

## Ultrasonic Screening for the Incidence of Common Benign Breast Pathologies in Sudanese Women

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**Abstract:** This study was carried out to determine the incidence of common benign breast pathologies that usually develops in Sudanese women at Khartoum State by using ultrasound. 100 Sudanese women aged 15 - 80 years with positive sonographic criteria of benign breast mass were selected from the outflow of patients. Breasts were scanned using sonographic brightness mode (B-Mode) to determine the incidence of common benign breast pathologies. Findings of ultrasound were confirmed by biopsy in all positive cases. Statistics were estimated according to distribution of benign breast diseases. Fibroadenoma incidences along the spectrum of other diseases, found to be the most common type of benign breast pathologies that affected Sudanese women. Findings report that a breast ultrasound scanning is informative, noninvasive, and safe procedure to determine the incidence of common benign breast pathologies. Also it answers questions about the nature of breast mass which in turn can reduce unnecessary breast biopsy.

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### 1. Introduction

Breast ultrasound is an adjunct to mammography and physical examination for breast masses by a confirming diagnosis of cysts and providing accurate guidance for needle biopsy of the vast majority of solid masses (Rumach et al., 2010). However, benign lesions are found more often than malignant lesions and often require diagnostic imaging and follow-up care. When assessing a breast mass, ultrasound is often necessary to distinguish between fluid-filled cysts and solid masses. This distinction is important for the purposes of patient treatment and management (Hagen, 2011).

Sonography has the potential to prevent unnecessary biopsies and reduce the number of short term follow up examinations by determining the tissue characteristics of non palpable mammographic abnormalities and palpable lumps (Whitman and Phelps, 2006). Sonographically guided core-needle biopsy (CNB) is a readily performed, diagnostically accurate alternative to stereotactic or excisional biopsy (Bassett, 2000) and (Parker et al., 1993).

Sonographically guided aspirations of symptomatic cysts, complicated cysts, and possible abscesses are also readily performed. Sonographically guided fine-needle aspiration with multiple passes with a 20-25 gauge needle is not favored for solid non palpable masses because of the substantial insufficient sample rate; averaging 10% in a multicenter trial (Pisano et al., 2001).

Most breast studies to date in Sudan have focused on malignant breast diseases. Only a few studies have focused on the benign pattern of female breast diseases. Also absent of records which determine the incidence of benign breast pathologies in Sudanese ladies and compare this incidence with the international standard rank, in the Federal Ministry of Health of Khartoum State, were the main problems for which this research was designed.

In a study about ultrasound in the evaluation of solid breast masses, fibroadenoma found to be the most common benign mass incidence (Harper et al., 1983). Sonographic patterns of breast diseases were studied in a teaching hospital in Jeddah, where the related patterns of breast diseases in females breast lesions were varied but benign fibroadenoma constituted the most common breast lesion and secondly ductal carcinoma (Jamal, 2001). An increased incidence of benign breast disease found in female with renal transplant and receiving cyclosporine, and the incidence of Fibroadenoma is higher than the incidence of other benign breast pathologies such as fibrocystic disease and intraductal papillomatosis (Sangthawan et al., 2002).

The efficacy of ultrasound as a method of choice to evaluate breast masses in young patients avoiding the need of biopsy was proved in a study of sono-mammography for evaluation of solid breast masses in young patients (Malik et al., 2006). The objective was concerned with the diagnosis of different benign breast pathologies present in

Sudanese women in Khartoum State and also to determine the percentages of their incidence in comparison to the international standard in this direction, so as to design a clear base that can be used latter in other studies in different states of Sudan.

## 2. Material and Methods

Breast sonography B-mode was performed using different high resolution ultrasound scanners available in the areas of study such as Aloka Prosound SSD 4000 (Aloka holding Europe AG, Switzerland), Toshiba Nemio 20 (Toshiba, Japan), Siemens sonoline G60S (Siemens, USA), Philips HID 4000 (Philips, Netherlands) and Shimadzu SBU 2200 (Shimadzu Europe GmbH, Germany). All of these scanners fitted with linear array transducers produce a frequency of 7.5 MHz; also the ultrasound machines were connected with printing facility through digital graphic printer (Sony Corporation, Japan).

