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Clinicopathological Correlation of Modified Triple Test Components with Histopathological Subtypes in Patients Presenting with Breast Lump

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ABSTRACT

Background: Breast lumps are a common clinical presentation, with timely differentiation between benign and malignant lesions being critical for appropriate management. The Modified Triple Test Score (MTTS), integrating clinical examination, imaging, and cytopathology, offers a structured, cost-effective, and reproducible method for preoperative evaluation of breast masses, particularly in low-resource settings.

Objectives: To assess the clinicopathological correlation of MTTS components with final histopathological subtypes in patients presenting with palpable breast lumps, and evaluate its diagnostic performance in identifying malignancy.

Methods: This prospective observational study was conducted at Shri Mahant Indiresh Hospital, Dehradun, between January 2023 and March 2024. Sixty female patients over 18 years of age with palpable breast lumps were enrolled. Each underwent clinical breast examination, radiological assessment (sonomammography), and FNAC or core biopsy. Findings were scored using the MTTS system and compared with post-excisional histopathological examination (HPE). Data were analyzed using SPSS v23, applying Chi-square and Fisher's exact tests with $p < 0.05$ as significant.

Results: MTTS categorized 70% of cases as malignant and 30% as benign. Histopathological analysis revealed fibroadenoma and invasive ductal carcinoma as the most common lesions (20% each), followed by lobular carcinoma, phyllodes tumor, intraductal papilloma, and fibrocystic changes (15% each). High MTTS scores showed strong concordance with malignant histology, supporting its diagnostic reliability.

Conclusion: MTTS is a valuable, accurate, and accessible diagnostic modality that demonstrates strong agreement with histopathological findings, facilitating early detection and triage of breast lesions in clinical practice.

Keywords: *Breast neoplasms; Triple test; Histopathology; Cytodiagnosis; Ultrasonography.*

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1. INTRODUCTION

Breast lumps represent a frequent clinical presentation in surgical outpatient departments, warranting prompt evaluation due to the risk of malignancy. Although the majority of these lesions are benign, the clinical priority lies in distinguishing them accurately from malignancies to initiate timely management and avoid overtreatment[1]. Breast cancer, in particular, remains the most prevalent malignancy among women globally, accounting for approximately 2.3 million new cases and over 670,000 deaths in 2023 alone[1,2]. In India, breast cancer accounts for nearly 14% of all cancers in women, with a growing burden particularly in urban populations due to lifestyle changes, delayed childbirth, and lack of early detection[3]. To address this growing burden, early and accurate diagnosis of breast lumps is essential. The Triple Assessment—

comprising Clinical Breast Examination (CBE), imaging (ultrasonography or mammography), and pathological analysis through Fine Needle Aspiration Cytology (FNAC) or core biopsy—has long been a diagnostic mainstay. However, the Modified Triple Test Score (MTTS) enhances this approach by assigning structured scores to each component, offering a composite assessment that improves preoperative diagnostic accuracy[4].

Histopathological examination (HPE) remains the gold standard for definitive diagnosis, providing critical insights into both benign and malignant pathologies and allowing histological subtyping essential for management[5]. Despite widespread use of the MTTS, its diagnostic correlation with post-excisional histopathological findings, particularly across diverse histological subtypes, has not been adequately studied in many clinical settings, especially within resource-constrained healthcare systems.

The purpose of the study was to assess the correlation between MTTS components and histopathological subtypes of breast lumps, evaluating its diagnostic accuracy in guiding preoperative assessment and improving patient triage.

2. AIM AND OBJECTIVES

To evaluate MTTS accuracy by correlating clinical, imaging, and cytology findings with histopathological subtypes in breast lumps.

3. MATERIALS AND METHODS

A prospective observational study was conducted from January 2023 to March 2024 at the Departments of General Surgery and Surgical Oncology, Shri Mahant Indiresh Hospital, Dehradun. A total of 60 female patients were included.

4. INCLUSION CRITERIA

- Female patients aged >18 years.
- Presence of a palpable breast mass.

5. EXCLUSION CRITERIA

- Previously diagnosed cases of carcinoma breast.
- Patients unwilling to undergo invasive or surgical procedures.

