



## Comparison of Sonographic and Histological Findings among Women with Breast Masses in Owo

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### Abstract

*This retrospective study compared the sonographic features with histopathological findings in women with breast lesions at Federal medical centre Owo, to determine the sensitivity, specificity and accuracy of ultrasound in the diagnosis of breast masses using histopathology as gold standard. Ethical approval was obtained from the Health and Research Ethics Committee of Federal Medical Centre, Owo. Sonographic reports conducted on 123 patients aged 15 to 69 years (mean age 38.57 years) who presented with breast lesions at Federal medical centre, Owo were retrieved from the case notes.*

*Histopathology reports of the patients were also retrieved and correlated with the ultrasonographic findings. American College of Radiology's Breast imaging Reporting and Data System (BI-RADS) descriptors were used to categorize the sonographic features into different BI-RADS assessment category. The BI-RADS in this study accurately predicted 63 benign breast lesions and 60 malignant lesions. Histopathology identified 65 benign breast lesions and 58 malignant lesions. The difference may be attributed to the limitation of relying purely on morphological appearances. Ultrasound BI-RADS assessment from this study has sensitivity of 96.5%, specificity of 93.8%, positive predictive value (PPV) of 93.3%, negative predictive value (NPV) of 96.8% and accuracy of 95.1%. When histopathology results were compared with that of BI-RADS predictions in this study, no statistically significant difference ( $p > 0.05$ ) was observed.*

**Keywords:** Women Breast Histology Ultrasound.

### INTRODUCTION

Breast lump in women is a cause of great concern. Its presence is known to cause fear, anxiety, uncertainty, apprehension and depression.<sup>1</sup> Breast cancer has a worldwide major public health implication among women. It is the most common cancer seen among women in both developed and developing countries, globally it is the most common cause of cancer death in women.<sup>2</sup> There is a rising incidence of breast cancer with faster rate of occurrence in developing countries population that previously enjoyed low incidence of the disease as indicated by global cancer statistics.<sup>3</sup> Rising incidence of breast cancer is thought to be due to

westernization that is associated with life style changes such as calorie dense food consumption, obesity, physical inactivity, late child bearing and having fewer children.<sup>2,4</sup> However, early breast cancer detection and treatment was responsible for the decline in mortality rate from breast cancer in developing countries.<sup>5</sup> Early diagnosis and management of breast masses is therefore important to reduce mortality. The best cancer screening test is mammography with sensitivity of 85-95%, this can help with the diagnosis of symptomatic and asymptomatic breast diseases.<sup>6</sup> However, limitations to this technique is the relatively high rate of false mammograms. Dense breasts tissues can undermine

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the sensitivity of mammography as some cancers are missed hence often requiring breast ultrasound to complete breast imaging.<sup>7</sup> Other imaging modalities of the breast such as magnetic resonance imaging<sup>8</sup> and digital mammography are not readily available in developing countries.

Breast ultrasonography is a readily available, affordable and cheap breast imaging modality. It does not involve use of ionizing radiation. Clinical or radiological suspected breast abnormalities are evaluated widely by breast ultrasonography as a diagnostic modality.<sup>9,10</sup> As a screening modality, it effectively detects occult breast cancer in dense breasts.<sup>11,12</sup> Several sonographic features like margins, shape, echotexture have been proposed for diagnoses of breast nodules.<sup>13,14</sup> Gold standard of laboratory breast lesion confirmation is widely done by histopathology which uses an invasive technique of biopsy for benign and malignant breast lesion.

The aim of this study was to correlate the sonographic and histopathologic breast findings among women who presented with breast masses at Federal Medical Centre, Owo.

## MATERIALS AND METHOD

This was a descriptive retrospective study carried out at Federal Medical Centre, Owo which covered the period between January 2019 to December 2022.

Prior to commencement of the study, approval was obtained from the health and research ethics committee of the Federal Medical Centre, Owo.

A total of 123 case notes of patients who presented in the breast clinic of the department of surgery who also had breast ultrasound examination during this period were used for this study.

Clinical information, ultrasound findings and histopathological diagnosis were assessed. The interpretation of the ultrasound findings were based on the standard lexicon recommended by American College of Radiology - BIRADS.

The mass was characterized using BIRADS ultrasound descriptors of mass.

MARGIN: circumscribed, obscured, microlobulated, ill-defined/indistinct or spiculated.

SHAPE: oval, round, lobular or irregular.

ORIENTATION: parallel or not parallel to the skin.

