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To measure specificity and sensitivity of ultrasonography in evaluation of breast lesions in a tertiary care centre

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Abstract

Materials & Methods: The present study entitled "specificity and sensitivity of ultrasonography in evaluation of breast lesions in a tertiary care centre" was carried out over a period of two years at Gandhi Medical College & Hamidia Hospital Bhopal. Patients from almost all the areas of Bhopal & nearby districts seek medical attention there. A total of 100 participants were enrolled in the study, who attended general surgery OPD for breast lesions and later came for breast ultrasound in our department and histopathological sampling.

Results: In our study 28 out of 32 (87.5%) malignant and 58 out of 68 (85.29%) benign lesions were correctly identified by ultrasound while 10 benign lesions were wrongly characterized as malignant and 4 malignant lesions were wrongly classified as benign on ultrasound. We found the sensitivity, specificity, positive predictive value, negative predictive value of ultrasound in our study in differentiation of malignant breast lesions from benign lesions were 85.29%, 87.5%, 93.55% and 73.68% respectively.

Conclusion: This study highlights the usefulness of ultrasound in the evaluation of breast lesions as an adjunct to clinical examination. Ultrasound is advised as the first option for follow-up examinations of lesions due of its high sensitivity and capacity to detect lesions

outside the breast density. It can help to differentiate benign from malignant lesions with some limitation because of overlapping of some features in both benign and malignant lesions like lobulated margins, microcalcification, and echogenicity.

Keywords: Breast ultrasound, histopathological correlation, Specificity, sensitivity, PPV, NPV, BC

Introduction

Female BC has surpassed lung cancer as the most diagnosed cancer, with an estimated 2.3 million new cases (11.7%), followed by lung (11.4%) and colorectal (10.0%), cancers. Death rates for female breast and cervical cancers, however, were considerably higher in transitioning versus transitioned countries (15.0 vs 12.8 per 100,000 and 12.4 vs 5.2 per 100,000, respectively). [1] A study in 2020 found that BC incidence in women under 50 years increased in 20 of 44 populations across the globe from 1998-2012, most of which were in high income countries, whereas BC incidence in women 50 years and older increased in 24 of 44 populations, mostly in countries undergoing socioeconomic transitions. [2] BC mortality rates have decreased over time in most high-income countries but remain high and are increasing in many low medium income countries and low-income countries.[3]

As per the GLOBOCAN data 2020, in India, breast carcinoma accounted for 13.5% (178361) of all cancer cases and 10.6% (90408) of all deaths with a cumulative risk of 2.81.[4] In the case of BC, a significant increasing trend was observed in Bhopal, Chennai and Delhi.[5]

In 2020, there were 2.3 million women diagnosed with BC and 685 000 deaths globally. As of the end of 2020, there were 7.8 million women alive who were diagnosed with BC in the past 5 years, making it the world's most prevalent cancer.[6]

BC is the most common cause of cancer death for women worldwide. In the past two decades, published epidemiological reports in different parts of the world show significant increase in BC mortality rate.[7]

Currently, among Indian women, BC is the main cause of cancer death and has surpassed cervical cancer in incidence.[8].

Radiological investigations for breast consist of ultrasonography (USG), MG (mammography) and MRI (magnetic resonance imaging).[9] USG is essential in differentiating cystic from solid masses. It is a non-invasive procedure used to evaluate the breast. The blood flow to a region inside the breast can also be evaluated using duplex ultrasound. It is helpful in the evaluation of abscesses, masses that are not totally evaluable with MG, palpable masses that are not apparent in radiographically dense breasts and young patients who are sensitive to radiation harm. [10,11]

Ultrasonography has become the most significant and useful supplement to mammography in patients with breast masses and in cases with normal or equivocal mammographic findings.[12] Breast density causes decline in mammography's sensitivity to detect, significantly raising the risk of BC in the process. Additional cancers are found with ultrasound.[13]

Materials & Methods

The present study entitled "specificity and sensitivity of ultrasonography in evaluation of breast lesions in a tertiary care centre" was carried out over a period of two years at Gandhi Medical College & Hamidia Hospital Bhopal. Patients from almost all the areas of Bhopal & nearby districts seek medical attention there. A total of 100 participants were enrolled in the study, who attended general surgery OPD for breast lesions and later came for breast ultrasound in our department and histopathological sampling. Permission to conduct the study was obtained

from the ethical committee of Gandhi Medical College, Bhopal, Madhya Pradesh. After obtaining informed consent & explaining the purpose of study to the participants, data collection was done & information was recorded on a predesigned, pretested & semi-structured proforma.