This was a prospective study that spanned a two year period from May 2010 to May 2012, involving 100 women aged 15 to 80 years, selected from the outflow of the patients. It was performed at five ultrasound departments in the Omdurman Military Hospital, Soba University Hospital, Khartoum Developed Diagnostic Center, Radiation and Isotopes Center, and Alzaiem Alazhari University at Khartoum State, Sudan. The positive sonographic evidences used to diagnose a benign breast mass such as masses that meet simple cystic criteria are essentially always benign and usually require no follow-up treatment. The same is not true for smooth, round, or oval solid masses. These lesions may require short-term interval follow-up examinations or biopsy although the vast majority of these solid masses were benign (Hagen, 2011).

Excluded criteria were patients already diagnosed and treated for breast lump, patients with echogenic cystic mass on first ultrasonography, Post-traumatic or post-infective breast swelling and patients with physiological swelling. At inclusion a detailed 'breast specific history' was taken including menstrual history, history of mastalgia, lactation history, past and family history of any breast problem. Patients having a palpable breast lump, patients having diffuse nodularity, patients having breast lump associated with other symptoms like pain and nipple discharge, and patients having unilateral or bilateral symptoms were included in this study. An informed constant was obtained from all the subjects before scanning but, in addition, a review and authorization of the study protocols were done by the Ethical Committee available in the area of the study. Parameters including age, weight, and clinical history were also recorded prior to examination.

Ultrasound scanning for each sample executed in international scanning guidelines and protocols in which the breast in question begins scanning at 12 O'clock position. Transducer orientation was set up so that the breast is viewed in sections from the nipple outward, where the orientation notch is located. Scanning was initiated around the breast in a clockwise manner, covering all anatomy, including the axillary regions (Tempkin, 2009). Females asked to lie on her back on an examination table and raise her arm above the head in the side of the breast to be examined; alternatively the patient may be positioned on her side.

A conductive paste or gel will be applied to the breasts and a handheld transducer with high frequency will be placed directly on the skin overlying the breast, the gel will be removed from the breasts after completing the procedure.

Breasts scanning done in a radial fashion from the outer margin towards the nipple in a series of scans mimic clockwise order; either the patient initially lies supine with the ipsilateral hand raised above her head, medial quadrant lesions may be scanned in this position, then the patient is rolled into contra lateral posterior oblique position to a degree which minimizes the breast thickness in the quadrant being scanned, larger breasts require greater obliquity, positioning the patient in this fashion will thin the breast, so the near field probe can penetrate to the chest wall.

Ultrasound guided percutaneous biopsy or open surgical biopsy was performed to obtain tissue sample of the palpable area using automated 14 gauge large-core biopsy needles. Biopsy was performed on all selected women, so to check the reality of the diagnosing criteria used to determine if the breast mass is more benign rather than malignant.

Data of this study were initially summarized into frequency distribution tables. From these tables, the percentages of benign breast pathologies, distribution of masses, pattern of masses, and biopsy results were calculated. Results statistical analysis overviews in a form of tables and graphs by using Microsoft Office Excel package depend on the frequencies and the percentages of benign breast pathologies among the scanned sample.

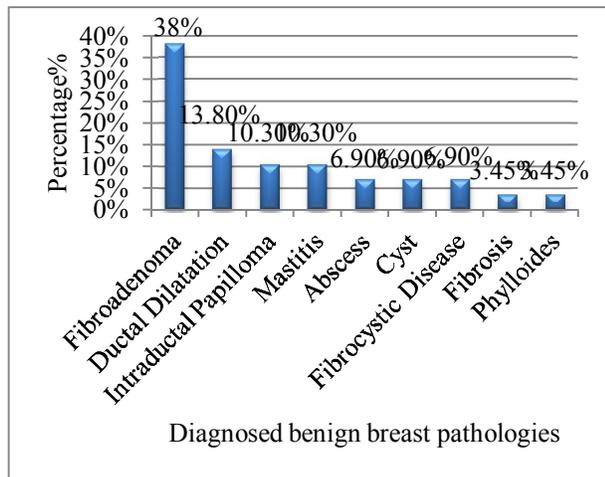
## 3. Results

Sample population compromised 100 women. Their age ranged between 15 to 80 years, with mean age and SD of  $47 \pm 3.47$  years. It was observed that fibroadenoma (38%) is the most benign breast pathologies recorded in Sudanese women in Khartoum State, followed by ductal dilatation (13.8%), intraductal papilloma (10.3%) and mastitis (10.3%), breast abscess (6.9%), cysts (6.9%) and

fibrocystic lesions (6.9%). While phylloides (3.45%) and fibrosis (3.45%) were the least benign breast pathology detected in this study (Table 1 and Figure 1).

