| Diagnosis | Age groups (in years) | | | | |
| --- | --- | --- | --- | --- | --- |
| | <10 | 11-20 | 21-30 | 31-40 | >40 |
| Fibroadenoma | 0 | 17 | 11 | 6 | 0 |
| Fibroadenosis | 0 | 0 | 1 | 5 | 0 |
| Mastitis | 0 | 2 | 1 | 1 | 1 |
| Ductal Papilloma | 0 | 0 | 0 | 0 | 0 |
| Galactocele | 0 | 0 | 1 | 1 | 0 |

Table 4: Comparison of Clinical versus USG versus FNAC diagnoses of BBL

| Diagnosis | Clinical | | USG | | FNAC | |
| --- | --- | --- | --- | --- | --- | --- |
| | n | % | n | % | n | % |
| Fibroadenoma | 27 | 79.41 | 24 | 70.59 | 25 | 73.53 |
| Fibroadenosis | 3 | 50.00 | - | - | 5 | 83.33 |
| Mastitis | 0 | 0.00 | - | - | 4 | 80.00 |
| Galactocele | 1 | 50.00 | 0 | 0.00 | 1 | 50.00 |

groups of 21-30 years and then 31-40 years (refer to Table 1). The majority of patients presented with a complaint of a breast lump, followed by pain and nipple discharge. Most of these lumps were smaller than 3 cm in size (refer to Table 2). The disease pattern of BBL is detailed in Table 2, with fibroadenoma being the most prevalent, followed by fibroadenosis. Table 3 illustrates the age distribution according to breast pathology, revealing that the majority of lesions were solitary. Table 4 presents a comparative analysis of Clinical versus USG versus FNAC diagnoses of BBL.

## DISCUSSIONS

Breast cancer remains a significant threat to women's health globally, exhibiting considerable variations between industrialized and developing nations. The clinical assessment of this condition necessitates reliable investigative tools to enhance diagnostic precision. Hence, our study aimed to establish the diagnostic accuracy of two fundamental tools for detecting breast lumps, namely USG and FNAC[2,3]. In our study, the prevalence of benign lumps was highest in the age range of 11-20 years, followed by 21-30 years and then 31-40 years. In accordance with the investigation by Kalwani et al. the mean age of individuals with malignant cases was 51.25±11.40 years, with the highest incidence observed in the fifth decade of life, followed by the sixth decade. Our findings align with the data from the Indian Council of Medical Research's National Cancer Registry Program (1996), reporting an average age of 51-53 years for females with breast cancer[3].

Shyamala Jothy et al. found that the majority of patients (68.33%) in their study were in the active reproductive years (20-40 years), illustrating the impact of cyclical changes such as menstruation, pregnancy and breast feeding on the incidence of breast disorders. The prevalent lesions in our investigation were fibroadenoma, fibrocystic disease, galactocele, cystosarcoma phyllodes tumor and ductal papilloma. Calculating the sensitivity and specificity of each modality for Benign Breast Disease (BBD) diagnosis requires a substantial sample size and the presence of malignant lesions[6,9]. In our current study,

clinical detection identified 83.3% of fibroadenomas, whereas USG diagnosed 73.3% of cases, confirmed by FNAC. Sensitivity and specificity of USG were determined to be 100 and 75%, respectively. Discrepancies in the age distribution of fibrocystic breast disease were noted compared to Khanna et al[10] and Rangabashyam et al[11].

Regarding fibroadenomas, majority were found in individuals aged 11-30 in our study, aligning with Rangabashyam et al. Indian study where 75.39% of cases fell within the 11-30 age range[11]. The reproductive age group constituted the majority of our participants, with no significant variation in swelling amount before or during menstruation. Clinical examination and USG showed good agreement with HPE in BBL diagnosis. However, decisions regarding benign breast lump's management cannot rely solely on these modalities. FNAC, when combined with physical and radiological findings, was found to provide more informative traits. Our study underscores the importance of a multimodality approach, combining FNAC and USG, to enhance diagnostic accuracy and overcome false negatives. Effective communication among doctors, radiologists and pathologists proved beneficial in improving diagnostic precision[12-15]. It is crucial to note that our study has limitations, being a single-center, record-based investigation. Larger-scale studies on the accuracy and necessity of the triple assessment of benign breast tumors would offer valuable insights. Integrating triple assessment parameters could yield a definitive diagnosis with high sensitivity, specificity, positive predictive value and negative predictive value, minimizing diagnostic errors.

## CONCLUSION

Our research suggests FNAC as a dependable diagnostic approach for BBL patients; however, in cases of ambiguous results, opting for excisional or core needle biopsy is advisable for breast lesions. FNAC/HPR contributes to recognizing diverse presentations of BBL, influencing disease management. Integrating clinical breast examination, ultrasonography and fine needle aspiration cytology in the assessment of benign breast masses is a beneficial

and successful strategy. Triple examination aids in preventing unnecessary surgeries for benign lesions.

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