Sample size and statistical analysis

Statistical analysis: Data was entered into MS excel 2007, analysis was done with the help of Epi info Version 7.2.2.2. Frequency & percentages were calculated. Quantitative variables were expressed as the mean & standard deviation. Categorical data was expressed as percentage. Microsoft office was used to prepare the graphs. Chi- square/Fischer's exact test was applied for comparison. Independent t-test was applied for continuous variables, $P<0.05$ was considered to be statistically significant.

Results

Table 1: Distribution of Cases

Sn.	Type of Lesion		No. of Cases	Total
1.	Benign	Fibroadenoma	46 (67.6%)	68(68%)
		Fibrocystic Disease	10 (14.7%)	
		Breast Abscess	08 (11.7%)	
		Duct Ectasia	03 (4.4%)	
		Phyllodes	01 (1.4%)	
2.	Malignant	Ductal Carcinoma In situ	32 (100%)	32 (32%)

Among total of 100 cases 68 were found to be benign and 32 were found to be malignant. Among 68 benign lesions 46 were Fibroadenoma. 32 out of 100 cases were of malignant nature and all of them turned out to be ductal carcinoma in situ(Table 1).

Similar results were found by Luciano Chala et al (2006) [14], Ghazala Malik et al (2006) [15], Jaipal R et al (2016) [16], Hemant Kumar et al (2016) [17] and Farooq et al (2021) [18].

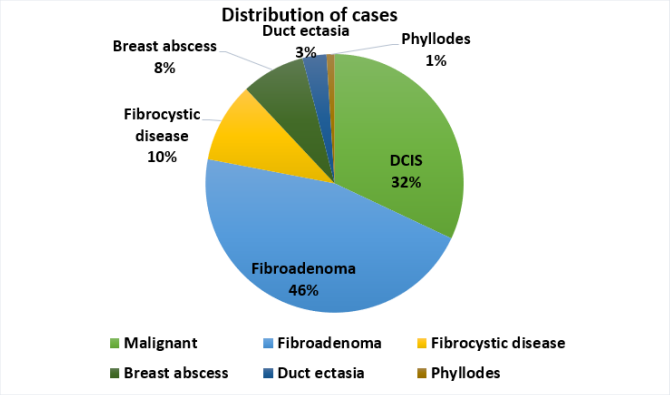


Figure 1: Various type of lesions and their incidence of detection is mentioned above

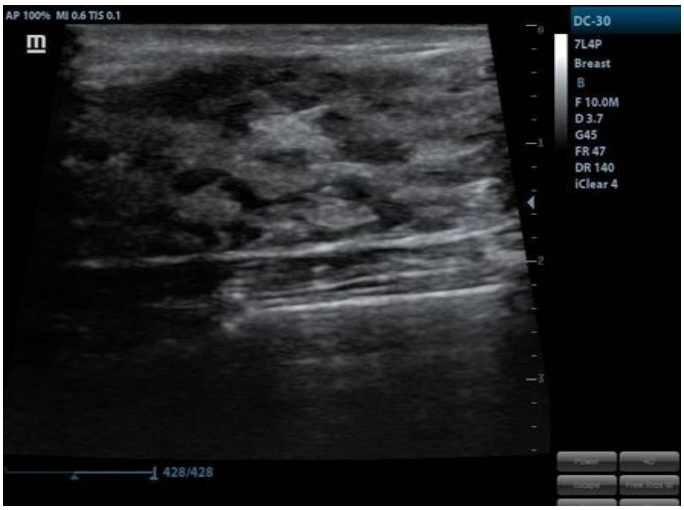


Figure 2: Shows multiple dilated anechoic tubular structures suggesting duct ectasia.

