SONOGRAPHIC PREVALENCE AND CHARACTERISTICS OF BREAST LESION, IN A NEGROID POPULATION.

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ARTICLE INFO	ABSTRACT

Introduction: Ultrasonography (US) is an essential tool for evaluating breast masses. Advances in US technology allow confident characterization of benign cysts and solid masses. In women with dense breast tissue, ultrasonography is useful in detecting small non-palpable masses that are not detected on mammography.

Objectives: To determine sonographic prevalence and characteristics of breast lesions at Aminu Kano Teaching Hospital, Kano, Nigeria.

Methodology: Breast ultrasound of 100 patients that their age ranges from 18-60 years that clinically present with breast lesions was performed using ultrasound scan machine Sonoscape model version 18, probe frequency 7.5MHz.

Results: The study has established (59.0%) prevalence rate of breast mass, (33.0%) prevalence rate of mastitis, (7.0%) prevalence rate of duct ectasia, (1.0%) prevalence rate of abscess. The study shows hypoechoic as the commonest echogenicity of breast mass found among the patients. The study shows solid masses as the commonest found among the patients. Findings from the study shows that 0-2cm and 3-5cm of the breast mass are the commonest sizes among the patients

Conclusion: Ultrasound can detect and characterize breast lesions, and also reliably differentiates between solid and cystic masses. Ultrasound is highly recommended as the first line imaging technique in women with breast symptoms because it is a safe, non-invasive and does not require the use of ionizing radiation

Introduction

Ultrasonography (US) is an indispensable tool in breast imaging and is complementary to both mammography and magnetic resonance (MR) imaging of the breast. Advances in US technology allow confident characterization of not only benign cysts but also benign and malignant solid masses.

Knowledge and understanding of current and emerging US technology, along with the application of meticulous scanning technique, is imperative for image optimization and diagnosis. The ability to synthesize breast US findings with multiple imaging modalities and clinical information is also necessary to ensure the best

patient care. US is routinely used to guide breast biopsies and is also emerging as a supplemental screening tool in women with dense breasts and a negative mammogram [1]

The early diagnosis and management of breast masses is therefore important to reduce mortality. The established management of palpable breast lesions includes the triple assessment of physical examination, mammography and percutaneous biopsy. In the absence of palpable breast masses, mammography is often done even in symptomatic women below 30 years to exclude an occult lesion, although ultrasound is the modality of choice. However, mammography services are expensive and not readily accessible for many women especially in developing countries. Additionally, the cost of biopsies is also high and a large number of biopsies for benign breast abnormalities have been recognized as a serious problem since excessive biopsies have adverse effects on women who undergo them. Therefore, the evaluation of breast masses without resorting to formal biopsies is highly desirable. Ultrasound is an important imaging modality in the assessment of palpable breast masses. Though the use of ultrasound is determined by the patient age and nature of the breast lesion, its main role has been differentiating cystic from solid breast masses [2]

Breast ultrasonography (US) is widely accepted as an adjunct to mammography in the diagnosis and management of breast masses, but its role as a primary diagnostic tool is not fully established. When evaluating non-palpable breast lesions, Breast Imaging-Reporting and Data System (BI-RADS) lexicon based on Stavros sonography criteria of US is a validated method to identify probably benign masses, which can be managed with short interval follow-up(Ha et al., 2014). However, at many institutions palpable breast masses often undergo biopsy despite likely benign US characteristics. While tissue sampling can diagnose the rare malignancy among breast masses with probably benign features, the downsides of biopsy procedures are cost, patient anxiety, and potential risks, such as bleeding, infection and hematoma formation [3].

Ultrasonography (US) is an essential tool for evaluating breast masses. In the Breast Imaging Reporting and Data System (BI-RADS) and lexicon for US established by the American College of Radiology, breast lesions are classified as benign category 2, likely benign category 3, suspicious for malignancy category 4 (a–c), and highly suggestive of malignancy category 5. This classification is based on the sonographic features of breast lesions including shape, margin, orientation, echo pattern, and posterior features. Irregular hypoechoic masses on breast ultrasound are usually considered suspicious lesions. If the lesions combine other features of malignancy such as speculated margin, nonparallel orientation and posterior shadowing they are considered moderate and highly suspicious for malignancy (BI-RADS categories 4b and 4c) or highly suggestive of malignancy (BI-RADS category 5). However, lesions with benign features such as a circumscribed margin are classified as low suspicion (BI-RADS category4a). BI-RADS category 4 lesions are known to have abroad range of malignancy rates (3–94%). There are various histopathologic results for US BI-RADS category 4 lesions. Taskin *et al*, found that the benign histopathological diagnoses of these lesions on US were fibro adenoma (38%), sclerosing adenosis (18%), fibrocystic changes (FCCs) (14%),mastitis-inflammation (9.5%), intraductal papilloma's(5.5%), focal fibroses (5%), atypical ductal hyperplasia's(2.5%), fat necrosis (2.5%), phyllodes tumours (1%),tubular adenomas (0.5%), epidermal inclusion cysts (0.5%),and others (3.5%) [4].

