**Sudan University for Sciences and Technology**

**College of Graduate Studies**

# Characterization of Female Breast Tumors using Ultrasonography

# توصيف أورام ثدي النساء باستخدام التصوير بالموجات فوق الصوتية

*A thesis Submitted for Partial Fulfillment for the Requirement of M.Sc. Degree in Medical Diagnostic Ultrasound*

**By:**

**Salma Mohammed Nour Mohammed Ali**

**Supervisor:**

**Dr. BabekerAbdelwahab Awad Alla Awad Elseed**

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# الآيـة

بسم الله الرحمن الرحيم

**قال الله تعالي :**

﴿ شَهِدَ اللَّهُ أَنَّهُ لَا إِلَٰهَ إِلَّا هُوَ وَالْمَلَائِكَةُ وَأُولُو الْعِلْمِ قَائِمًا بِالْقِسْطِ لَا إِلَٰهَ إِلَّا هُوَ الْعَزِيزُ الْحَكِيمُ ﴾

صدق الله العظيم

سورة آل عمران الاية ﴿١٨﴾

# Dedication

*To my parents ,to my Husband (Hisham) my support To my daughters (Sara, Randa) the light of my way To my teachers and collogues To all people who help me.*

# Acknowledgment

First and foremost, I would like to express my deepest gratitude to **Dr.Babeker Abd Elwahab,** without his help this work could not have been accomplished

Deep thanks to my family for their consistent mental support, finally I would like to thanks my friends.

## Abstract

This was a retrospective cross sectional study aimed to characterized of female breast tumors using ultrasonography. Study conducted from August 2018 up to December 2018 in Omer Sawy Hospital .

The machine used in the study was neurosoft with 7.5 MHz. The data was analyzed using SPSS.

The results showed that difference in diagnosis were related to past history , family history , and breast side was not supported and diagnosis did not dependent on past history, family history, and breast site . Whereas diagnosis was differ for different age groups, that it was carcinoma for who were 40 years or more , while it was fibroadenoma for who were less than 40 years old. The hypothesis that difference in diagnosis were related to age was supported and diagnosis dependent on age. That most of final diagnosis was differ for different quadrant , echogenicity, and margin , since most of carcinoma tumors were at upper outer , and upper inner , while most of fibroadenoma tumors were at upper outer and lower outer . Most of carcinoma tumors were iso or hypo , while the majority of fibroadenoma tumors were hypo. And the majority of carcinoma tumors were ill define , while all fibroadenoma tumers were well define. Whereas the number of masses for both carcinoma and fibroadenoma were solitary and the diagnosis did not were similar in number of masses.

Self-examination is very important to discover the masses early so the output of treatment is best. The patient who diagnosed with breast cancer must be examined with ultrasound every six months to detect any growing mass.

# المستخلص

كانت هذه دراسة استباقية تتناول النساء الاتي يشتكين من كتل الثدي غير الطبيعية اللاتي ياتين الي قسم الموجات فوق الصوتية في مدينة الخرطوم.

كان الهدف من الدراسة هو توصيف كتل الثدي من اجل توفير مرجعية لظهور كتل الثدي المختلفة. تم عمل هذه الدراسة في 54 مريضا يشكون من كتل الثدي. وقد اجريت هذه الدراسة من اغسطس 2018 حتي ديسمبر 2018 في مستشفي عمر ساوي . والجهاز المستخدم في الدراسة نيوروسوفت مع 7.5 ميغاهيرتز. لقد حللت البيانات باستخدام برنامج اس بي اس اس.

اظهرت النتائج ان الاختلاف في التشخيص كان مرتبطا بتاريخ العائلة وتاريخ الماضي وجانب الثدي لم يكن مدعوما وان التشخيص لم يعتمد علي تاريخ العائلة ولا التاريخ الماضي او جانب الثدي. في حين كان التشخيص مختلفا بالنسبة للفئات العمرية المختلفة الا انه كان سرطانا لمن هم 40 عاما او اكثر , بينما كان الورم الليفي لمن لم يبلغ من العمر 40 عاما. تم دعم الفرضية القائلة بان الاختلاف في التشخيص يرتبط بالعمر والتشخيص يرتبط بالعمر . كان معظم التشخيص النهائي يختلف بالنسبة للارباع والصدى المختلفة وحواف الورم , معظم الاورام السرطانية كانت في الجزء العلوي الخارجي والعلوي الداخلي , في حين ان معظم الاورام الليفية كانت في الجزء الخارجي السفلي والجزء الخارجي العلوي , كانت معظم اورام السرطانات هي هيبو او ايزو , في حين ان غالبية الاورام الليفية كانت هيبو , واورام السرطان الغالبية كانت غير محددة في حين ان جميع الاورام الليفية كانت محددة . في حين ان عدد الكتل في كل من اورام السرطان والاورام الليفية كان انفرادي والتشخيص لم تكن متشابهة في عدد الكتل.