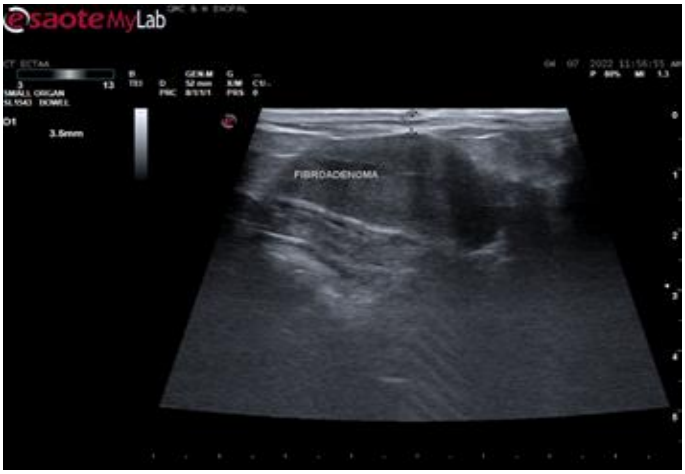


Figure 3: Shows oval hypoechoic solid mass lesion with smooth margins oriented horizontally without any

significant posterior acoustic feature. Lesion proved to be a fibroadenoma later.

Table 2: Age Wise Distribution of Cases

Sn.	Age Group	Benign	Malignant	Total
1	<20 Years	6	0	6
2	20-29 Years	26	0	26
3	30-39 Years	22	2	24
4	40-49 Years	10	8	18
5	50-59 Years	4	14	18
6	>60 Years	0	8	8
7	Total	68	32	100

Majority of benign cases were found in age group between 20-40 years while majority of malignant cases were found in age group between 40-60 years (Table.2). Hemant Kumar et al (2016) [17], Farooq et al (2021) [18], B. Vinod Kumar et al (2018) [19], and Devkota et al in 2021[20] had similar observations regarding the age of patient.

Table 3: Distributions According to Echogenicity

Sn.	Echogenicity	Benign (%)	Malignant (%)	Total
1.	Anechoic	06 (100%)	00	06 (06%)
2.	Hypoechoic	60 (65.21%)	32 (34.78%)	92(92%)
3.	Isoechoic	02 (100%)	00	02(02%)
4.	Hyperechoic	00 (00%)	00	00
5.	Total	68	32	100(100%)

In our study 92 (92%) lesions were hypoechoic (60 benign, 32 malignant) 06 lesions were anechoic and 02 lesion was isoechoic to the surrounding fat. All anechoic and isoechoic lesions were found to be benign in nature. With this we can say that majority of the breast lesions are hypoechoic as compared to the surrounding fatty tissue in the breast. Anechoic and isoechoic echopattern reduces the chances of malignancy. Among hypoechoic lesions there were 65.21% benign and 34.78% malignant lesions therefore we cannot take hypo-echogenicity as a reliable predictor of benignity or malignancy (Table 3). These results were similar to findings of Jaipal R et al (2016) [16] and Hemant Kumar et al (2016) [17].

Table 4: Distribution according to internal echotexture of lesions

Sn.	Echotexture	Benign	Malignant	Total no. Of cases
1.	Homogenous	54	10	64
2.	Heterogenous	14	22	36
3.	Total	68	32	100

64 out of 100 (64%) lesions having homogenous echotexture, out of which 54 (84.3%) lesions were proved benign and 10 (15.6%) lesions were malignant in nature. 36 out of 100 (36%) lesions were found having heterogenous echotexture out of which 14 (38.8%) were benign and 22 (61%) were malignant (Table 4). With these observations we can say that benign lesions usually present with homogenous echotexture, but they can also exhibit heterogenous echotexture such as in abscess. Malignant lesions usually have heterogenous echotexture, but they can also present with homogenous echotexture. With these findings we can say that internal echotexture is a less specific sonographic feature in the characterization of a breast lesion.

Ghazala Malik et al (2006) [15], Hemant Kumar et al (2016) [17] and Devkota et al in 2021[20] concluded similar results.

Figure 4: USG Image of Phylloides Tumor of Breast

Figure 4. shows a large well circumscribed heterogenous solid mass lesion with lobulated margins showing no posterior acoustic enhancement Lesion proved to be a phyllodes later.