Each patient underwent a clinical breast examination, radiological assessment (sonomammography), and pathological evaluation (FNAC/core biopsy). Findings were scored using the Modified Triple Test Score (MTTS), with values ranging from 3–9, and classified as benign (3–4), suspicious (5), or malignant (6–9). These were compared with final post-excisional histopathological examination (HPE) findings.

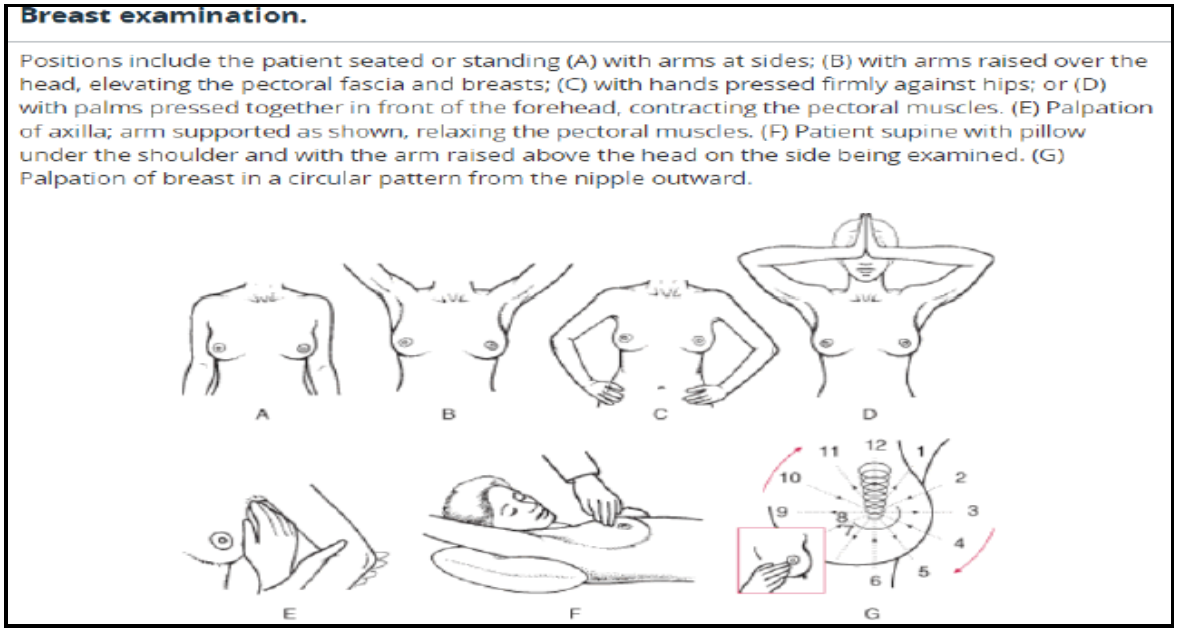

Figure 1: Clinical Breast Examination

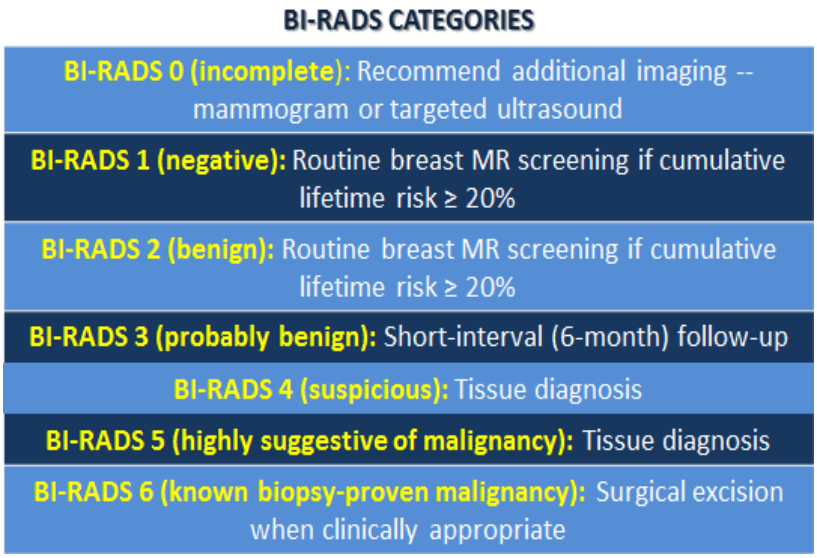

Figure 2: BI-RADS Categories

Cytology categories	Explanation
C1	Inadequate
C2	Benign
C3	Atypical, probably benign
C4	Suspicious, favor malignancy
C5	Malignant

Figure 3: Cytology Categories

6. STATISTICAL ANALYSIS

Data were analyzed using SPSS version 23. Chi-square or Fisher's exact tests were applied to assess associations. A p-value <0.05 was considered statistically significant. Ethical approval was obtained from the Institutional Ethics Committee.