MATRIX ECHOGENICITY AND HOMOGENICITY: isochoic, anechoic, hypoechoic or hyperechoic, homogenous, heterogenous and attenuation indifferent, shadowing or enhancement.

Additionally, any associated findings e.g. architectural

distortion or axillary lymphadenopathy, skin changes, duct changes, presence of calcification were noted.

A final ACR breast imaging reports and Data System (BIRADS) assessment category was assigned with recommendation as follows:-

BIRADS 1 (negative), BIRADS 2 (benign findings), BIRADS 3 (probably benign)

BIRADS 4 (suspicious for malignancy), BIRADS 5 (highly suspicious for malignancy)

BIRADS 6 (histological proven malignancy).

In cases of multiple lesions with different sonographic features in one breast the highest BIRADS score was recorded.

Tru-cut biopsy was performed and pathological diagnosis was obtained from pathological reports from the department of pathology and were compared with ultrasound findings.

The data obtained were entered and analyzed using the statistical package for social science software for windows 22 (SPSS Version 22)

## RESULTS

In this study, the total number of cases were 123. The age range of patients presenting with breast diseases was 15 – 69 years with mean age of 38.57 years. Most of the patients (34), were within the age range of 40 – 49 years representing 27.7% (Table 1). Majority of the patients were premenopausal (89) representing 72.4%, while 34 patients were post-menopausal representing 27.6% (Table 2). Over a third of the premenopausal patients (31, 34.8%) had malignant histologic findings while over three quarter (27, 79.4%) of the postmenopausal had malignant histologic breast findings (Table 3). Most of the patients (115, 93.5%) have no positive family history of breast cancer however less than half of them (50, 43.5%) had malignant histologic findings. All the patients (8, 100%) with positive family history of breast cancer had malignant histologic findings (Table 4). Only 2 of the patients representing 1.6% had personal history of breast cancer. Majority of the patients (80) representing 65% presented with lump while breast swelling was seen in 31.7% (39) and 3.3% (4) presented with breast pain (Table 5). The common disease of the breast by histopathological findings were invasive ductal carcinoma (56) representing 45.5%, fibroadenoma (53) representing 43.1%. Others include lipoma (7) representing 5.7%, fibrocystic disease (4) representing 3.3% and Invasive papillary carcinoma (3) representing 2.4% (Table 6). Benign breast lesion by ultrasound (BI-RADS) were 63 (51.2%) while by histopathology was 65 (52.8%). Malignant breast lesion by ultrasound (BI-RADS) were 60 (48.8%), however by histopathology were 58 (47.2%) (Table 7).

**Table 1.** Age Group of Patients with Breast Lesions

			Frequency	Percent	Valid Percent	Cumulative Percent
Group Label	Valid	<20	13	10.6	10.6	10.6
		20-29	23	18.7	18.7	29.3
		30-39	24	19.5	19.5	48.8
		40-49	34	27.6	27.6	76.4
		50-59	19	15.4	15.4	91.9
		60-69	10	8.1	8.1	100.0
		Total	123	100.0	100.0	

**Table 2.** Menopausal Status of Patients with Breast Lesions

		Frequency	Percent	Valid Percent	Cumulative Percent
VALID	PREMENOPAUSAL	89	72.4	72.4	72.4
	POST MENOPAUSAL	34	27.6	27.6	100.0
	TOTAL	123	100.0	100.0	

**Table 3.** Menopausal Status versus Histology

		HISTOLOGIC TYPE OF LESION	
		BENIGN	MALIGNANT
PREMENOPAUSAL	Count % within MENOPAUSAL STATUS	31 34.8%	89 100.0%
MENOPAUSAL STATUS	Count % within MENOPAUSAL STATUS	27 79.4	34 100.0%
POST MENOPAUSAL	Count % within MENOPAUSAL STATUS	58 47.2%	123 100.0%

**Table 4.** Family History of Breast Cancer Versus Histology

			HISTOLOGIC TYPE OF LESION	
			BENIGN	MALIGNANT
FAMILY HISTORY OF BREAST CANCER	YES	Count % within FAMILY HISTORY OF BREAST CANCER	0 0.0%	8 100.0%
	NO	Count % within FAMILY HISTORY OF BREAST CANCER	65 56.5%	50 43.5%
Total		Count % within FAMILY HISTORY OF BREAST CANCER	65 52.8%	58 47.2%

**Table 5.** Physical Presentation of Patients with Breast Lesions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	BREAST LUMP	80	65.0	65.0	65.0
	BREAST PAIN	4	3.3	3.3	68.3
	BREAST SWELLING	39	31.7	31.7	100.0
	Total	123	100.0	100.0	