Table 5: Distribution according to the shape of lesions on ultrasound

Sn.	Shape of lesion	Benign	Malignant	No. of cases
1.	Round/oval	60 (83.33%)	12 (16.66%)	72
2.	Irregular	08 (28.57%)	20 (71.42%)	28
3.	Total	68	32	100

72 out of 100 (72%) lesions were round or oval shaped out of which 60 (83.33%) lesions were benign and 12 (16.66%) lesions were malignant. 28 out of 100 (28%) lesions were irregular shaped of which 08 (28.57%) were benign and 20 (71.42%) were malignant (Table 5). Ghazala Malik et al (2006) [15], Jaipal R et al (2016) [16] and Hemant Kumar et al (2016) [17] also concluded similar findings.

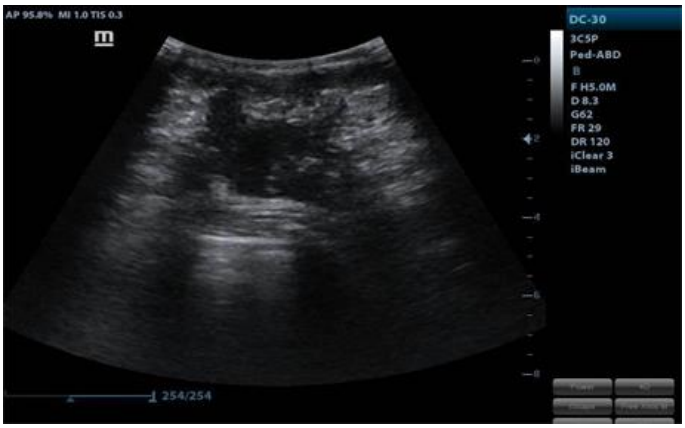


Figure 5: USG of Malignant Breast Pathology

Figure 5. shows irregular shaped solid mass lesion with spiculated margins with multiple micro calcific foci. The lesion does not show any posterior acoustic feature. The lesion proved to be malignant pathology later.

Table 6: Distribution of Cases According to The Margins

Sn.	Margins	Benign	Malignant	Total no. Of cases
1.	Smooth	54 (96.4%)	02 (3.57%)	56
2.	Lobulated	10 (71.4%)	04 (28.6%)	14
3.	Ill defined	02 (20%)	08 (80%)	10
4.	Spiculated	02 (10%)	18(90%)	20
5.	Total	68	32	100

56 (56%) cases (54 benign, 02 malignant) had smooth margins, 14 (14%) cases (10 benign, 04 malignant) had lobulated margins, 10 (10%) cases (02 benign, 08 malignant) had ill-defined margins and 20 (20%) cases (02 benign, 18 malignant) had spiculated margins (Table 6).

Luciano Chala et al (2006) [14], Ghazala Malik et al (2006) [15], Jaipal R et al (2016) [16], Hemant Kumar et al (2016) [17], and Sannomiya N et al (2016) [21] concluded similar results. Devkota et al in 2021[20] in most recent study concluded that most of the malignant masses had spiculated margins. Margin is regarded as one of the most important features to differentiate benign and malignant breast lesions.

Table 7: Distribution of cases according to the presence of microcalcifications within

Sn.	Micro-Calcification	Benign	Malignant	Total no. Of cases
1.	Present	04(22.22%)	14(77.77%)	18
2	Absent	64 (78%)	18 (22%)	82
3	Total	68	32	100

Micro calcification is present in 77.77% of cases (Table no 7) .Luciano Chala et al (2006) [14], Ghazala Malik et al (2006) [15] B. Vinod Kumar et al (2018) [19] reported similar results.

Table 8: Distribution of Cases According To The Presence Of Posterior Acoustic Features

Sn.	Posterior Acoustic features	Benign	Malignant	Total no. Of cases
1.	Enhancement	16 (100%)	00	16
2.	Shadowing	06(30%)	14(70%)	20
3.	No feature	46(71.87%)	18(28.12%)	64
4.	Total	68	32	100

Posterior wall enhancement was noted in 16 (16%) lesions (16 benign, 0 malignant), shadowing was noted in 20 (20%) (06 benign, 14 malignant) and no posterior acoustic feature was noted in 64 (64%) (46 benign, 18 malignant). (Table 8). Enhancement when present usually exhibit by benign lesions and posterior wall shadowing usually exhibited by malignant lesions. Hemant Kumar et al (2016) [17] and B. Vinod Kumar et al (2018) [19] found similar results. All these studies were in accordance with our study findings.