7. RESULTS

Table 1: Distribution of study subjects according to their history of Family, Previous surgery, and other medical conditions

Variable	Category	Frequency (n)	Percentage (%)
Family History	**Yes**	12	20.0
	No	48	80.0
	Total	**60**	**100**
History of Previous Surgery	**Yes**	12	20.0
	No	48	80.0
	Total	**60**	**100**
Other Medical History	**Diabetes**	3	5.0
	Hypertension	9	15.0
	Hyperlipidaemia	12	20.0
	None	36	60.0
	Total	**60**	**100**

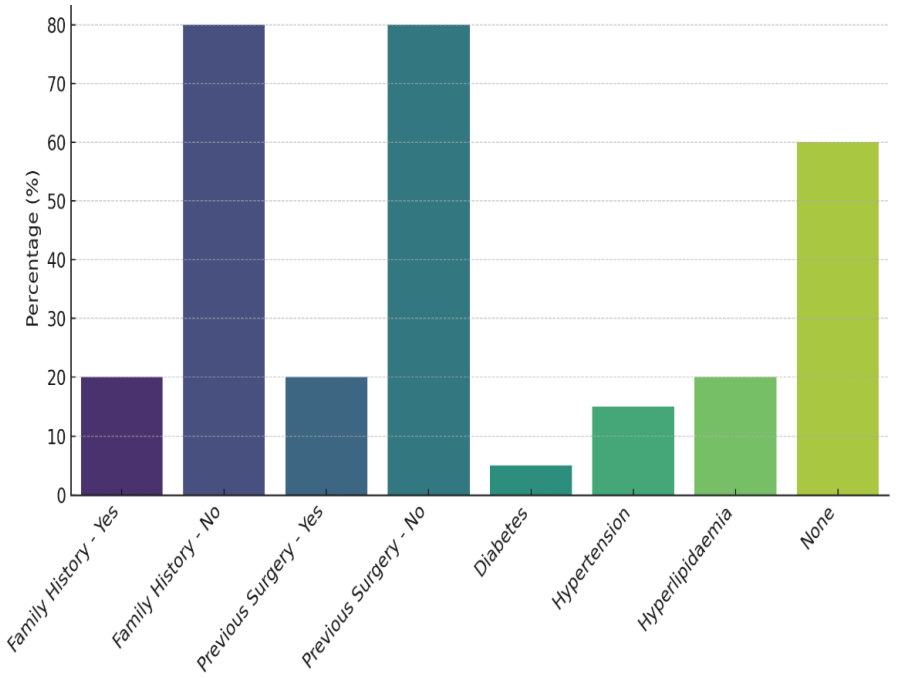

Figure 1: Distribution of Family History, Surgery, and Medical History

Table 2: Distribution of study subjects according to Clinical Breast Examination, Radiological, and Pathological Findings

Category	Clinical Breast Examination Findings		Radiological Findings		Pathological Findings (FNAC/Biopsy)	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
Benign	18	30.0	18	30.0	9	15.0
Suspicious	21	35.0	30	50.0	30	50.0
Malignant	21	35.0	12	20.0	21	35.0
Total	**60**	**100**	**60**	**100**	**60**	**100**