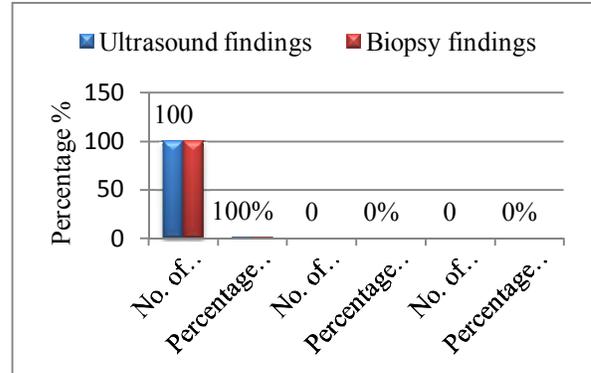
**Table 1.** Frequencies and percentages for the incidence of common benign breast(s) pathologies in Sudanese women at Khartoum state- Sudan

Diagnosed benign breast pathologies	Frequency of cases (n=100)	Percentage% (n=100)
Fibroadenoma	38	(38%)
Ductal Dilatation	14	(13.8%)
Cyst	7	(6.9%)
Abscess	7	(6.9%)
Mastitis	10	(10.3%)
Fibrosis	4	(3.45%)
Intraductal Papilloma	10	(10.3%)
Fibrocystic Disease	7	(6.9%)
Phylloides	3	(3.45%)
Total number of cases	100 cases	(100%)



**Figure 1.** Incidence of common benign breast(s) pathologies in Sudanese women at Khartoum state, Sudan

Fine needle aspiration cytology results; revealed that the 100 masses that diagnosed by follow the sonographic criteria of benign masses to be benign were completely benign and 0% masses turned out to be malignant (Figure 2).



**Figure 2.** Comparison between breast ultrasound findings and biopsy results between the samples.

**4. Discussions**

In this study we observed that fibroadenoma along the spectrum of other benign diseases detected in the sample, was the common benign breast pathology affected Sudanese women. This finding was confirmed by fine needle aspiration cytology that done for all the affected cases. Such results were in agreement with studies about ultrasound in the evaluation of solid breast masses and pattern of breast diseases in a teaching hospital in Jeddah, Saudi Arabia where they used ultrasound in the evaluation of solid breast masses and its pattern (Harper et al., 1983) and (Jamal, 2001). Our study also showed that breast sonography has the potential to prevent unnecessary biopsies and reduce the number of short term follow up examinations by determining the tissue characteristics of non palpable mass, where 100 diagnosed benign cases were confirmed to be benign when examined by cytological biopsy. This finding was proven in sono-mammography for evaluation of solid breast masses in young patients in which the efficacy of ultrasound as a method of choice to evaluate breast masses in young patients avoiding the need for biopsy (Malik et al., 2006). The accuracy of sonography guided needle biopsy was proven in this study which was supported by Whitman and Phelps, Bassett and Parker et al. where they stated that sonography has the potential to prevent unnecessary biopsies (Whitman and Phelps, 2006), (Bassett, 2000) and (Parker et al, 1993).

The increased incidence of benign breast disease in female renal transplant patients receiving cyclosporine such as fibroadenoma was in six patients (66.7%), fibrocystic disease is two patients (22.2%), and intraductal papillomatosis is one patient (11.1%) out of nine patients (Sangthawan et al; 2002). These results when compared with the obtained results of this study showed a direct relationship between the incidence of fibroadenoma and intraductal papillomatosis but didn't match the

percentage of incidence of fibrocystic disease. As limitation of standard diagnostic ultrasound there were no known harmful effects on humans. Interpretation of a breast ultrasound examination may lead to additional procedures such as follow-up ultrasound and/or aspiration or biopsy. Many of the areas thought to be of concern only on ultrasound turn out to be non-cancerous.

Occasionally, many factors affect image quality and the ability of an ultrasound system to display a lesion. They include design of the transducer (frequency, bandwidth, and aperture), acoustic properties of the tissues (frequency dependent attenuation, regional variation in sound speed and tissue density, and speckle caused by the interference of waves), signal processing, and the nature of the display monitor. Because of the complex interactions between various factors, highly specialized skills are required for interpreting B-mode images.

In fact, it was the first study that reported the incidence of common benign breast pathology among Sudanese women in Khartoum State- Sudan, which found to be acceptable when compared with the international standard but with just a few differences that are not remarkable.

In conclusion, fibroadenoma recorded as the common benign pathology incidents in Sudanese women. Also it could be reported that ultrasound can reduce unnecessary biopsy as proved in this study.

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