Table 9: Distribution of Cases According to The Orientation of Lesions.

Sn.	Orientation of lesions	Benign	Malignant	Total no. of cases
1.	Horizontal (width to ap ratio >1.4)	56 (90.32%)	06 (9.67%)	62
2.	Vertical (width to ap ratio <1.4)	12 (31.57%)	26 (68.42%)	38
3.	Total	68	32	100

In our study 62 (62%) lesions (56 benign, 06 malignant) were oriented horizontally (width to AP diameter >1.4) with the normal breast tissue while 38 (38%) lesions (12 benign, 26 malignant) were vertically (width to AP diameter <1.4) oriented to normal breast tissue (Table 9). Ghazala Malik et al (2006) [15], Jaipal R et al (2016) [16] & Gharekhanloo et al(2018) [22] concluded similar results.

Table 10: Distribution of Cases According to The Presence of Vascularity.

Sn.	Type of vascularity	Benign	Malignant	Total no. Of cases
1.	Penetrating vessels	04 (15.3%)	22 (84.6%)	26
2.	Peripheral vessels	22 (78.5%)	06 (21.4%)	28
3.	No vascularity	42 (91.3%)	04 (8.7%)	46
4.	Total	68	32	100

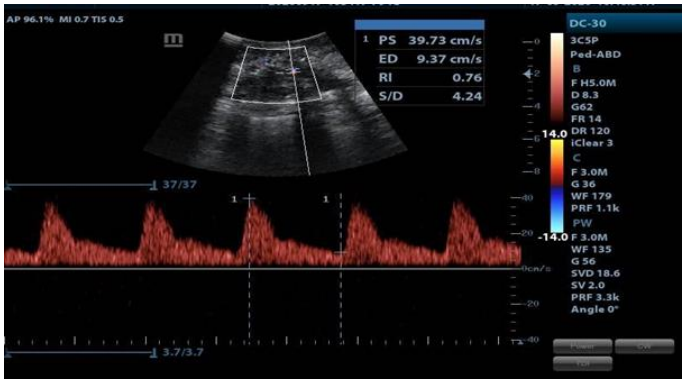


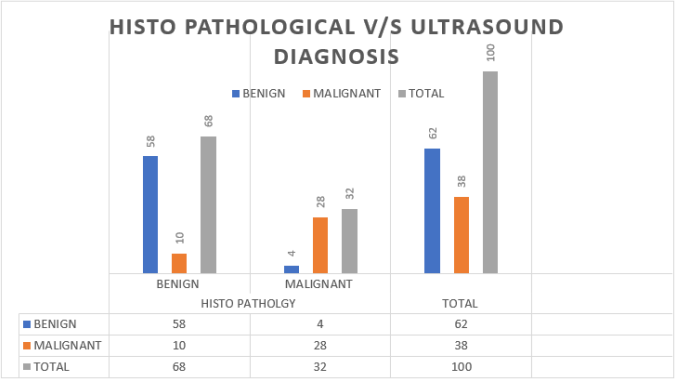
Figure 6: USG Color Dopler Of Breast Lesion

Fig 6. showing penetrating vessel entering within the mass lesion along with arterial doppler waveform of penetrating vessel entering the mass lesion. Penetrating blood vessels were found in 26 (26%) (04 benign, 22 malignant), peripheral vessels were found in 28 (28%) (22 benign, 06 malignant) while there were no vascularity in 46 (46%) (42 benign, 04 malignant)(Table 10) .

Jaipal R et al (2016) [16] and Devkota et al in 2021[20] found similar results.