Young women usually undergo US alone in the diagnostic evaluation of a palpable breast mass. Most solid palpable masses in young women are biopsied regardless of US features and despite a very low incidence of breast malignancy in this age group. Recent studies demonstrated that US reliably identified probably benign palpable masses with a negative predictive value of 98.0% to 99.5%. Given this high negative predictive value, investigation is needed to find more non-invasive management for these young women presenting with a palpable breast mass. Even in very high risk patients for breast cancer with Breast Cancer gene (BRCA) mutation, the current guideline recommends screening imaging studies starting at age 25 given the low likelihood of earlier cancer development in these patients[3].

One major benefit of ultrasound is to directly relate the physical examination findings with real time imaging results. From this study, ultrasound has been found to be useful as well as in characterizing palpable breast masses as well as detecting suspicious masses that could be malignant. If utilized, ultrasound may play a vital role in

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detecting malignant breast masses early enough before metastasizing and thus reduce mortality from breast cancer[2].

Breast cancer is the most common malignancy and is the second cause of mortality from cancer in the adult female population. It is a hormone-dependent disease, and the age of menarche, first pregnancy, and menopause have a major effect on its incidence. The risk of breast cancer is one per eight women, and its lifetime risk is 12.5%.In addition, female-to-male incidence rate ratio of breast cancer is 150/1. The early diagnosis, size of the tumor and its spread, and the lymph node involvement at the time of diagnosis play an important role in choosing the type of surgery and further treatments for these patients [5].

Breast cancer is among the most common causes of cancer deaths today, coming fifth after lung, stomach, liver and colon cancers. It is the most common cause of cancer death in women (Gokhale, 2009). In women with dense breast tissue, ultrasonography is useful in detecting small breast cancers that are not detected on mammography(Gokhale, 2009). Studies have described sonographic criteria that could be used to reliably characterize solid breast masses as benign with the American College of Radiology developing a BIRADS-US classification system for categorizing focal breast lesions(Mainiero et al., 2005)

Hence, the aim of this study to determine the sonographic prevalence and characteristics of breast lesions among adult women attending ultrasound clinic of Aminu Kano teaching hospital, Kano-Nigeria.

Methodology
The study is a cross sectional, descriptive study that was conducted among 100 consenting adult female patients aged 18-60 years over the period of 8 weeks at the ultrasound scan unit of radiology department, AKTH between April 2019 to November 2019. Primary data was obtained which includes socio-demographics, clinical history and sonographic findings of the study subjects, using a data capture sheet. Convenient sampling technique was employed for the study. Subjects who satisfied the inclusion criteria were recruited consecutively. Recruitment was done during working hours/days only. Data analysis was performed using a statistical software package IBM SPSS Statistics, version 23.0 Chicago for Windows.Data was analyzed for descriptive statistics and represented as mean ± standard deviations for continuous

variables and as proportions/percentages for categorical data. Chi square statistics was used to analyze for the relationship between size and age, size and parity. Statistical significance was considered at P<0.05.

Kano state is located at the northern part of Nigeria, created on the May 27, 1967. It has a population of 9,4,01,288 and 44 local govt. area. Kano state is blessed with universities which include one federal and two states universities and one private university. Aminu Kano teaching hospital (AKTH) is a tertiary government teaching hospital, located at Gyadi-gyadi road, Kano. Radiology department is a clinical department at AKTH, in which conventional and digital x-rays, CT-scans, Angiography, fluoroscopy, ultrasound scan are been carried out. Our source of data is at the ultrasound room.
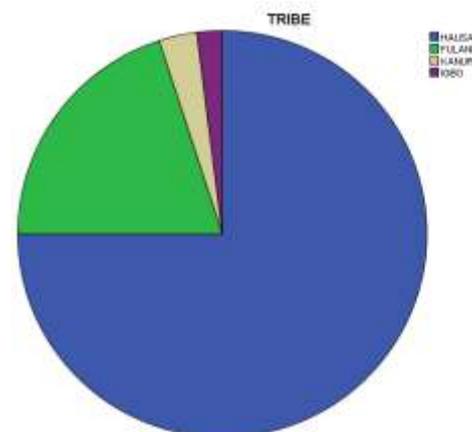
Results
A total of 100 patients whose age range from 18 to 64 years were enlisted into the Study. It shows the sonographic prevalence of breast lesions among female patients attending breast ultrasound at Aminu Kano teaching hospital, Kano. The highest number of lesion present with is breast Mass 59.0% (N=59)
Table 1, shows the age distribution of patients. The highest number of patients were within 18-30 years representing56.4% (N=57).