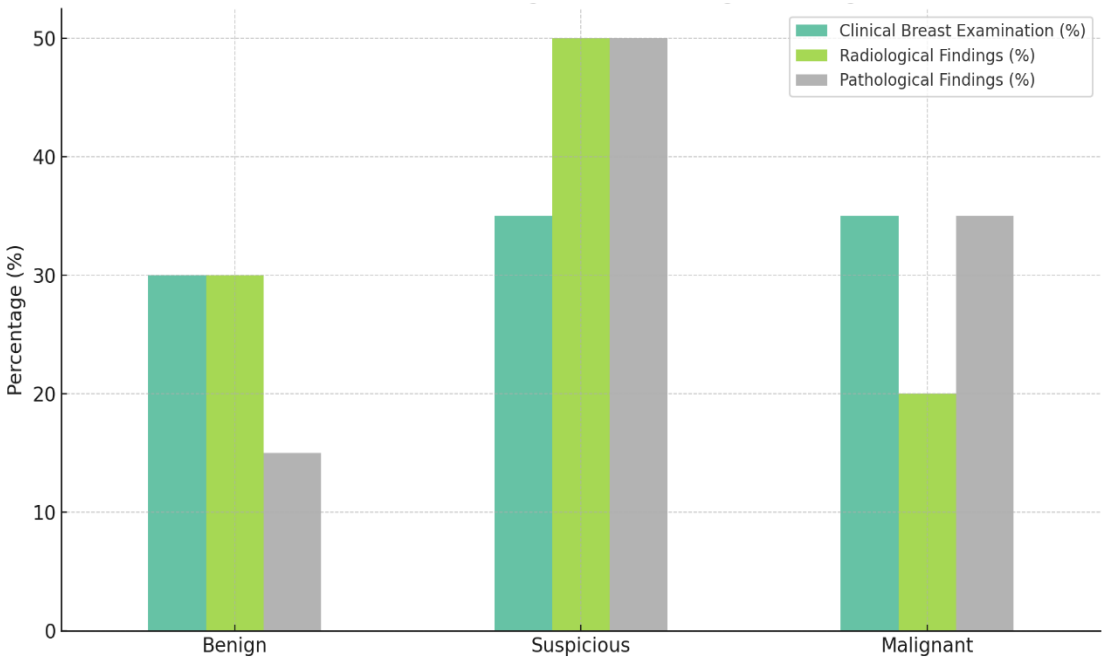

Figure 2: Distribution of Clinical, Radiological, and Pathological Findings

Table 3: Distribution of study subjects according to Modified Triple test score (MTTS)

Modified Triple test score	Frequency (n)	Percentage (%)
Benign (MTTS = 3-4)	18	30.0
Malignant (MTTS ≥ 6)	42	70.0
Total	**60**	**100**

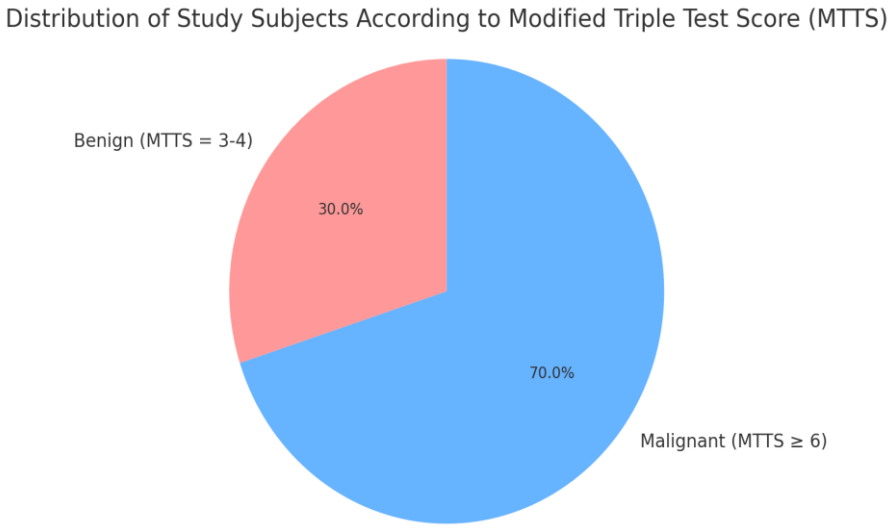

Figure 3: Distribution of Study Subjects According to Modified Triple Test Score (MTS)

Table 4: Distribution of study subjects according to Post-Excisional Histopathological Findings

Post-Excisional Histopathological Findings (HPE)	Frequency (n)	Percentage (%)
Fibroadenoma	12	20.0
Fibrocystic Changes	9	15.0
Invasive Ductal Carcinoma	12	20.0
Lobular Carcinoma	9	15.0
Phyllodes Tumour	9	15.0
Intraductal Papilloma	9	15.0
Total	**60**	**100**