Table 11: Distribution of Cases According To The Ultrasound Diagnosis And Histopathology

Sn.	USG Diagnosis	No. of Cases	%	Histopathological	%
1.	Benign	62	62%	68	68%
2.	Malignant	38	38%	32	32%
3.	Total	100	100%	100	100%



	BENIGN	MALIGNANT	TOTAL
BENIGN	58	4	62
MALIGNANT	10	28	38
TOTAL	68	32	100

Figure 7: Histopathological v/s ultrasound diagnosis

In our study 58 out of 68. (Table 11) benign breast lesions were correctly identified by ultrasound. while 4 lesions which were classified as benign on ultrasound proved to be malignant on histopathological examination. 28 out of 32 malignant lesions were correctly identified by ultrasound while 10 cases were incorrectly diagnosed as malignant on ultrasound which proved to be benign on histopathology (figure 8). The sensitivity, specificity, PPV, NPV, and accuracy of ultrasound in our study in differentiation of malignant breast lesions from benign lesions were 85.29%, 87.5%, 93.55%, 73.68 and 86 % respectively. In our study we applied the fisher exact test and found the statistic value <0.00001 and we found the result significant at p value <0.01.

Hemant Kumar et al (2016) [17] in his study over 100 patients in 2016 found sensitivity and specificity of ultrasound in differentiating between benign and malignant lesions 97.3 % and 92.3% respectively.

Jahan ab et al (2017) [23] found that USG, in diagnosis of malignant lesion has sensitivity was 80.0%, specificity 96.97%, positive predictive value (PPV) (88.89%), negative predictive value 94.12% and accuracy was 93.02% and comparable to other study.

Jaipal R et al (2016) [16], Farooq et al (2021) [18], B. Vinod Kumar et al (2018) [19], Devkota et al in 2021[20] and Gharekhanloo et al(2018) [22] also concluded with results similar to our study.

Conclusions

Ultrasound is a technique that is easily available, rapid, non-invasive, reliable, acceptable, economical, free from any harmful radiation and helpful in guiding interventional procedures.

Ultrasound is advised as the first option for follow-up examinations of lesions due of its high sensitivity and capacity to detect lesions outside the breast density. It can help to differentiate benign from malignant lesions with some limitation because of overlapping of some features in both benign and malignant lesions like lobulated margins, microcalcification, and echogenicity. However, some features like spiculated margins, vertical orientation and presence of penetrating intra tumoral vessels favours the diagnosis of a malignant lesion.

Therefore, ultrasound is used as a valuable adjunct with the clinical examination, since both the benign and malignant features overlap with each other it should not be used as a confirmatory final diagnosis for which histopathological FNAC or biopsy examination should be used as a confirmatory and gold standard test.

Abbreviations

BC- Breast cancer

USG- Ultrasonography

PPV- Positive predictive value

NPV- Negative predictive value

FNAC- Fine needle aspiration cytology

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. Heer E, Harper A, Escandor N, Sung H, McCormack V, Fidler-Benaoudia MM. Global burden and trends

in premenopausal and postmenopausal breast cancer: a population-based study. The Lancet Global Health. 2020 Aug 1;8(8):e1027-37.