**Table 6.** Histologic Diagnosis

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	FIBROCYSTIC	4	3.3	3.3	3.3
	FIBRO ADENOMA	54	43.9	43.9	47.2
	LIPOMA	7	5.7	5.7	52.8
	DUCTAL CA	55	44.7	44.7	97.6
	INVASIVE PAPILLARY CARCINOMA	3	2.4	2.4	100.0
	Total	123	100.0	100.0	

**Table 7.** Comparison of the Reports of Breast Lesions between Ultrasound and Histopathology

		Ultrasound		Histopathology	
		Frequency	Percent	Frequency	Percent
VALID	BENIGN	63	51.2	65	52.8
	MALIGNANT	60	48.8	58	47.2
	Total	123	100.0	123	100.0

## DISCUSSION

The most common ailment from which most women suffer throughout the world are breast diseases. Breast lump is the most common symptom seen in both benign and malignant breast disease.

In this study, the age range of the patients with breast masses was 15-69 years with a mean of  $38.57 \pm 14.16$  years. This is similar to the studies by Mark.C OKeji et al,<sup>15</sup> Hafsai Oluwatosin Akinnibosun et al<sup>16</sup> and Bello N et al<sup>17</sup> where the age range and mean were 15-69 years with mean of 40 years, 16-75 years with mean of  $33.3 \pm 12.32$  years, 18-69 years with mean of  $34.66 \pm 13.99$  respectively. Most of the patients had benign lesions by BI-RADS constituting 63 (51.2%) whereas malignant lesion by BI-RADS constitute 60 (48.8%).

Histopathological diagnosis of malignancy in this study had highest frequency (25) representing 73.5% of the patients aged 40-49 years. This finding is similar to Ogbunaya et al<sup>18</sup> where malignant cases had highest frequency of 37 (28%) at age ranged 40-49 year. This could be due to the fact that both studies were conducted in southern part of the country and also that this age range constitute the highest in both studies. Studies done by Nwafor CC and Keshiro<sup>19</sup> also had highest frequency 86 (33.5%) at age range 40-49 years, this could also be due to geographical and racial similarities. However, studies by Mark C. Okeji et al<sup>15</sup> Okobia et al<sup>20</sup> had highest frequency at age 50-59 years (27.8%) and 4<sup>th</sup> decade of life respectively. The difference could be due to the fact that the last two studies were conducted in the same geographical area different from where our study was conducted.

The commonest malignant breast lesion by histopathology was invasive ductal carcinoma with highest frequency of 55 representing 44.7%.

This is similar to studies done by Nelema Jahan et al<sup>21</sup>, Nwafor CC and Keshiro<sup>19</sup> where ductal carcinoma was the commonest histopathological malignant findings with frequency of 31 (26.72%) and 237 (92.2%) respectively.

Most of the patients with benign lesions by histology were age ranged between 20-29 years with histopathological benign lesion frequency of 22 representing 95.7% of the total patient in that age group. This is similar to study by Ogbunaya et al<sup>18</sup> and Hafsai et al<sup>16</sup> where benign lesions by histology ranked high between 20-29 years (23.8%) and

15-30 years (64.5%) respectively, this could be due to high prevalence of benign breast lesion among the age group.

The commonest benign histopathological findings was fibroadenoma which constitute about 43.9% in this study, this is similar to Ogbunaya et al<sup>18</sup> (33.8%), Nwafor CC and Keshiro<sup>19</sup> (61.7%). Also similar findings was seen in Ibadan (59%), Ghana (70%) [22,23]. This is because fibroadenomas are common in negroes which have been previously documented<sup>24</sup>

The BI-RADS in this study predicted 63 benign breast lesion and 60 malignant lesion while histology identified 65 benign lesions and 58 malignant lesions. With Pearson's correlations, the discrepancy between histology reports and BIRADS in this study shows no statistical significance ( $p > 0.05$ ). Sonographic features and histological reports correlations in this study showed that sensitivity, specificity, positive predictive value, negative predictive value and accuracy were 96.5%, 93.8%, 93.3%, 96.8%, 95.1% respectively.

## CONCLUSION

This study demonstrated that ultrasound plays a major role in the characterization of breast diseases. Ultrasound is highly sensitive in differentiating benign and malignant breast masses. This study showed detection accuracy of 95.1% and this suggest that if BIRADS assessment category is done well, biopsy may be deferred although ultrasound is operator dependent and the gold standard is histology.

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