Table 1: Age distribution of patients presenting with breast lesion

S/N	AGE RANGE (YEARS)	FREQUENCY	PERCENTAGE (%)
1.	18-30	57	57.0
2.	31-40	22	22.0
3.	41-50	11	11.0
4.	51-60	10	10.0
	TOTAL	100	100

Figure 1: pie chart showing the tribes of patients

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The figure above shows the tribes of patients that present with breast lesion, with Hausa tribe having the highest percentage (75.0%), Fulani (20.0%), Kanuri (3.0) and Igbo (2.0).
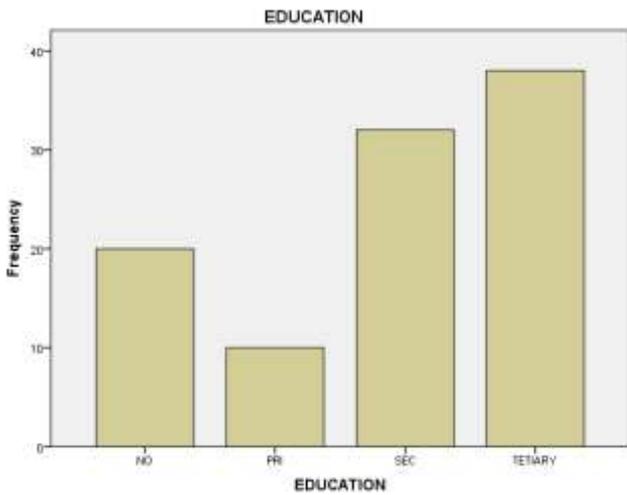
Figure 2: Bar chart showing the educational status of patients

Table 2 Sonographic Prevalence of Breast lesion

S/N	LESION	FREQUENCY	PERCENTAGE
1.	MASTITIS	33	33.0
2.	MASS	59	59.0
3.	DUCT ECTASIA	7	7.0
4.	ABSCESS	1	1.0
	TOTAL	100	100

The table above shows the sonographic prevalence of breast lesions among female patients attending breast ultrasound at Aminu Kano teaching hospital, Kano. The highest number of lesion present with is breast Mass 59.0% (N=59)
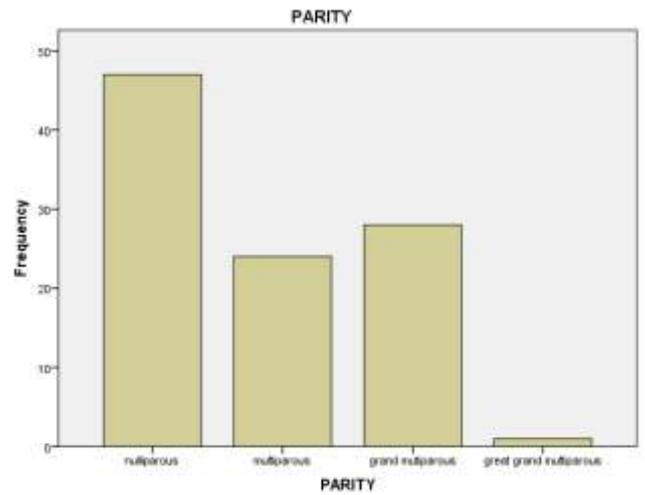
Table 3: Size of breast masses

S/N	SIZE (CM)	FREQUENCY	PERCENTAGE (%)
1.	0-2	28	47.5
2.	3-5	28	47.5
3.	>5	3	5.1
TOTAL		59	100

Table 4: Echogenicity of breast masses

S/N	ECHOGENICITY	FREQUENCY	PERCENTAGE (%)
1.	HYPERECHOIC	--	--
2.	HYPOECHOIC	46	77.6
3.	ISOECHOIC	1	1.7
4.	MIXED ECHOIC	12	20.7
	TOTAL	59	100