الفحص الذاتي مهم للغاية لاكتشاف كتل الثدي في وقت مبكر وبالتالي فان اخراج العلاج هو الافضل يجب فحص المريض المصاب بسرطان الثدي كل ستة اشهر للكشف عن اي كتلة متنامية .

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## List of Abbreviations

| | |
|---|---|
| MRI | Magnetic resonance imaging. |
| ANDIS | Aberrations of normal development and involutio |
| TDLU | Terminal ductolobular unit |
| DCIS | Ductal Carcinoma In Situ |
| IDC | Invasive Ductal Carcinoma |
| ILC | Invasive Lobular Carcinoma |
| BI-RADS | breast imaging reporting and data system |
| ACR | American College of Radiology . |
| RI | Resistive index |
| PSV | Peak systolic velocity |
| FNA | Fine niddle aspiration |
| CA | Cancer |
| AP | Antroposterior |
| US | Ultrasound |
| M/HZ | mega hertz |

# Chapter One

## Introduction

# Chapter One

# Introduction

## 1-1Background information:

Ultrasound is an essential breast imaging tool. Initially, the role of breast ultrasound was solely to distinguish cysts from solid masses. However, with major advances in ultrasound technology during the past 20 years, ultrasound can also now distinguish benign and malignant solid breast masses. Ultrasound is now used to evaluate masses seen on mammography and magnetic resonance imaging (MRI) and may also be used to evaluate clinical breast symptoms such as palpable masses, focal pain and suspicious nipple discharge. Moreover, ultrasound is the imaging modality of choice for image guided breast biopsies. Knowledge of the specific benign and malignant ultrasound characteristics of breast masses is imperative for accurate diagnosis and optimal patient management.

(IAME. Com/ online courses)

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.[WHO 2006] In 2005 alone, 519 000 deaths were recorded due to breast cancer.[WHO 2006] This means that one in every 100 deaths worldwide and almost one in every 15 cancer deaths were due to breast cancer. Refinement of high-frequency technology, particularly with 7.5–13 MHz probes, has brought out a totally new facet in USG breast imaging.

The most recent estimate indicated that more than 1,6 million new cases of breast cancer occurred among women worldwide in 2010. Control of modifiable breast cancer risk factors such as maintaining a healthy weight, regular exercise and reducing alcohol intake could eventually have an impact in reducing the incidence of breast cancers.However, the strategies cannot eliminate the majority of breast cancer. Therefore, early detection in order to

improve breast cancer outcome and cervival remains the cornerstone of breast cancer control. Breast cancer screening is one way of reducing mobility and mortality and improving the survival rate.

The female breast is in the unique position of being agland which is non-functional except during lactation. It is, nevertheless, subject to hormonal influences, particularly throughout reproductive life, and this probably accounts for most of its pathological changes, which rarely affect themale. By far the most important disease is carcinoma, which usually presents as a palpable lump. Other lesions are mostly of significance because some of them also produce a lump orlumpiness of the breast or other symptoms which raise the suspicion of carcinoma and must therefore be investigated. The commonest of these are the fibroadenoma, which are most frequent in the third decade.

Symptomatic breast masses and masses identified from mammographic screening are routinely investigated using ultrasound and often ultrasound guided core biopsy (Liston and Wilson, 2010; Willett et al, 2010). Despite the accuracy of grayscale ultrasound in differentiating benign from malignant solid breast masses, such masses usually undergo either image guided core biopsy.

**1-2Problem of the study:**

In the last years the female breast masses specially carcinoma and fibroadenoma become highlyincidence in Khartoum city .So a reference for these masses is important to detect the masses early which help in treatment because breast masses speciallyca breast has highly mortality rate.

**1-3 Objectives of the study:**

**1-3-1 General objective:**

The general objective of the study is to evaluate the differentiation between the breast fibroadenoma and breast carcinoma.