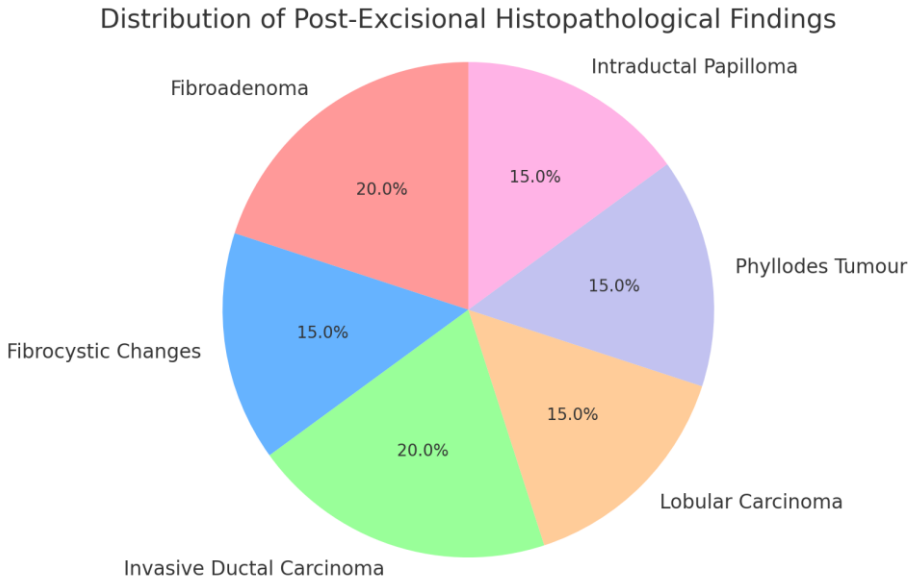

Figure 4: Distribution of Post-Excisional Histopathological Findings

8. DISCUSSION

In the current study, 20% of participants had a family history of breast cancer, and 20% reported a history of previous breast surgery. Hyperlipidemia (20%) was the most common comorbidity, followed by hypertension (15%) and diabetes (5%). These variables were not quantified in the studies by Kumari et al[6] or Jagadev et al[7], making the documentation of comorbid conditions unique to this analysis. Notably, 60% of participants had no other medical conditions, underscoring the importance of profiling systemic risk factors in breast lump evaluation.

Clinical Breast Examination (CBE) identified 35% of cases as malignant, 35% as suspicious, and 30% as benign. These findings are consistent with the diagnostic performance reported by Rohan S. More et al[8], who found a sensitivity of 73.08% for CBE. Radiological assessment in the present study classified 50% of cases as suspicious, 30% as benign, and 20% as malignant, which corresponds well with the findings of Akinnibosun-Raji et al[9], who reported ultrasound sensitivity of 79.5%, specificity of 98.3%, and strong diagnostic correlation with histopathology (r = 0.846). The predominance of the suspicious category in radiology highlights imaging's ability to detect early malignant or atypical lesions. In pathological analysis, 35% were malignant, 50% suspicious, and 15% benign. This distribution closely resembles the findings of Mahwish Niaz et al[10], who used the IAC Yokohama system[10] and reported high ROM for suspicious and malignant cytological categories—82.79% in C4 and 99.34% in C5. However, the low benign rate (15%) in this study contrasts with the higher benign rates reported by Kumari et al[6] (75%) and Niaz et al[10] (65.8%), likely reflecting a more selective, high-risk population.

According to the Modified Triple Test Score (MTTS), 70% of subjects were categorized as malignant and 30% as benign. These results are in line with the diagnostic performance described by Sushma Jagadev et al[7], who observed 96% sensitivity and 90% specificity for MTTS, and Rohan S. More et al[8], who reported 100% sensitivity and 98.65% specificity. This supports the use of MTTS as an effective tool for early identification of malignant lesions. When compared with the findings of Kumari et al[6], where only 18% of breast lumps were malignant, the present study shows a higher proportion of malignancy, possibly due to targeted selection of clinically suspicious cases.