3. Hashim D, Boffetta P, La Vecchia C, Rota M, Bertuccio P, Malvezzi M, Negri E. The global decrease in cancer mortality: trends and disparities. Annals of Oncology. 2016 May 1;27(5):926-33.
4. International Agency for Research on Cancer. India Source: Globocan 2020. [cited 11 June 2021].
5. Takiar R, Srivastav A. Time Trend in Breast and Cervix Cancer of Women in India–. Asian Pacific Journal of Cancer Prevention. 2008;9:777-80.
6. Arnold M, Morgan E, Rumgay H, Mafra A, Singh D, Laversanne M, Vignat J, Gralow JR, Cardoso F, Siesling S, Soerjomataram I. Current and future burden of breast cancer: Global statistics for 2020 and 2040. The Breast. 2022 Dec 1;66:15-23.
7. Azamjah N, Soltan-Zadeh Y, Zayeri F. Global trend of BCmortality rate: a 25-year study. Asian Pacific journal of cancer prevention: APJCP. 2019;20(7):2015.
8. Shreshtha MALVIA, SarangadharaAppalaraju BAGADI, Uma S. DUBEY and Sunita SAXENA. Epidemiology of BCin Indian women. AsiaPacific Journal of Clinical Oncology 2017; 13 (2): 289– 295.
9. Morris KT, Vetto JT, Petty JK, Lum SS, Schmidt WA, Toth-Fejel S, et al. A new score for the evaluation of palpable breast masses in women under age 40. Am J Surg 2002; 184:346–347.
10. Berg W, Gutierrez L, NessAiver M, Carter W, Bhargavan M, Lewis R et al. Diagnostic Accuracy of Mammography, Clinical Examination, US, and MR Imaging in Preoperative Assessment of Breast Cancer. Radiology. 2004;233(3):830-849. 117
11. Kerlikowske K, Smith-Bindman R, Ljung BM, Grady D. Ann Intern Med. 2003 Aug 19; 139(4): 274–84. Evaluation of abnormal mammography results and palpable breast abnormalities. Ann Intern Med. 2003 Aug 19; 139(4): 274–84.
12. Health Quality Ontario. Ultrasound as an adjunct to mammography for BCscreening: a health technology assessment. Ontario health technology assessment series. 2016;16(15):1.13.
13. Brem RF, Lenihan MJ, Lieberman J, Torrente J. Screening breast ultrasound: past, present, and future. American Journal of Roentgenology. 2015 Feb;204(2):234-40.
14. Chala L, Endo E, Kim S, de Castro F, Moraes P, Cerri G et al. Gray-scale sonography of solid breast masses: Diagnosis of probably benign masses and reduction of the number of biopsies. Journal of Clinical Ultrasound. 2006;35(1):9-19.
15. Malik G, Waqar F, Buledi GQ. Sonomammography for evaluation of solid breast masses in young patients. Journal of Ayub Medical College Abbottabad. 2006;18(2):34-7.
16. Jaipal R Beerappa, Balu S, Nandan Kumar LD, AnuradhaKapali, Raghuram P,Mammographic and Sonomammographic Evaluation of Breast Masses with Pathological Correlation: A Prospective Original Study. International Journal of Anatomy, Radiology andSurgery. 2016 Jul, Vol-5(3): RO09-RO12.
17. Kumar h, mehrotra a, kumar p, parakh p, tyagi s, hans p. Comparative study of mammography and sonography in breast lump with fine needle aspiration cytology correlation. ijbamr. 2016;5(2):712-722.
18. Farooq SM, Robot GC, Murrium SK, Gilani A, Gilani HS, Nazir M, Haider Z. Diagnostic Accuracy of Ultrasonography for Evaluation Solid Breast

Lesions–A Systematic Review. Asian Journal of Allied Health Sciences (AJAHS). 2021 Mar 19.

19. Kumar B, Kumar A. Ultrasound Evaluation of Breast Masses and Histopathology Correlation. International Journal of Contemporary Medicine, Surgery and Radiology. 2018;3(2).
20. Devkota R, Bhattarai M, Adhikari BB, Devkota R, Bashyal S, Regmi PR, Amatya I. Evaluation of Breast Mass by Mammography and Ultrasonography with Histopathological Correlation. J Nepal Health Res Counc. 2021 Dec 10;19(3):487-493. doi: 10.33314/jnhrc.v19i3.3476. PMID: 35140419.
21. Sannomiya N, Hattori Y, Ueda N, Kamida A, Koyanagi Y, Nagira H, Ikunishi S, Shimabayashi K, Hashimoto Y, Murata A, Sato K, Hirooka Y, Hosoya K, Ishiguro K, Murata Y, Clinicopathological Findings in Patients with Invasive Ductal Carcinoma of the Breast. Yonago Acta Med. 2016 Jun Hirooka Y. Correlation between Ultrasound Findings of Tumor Margin and 29;59(2):163-8. PMID: 27493488; PMCID: PMC4973023.
22. Gharekhanloo F, Haseli MM, Torabian S. Value of ultrasound in the detection of benign and malignant breast diseases: a diagnostic accuracy study. Oman Medical Journal. 2018 Sep;33(5):380.
23. Jahan AB, Ahmed MU, Begum M, Hossain MM, Rahman MM, Sarwar JM, Hossain MZ, Begum F, Saha PL, Haque S, Muktadira M. Ultrasonographic Evaluation of Palpable Breast Mass and Correlation with Histopathology. Mymensingh Medical Journal: MMJ. 2017 Apr 1;26(2):223-9.