### 1-3-2Specific objective:

To evaluate the echogenicity of the fibroadenoma and carcinoma of the breast, outline, the breast side, quadrant, family history, and final diagnosis.

To study the relation of the fibroadenoma and carcinoma of the breast with the risk factors(age, weight, environment etc….) and differentiate between fibroadenoma and carcinoma.

# Chapter Two

## Theoretical Background and Literature Review

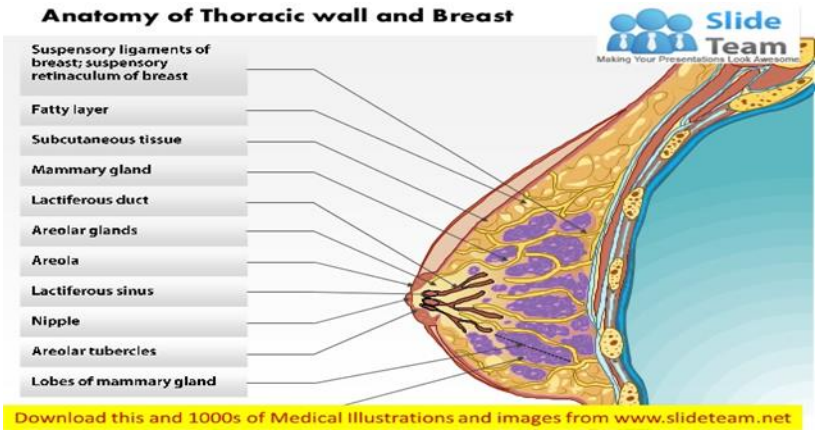
# Chapter Two

## 2theoretical Background and Literature Review

### 2-1-1 Anatomy Of The Breast:

The **breast** is a modified sweat gland located in thesuperficial fascia of the anterior chest wall. The majorportion of the breast tissue is situated between the secondand third rib superiorly, the sixth and seventh costalcartilage inferiorly, the anterior axillary line laterally,and the sternal border medially. In many women, thebreast extends deep toward the lateral upper margin ofthe chest and into the **axilla.** This extension is referredto as the axillary tail of the breast, or the **tail of Spence.**The surface of the breast is dominated by the nippleand the surrounding **areola.** A few women may haveectopic breast tissue or accessory (supernumerary)nipples. Ectopic breast tissue and accessory nipples areusually located along the mammary milk line, whichextends superiorly from the axilla downward and medially in an oblique line to the symphysis pubis of thepelvis.(Sandra 2012).

Composed of 15 to 20 lobes that are not well delineated from eachother, that overlap, and that vary greatly in size anddistribution. Each lobe consists of parenchymal elements (lobar duct, smaller branch ducts, and lobules) and supportingstromal tissues (compact interlobular stromalfibrous tissue, loose periductal and intralobular stromalfibrous tissue, and fat). The functional unit of the breastis the **terminal ductolobular unit** (TDLU), which consistsof a lobule and its extralobular terminal duct. Eachlobule consists of the intralobular segment of the terminalduct, ductules, and loose intralobular stromal fibroustissue. TDLUs are important because they are the site of origin of most breast pathology and of **aberrations ofnormal development and involutio**(ANDIs).(Sandra- 2012).