Table 5: Nature of breast masses

S/N	NATURE	FREQUENCY	PERCENTAGE (%)
1.	SOLID	54	91.5
2.	CYSTIC	5	8.5
TOTAL		59	100

Figure 3: Bar chart showing parity of patients with breast lesions

The bar chart above, shows nulliparous having the highest frequency (N=47), multi parous (N=24), grand multi parous (N=28), great grand multi parous (N=1).
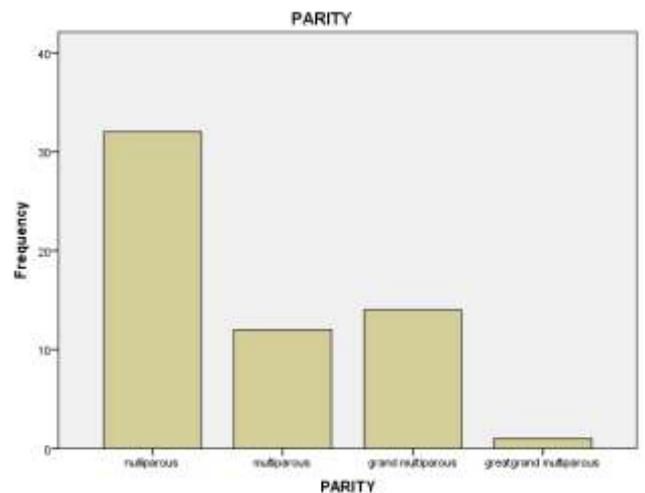
Figure 4: Bar chart showing parity of patient with breast mass

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The bar chart above shows nully parous having the highest frequency (N=32), multiparous (N=12), grand multiparous (N=14), Great grand multiparous (N=1)

However, applying chi-square to determine the relationship between size and age of patients that present with breast mass from the study, there was no significance as (p = 0.672 > 0.05). Also chi-square was used to determine the relationship between size and parity of the patients that present with breast mass from the study, there was no statistical significance as (p= 0.386 > 0.05).

Discussion

Breast ultrasound has become a popular imaging modality for the evaluation of breast diseases including clinically palpable lumps. Breast diseases cause considerable morbidity and palpable breast masses potentially pose serious concerns prompting immediate evaluation [2].

With recent developments in ultrasound equipment, sonography is now a well-established tool in breast imaging, allowing identification of up to 27% of breast masses that are occult on mammography, especially in women younger than 50 years of age [7].

US scanning of the breast has long been considered as just an additional examination for identifying the nature of any abnormalities detected at physical examination or at mammography in order to classify them in the following categories: Normal tissue, Simple cyst, Complicated or complex cyst, Indeterminate solid or cystic lesion, Solid lesion [8].

From the study, Hausa female patients have the highest percentage among the patients that present with breast lesion with (75.0%), Fulani (20.0), Kanuri (3.0), Igbo (2.0). the educational status among the patient, those with tertiary level have the highest percentage (38.0%), secondary school level (32.0%), primary school level (10.0%), those that have no qualification (20.0%).

From the study, the breast lesions found among women attending breast ultrasound at Aminu Kano hospital include; mastitis (33.0%), mass (59.0%), duct ectasia (7.0%), abscess (1.0%), and this shows that breast mass has the highest prevalence.

From the study, the age range of patients was 18-60 years, and the highest age group that present with breast mass is 18-30 years (64.4%), this was comparable to findings of Gonzaga (2010) [2] in which he found out that the highest incidence of breast lump was relatively higher in women of reproductive ages.

The echogenicity of breast mass was classified into hyperechoic, hypoechoic, isoechoic and mixed echoic. In which among the 100 female patients that were scanned, hyperechoic mass was not detected. Hypoechoic masses from the study have the highest percentage (77.6%) which is comparable to the findings of Ha *et al.*,(2014) [3] in which the 1st and 2nd radiologist found out that in masses detected, hypoechoic mass has the highest frequency (67.1%) by the 1st radiologist and (71.1%) by the second radiologist.

Ultrasound detected and differentiate breast mass into solid and cystic, with solid (91.5%) having the highest frequency and (8.5%) to be cystic in nature, this was comparable to the findings of klien (2005) [9] , in which she found out that Ultrasonography can effectively distinguish solid masses from cysts, which account for approximately 25 percent of breast lesion.

The parity of patients with breast lesions from the study shows nulliparous having the highest frequency (N=47), multi parous (N=24), grand multi parous (N=28), great grand multi parous (N=1) and also the parity of patients presenting with breast mass shows nully parous having the highest frequency (N=32), multiparous (N=12), grand multiparous (N=14), Great grand multiparous (N=1)

Conclusion

The study shows that ultrasound can detect and characterize breast lesions, and also reliably differentiates between solid and cystic masses. The study also shows the low rate / outcome of patients with breast lesions for breast ultrasound at Aminu Kano teaching hospital, this may be due to poor awareness on breast lesion or socio-economic status of most people in Kano state. In conclusion, ultrasound is highly recommended as the first line imaging technique in women with breast symptoms because it is a safe, non-invasive and does not require the use of ionizing radiation.

Conflict of Interest: Nil

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