Histopathologically, fibroadenoma and invasive ductal carcinoma were the most common findings (20% each), followed by lobular carcinoma, phyllodes tumour, fibrocystic changes, and intraductal papilloma (15% each). These findings are similar to those of Kumari et al[6], who reported fibroadenoma as the most prevalent benign lesion and invasive ductal carcinoma as the dominant malignancy. Rohan S. More et al[8] and Mahwish Niaz et al[10] also identified invasive ductal carcinoma as the leading malignant subtype. The equal distribution of three less commonly emphasized lesions—phyllodes tumour, fibrocystic changes, and intraductal papilloma—adds diversity to the histopathological spectrum, which was less extensively documented in the other referenced studies. The strong correlation between high MTTS scores and malignant histology in this study reinforces the diagnostic accuracy and clinical applicability of the MTTS approach in breast lump evaluation.

The limitations of the study include a relatively small sample size and single-center design, which may affect the generalizability of the results. The absence of long-term follow-up limits outcome analysis beyond diagnosis. Additionally, radiological categorization lacked standard BI-RADS scoring, and some indeterminate cytological results could have benefited from core biopsy confirmation for more definitive correlation.

The strengths of the study include the prospective design, strict inclusion criteria, and systematic comparison of clinical, radiological, and pathological findings. The use of histopathology as the gold standard enhances diagnostic validity. Inclusion of comorbidities and family history adds depth to clinical profiling, and the MTTS framework offers a practical approach for evaluating palpable breast lumps with reproducible accuracy.

9. CONCLUSION

We concluded that the Modified Triple Test Score (MTTS) is a highly effective diagnostic tool in evaluating breast lumps, demonstrating strong concordance with histopathological findings. Its ability to stratify cases into benign and malignant with high accuracy supports its utility in clinical decision-making. Incorporating clinical, radiological, and cytological findings improves diagnostic precision, thereby reducing unnecessary biopsies and facilitating early intervention, especially in resource-limited settings.

Conflict of Interest: *None.*
Funding: *None.*
Ethical Approval: *Obtained.*
Consent: *Written consent secured.*

REFERENCES

[1] Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, Bray F. Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA: a cancer journal for clinicians. 2021 May;71(3):209-49.

[2] World Health Organization. (2024, March 13). Breast cancer. Retrieved from World Health Organization website: https://www.who.int/news-room/fact-sheets/detail/breast-cancer

[3] Kumar S, Nath A, Sudarshan KL, Ramamoorthy T, Sakia J, Kumar N, Deo SV, Jain D, Malik PS, Mathur P. Clinical spectrum of lung cancer across hospitals under the National Cancer Registry Programme in India: Challenges and opportunities. Lung India. 2025 Jul 1;42(4):283-90.

[4] Gana SG, Olarinoye-Akorede SA, Samaila MO. Modified Triple Test Score for Palpable Breast Lumps: The Utility of Breast Ultrasound and Core Needle Biopsy in Resource-Constrained Settings. Medical Research Archives. 2025 Apr 30;13(4).

[5] Aziz S, Mohamad MA, Zin RR. Histopathological correlation of breast carcinoma with breast imaging-reporting and data system. The Malaysian Journal of Medical Sciences: MJMS. 2022 Aug 29;29(4):65.

[6] Kumari V, Sinha A, Nasreen K, Garg N. Study of Incidence of Malignancy in Breast Lumps-Prospective Study. European Journal of Cardiovascular Medicine. 2023 Apr 1;13(2).

[7] Jagadev S, Kustagi SS, Chowdari Balaji KS, Reddy BB. ASSESSING THE EFFICACY OF THE MODIFIED TRIPLE TEST IN THE DIAGNOSIS OF PALPABLE BREAST LUMPS. contexts.;7:8.

[8] More RS, Dumbre S, Dikle AM, More R. Efficacy of Modified Triple Assessment in Diagnosing Breast Lesions: A Prospective Observational Study. Cureus. 2025 Mar 31;17(3).

[9] Akinnibosun-Raji HO, Saidu SA, Mustapha Z, Ma'aji SM, Umar M, Kabir FU, Udochukwu UG, Garba KJ, Raji MO. Correlation of sonographic findings and histopathological diagnoses in women presenting with breast masses. Journal of West African College of Surgeons. 2022 Apr 1;12(2):109-14.

[10] Niaz M, Khan AA, Ahmed S, Rafi R, Salim H, Khalid K, Kazi F, Anjum A, Waheed Y. Risk of malignancy in breast FNAB categories, classified according to the newly proposed International Academy of Cytology (IAC) Yokohama System. Cancer Management and Research. 2022 May 7:1693-701.