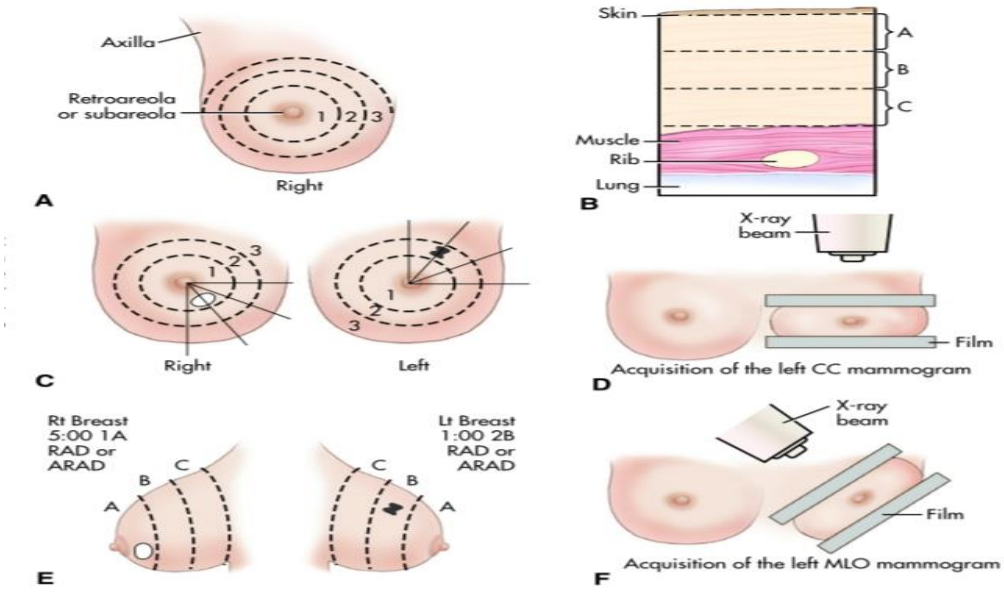



Figre1:anatomy of the breast (www.slideteam.net)

The breast can be divided into three zones, from superficial to deep. The most superficial zone is the **premammary zone,** or **subcutaneous zone,** which lies between the skin and the anterior mammary fascia. The premammary zone is really part of the integument, and processes that arise primarily within the premammaryzone are usually not true breast lesions. The **mammary zone** is the middle zone and lies between the anterior mammary fascia and the posterior mammary fascia. It contains the lobar ducts, their branches, most of the TDLUs, and most of the fibrous stromal elements of the breast. The deepest of the zones is the **retromammary zone**. It mainly contains fat, blood vessels, and lymphatic and is usually much less apparent on sonograms than on mammograms because sonographic compression flattens the retromammary zone against the chest wall. This differs chest wall and expands it in the anteroposterior (AP) direction. greatly from mammography, where mammographic compression pulls the retromammary fat away from the chest wall and expands it in the anteroposterior (AP)direction(Sandra-2012).

The normal anatomic structures of the breast spana spectrum of echogenicities, from midlevel gray to intensely hyperechoic. **Hyperechoic** normal structures include compact interlobular stromal fibrous tissue, anterior and posterior mammary fasciae, Cooper’s ligaments, and skin. Duct

walls, when visible, also appear hyperechoic. Normal structures that have midlevel echogenicity **(isoechoic)** include fat, epithelial tissues inducts and lobules, and loose, intralobular and periductal, stromal fibrous tissue.(Rumack-2011).



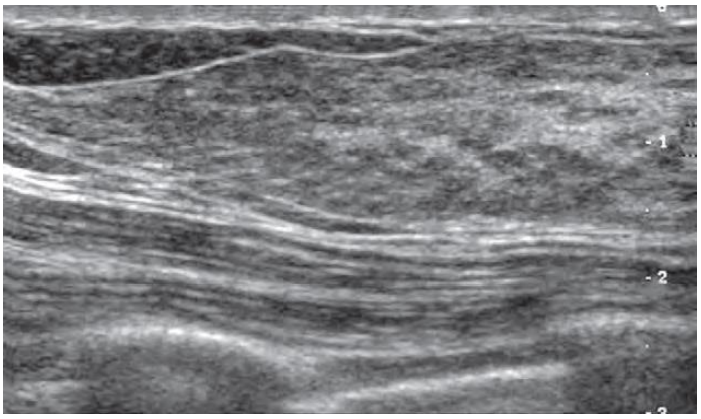

2.1The Breast Zones(Sandra-2012)

**2-1-2Sonographic Appearance:**

The boundaries of the breast are the skin line, nipple, and retromammary layer. These generally give strong, bright echo reflections. The areolar area may be recognized by its slightly lower echo reflection as compared with the nipple and the skin. The internal nipple may show low to bright reflections with posterior shadowing, and it has a variable appearance .Subcutaneous fat generally appears hypoechoic, whereas Cooper's ligaments and other connective tissue appear echogenic and are dispersed in a linear pattern. Cooper's ligaments are best identified when the beam strikes them at a perpendicular angle; compression of the breast often enhances the ability to visualize them.(Rumack-2011)

The mammary/glandular layer lies between the subcutaneous fatty layer anteriorly and the retromammary layer posteriorly. The fatty tissue

interspersed throughout the mammary/glandular layer dictates the amoun to intensity reflected from the breast parenchyma. If little fat is present, a uniform architecture with a strong echogenic pattern (because of collagen and fibrotic tissue) is seen throughout the mammary/glandular layer. When fatty tissue is present, areas of low-level echoes become intertwined with areas of strong echoes from the active breast tissue. Analysis of this pattern becomes critical to the final diagnosis, and one must be able to separate lobules of fat from an emarginated lesion(.Rumack-2011)

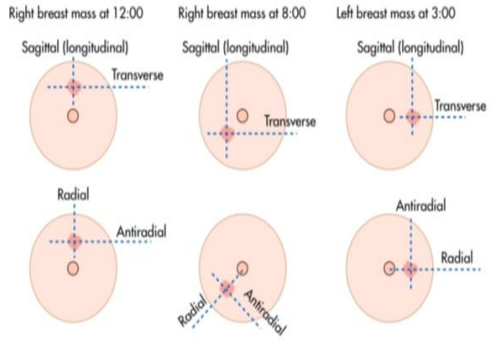


Fiugre3: Normal sonograghic appearance of the breast(.Rumack-2011)

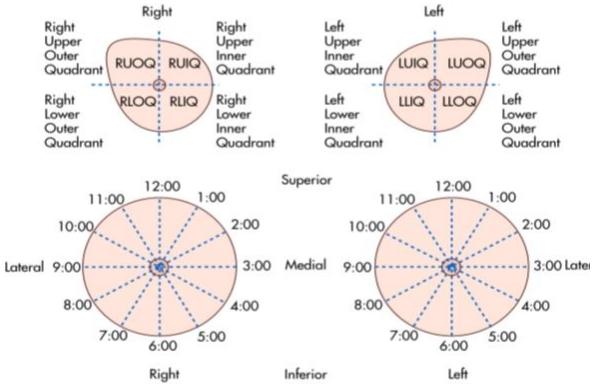
**2-1-3 Annotation**:

Labeling sonographic images of the breast is extremely important in the identification and correlation of breast images with images from other modalities. Most imaging centers have traditionally used the quasi grid pattern. This views the breast as a clock face. Directly above the nipple on either breast is 12 o'clock.

Right medial breast and left lateral breast are 3 o'clock. Directly below the nipple bilaterally is 6 o'clock, and right lateral breast and left medial breast are 9 o'clock, respectively. (Sandra – 2012)




Figre4: Examples of sagittal and transvers described by two methods Plus radial an antiradial, transducer(right/left, upper/lower, and Inner/ outer quadrants) and the clock face method




figre5: breastanatomy the quadrant method positions. (Sandra-2012)

**2-1-4 criteria for benign lesions:**

Several studies have described the sonographic characteristics commonly seen in benign lesions of the breast:[ Stavros AT, Thickman D, Rapp CL, Dennis MA, Parker SH, Sisney GA-1995_,Maniero MB, Goldkamp A, Lazarus E, Livingston L, Koelikker SL, Schepps B, Mayo-Smith – 2005]:

Smooth and well circumscribed.

Hyperechoic, isoechoic or mildly hypoechoic.

Thin echogenic capsule.

Ellipsoid shape, with the maximum diameter being in the transverse plane.

Three or fewer gentle lobulation.

Absence of any malignant findings.

**2-1-5 Characteristics of malignant lesions:**

Malignant lesions are commonly hypoechoic lesions with ill-defined borders. Typically, a malignant lesion presents as a hypoechoic nodular lesion, which is ‘taller than broader’ and has spiculated margins, posterior acoustic shadowing and microcalcifications[.Stavros AT- 2004]

### 2-1-6Vascular Supply

The main arterial supply to the breast comes from the internal mammary and the laterthe primary function of the breast is fluid transport. Thebreast includes fat, ligaments, glandular tissue, and aductal system that work together to provide fluid transport.The ductal system is critical in the transport ofthoracic arteries. Morethan half of the breast—mainly the central and medial portions—is supplied by the anterior perforating branches of the internal mammary artery. The remainingportion—the upper outer quadrant—is supplied by the lateral thoracic artery; intercostals and subcapsular and thoracodorsal arteries contribute in lesser ways to the blood supply. (Sandra 2012)

### 2-1-7Venous drainage:

Is mainly provided by superficial veins that can be seen sonographically just under the skin.(Sandra 2012)

### 2-1-8 Lymphatic System:

Lymphatic drainage from all parts of the breast generally flows to the axillary lymph nodes.(Sandra 2012)

### 2-2physiology of the Breast:

The primary function of the breast is fluid transport. The breast includes fat, ligaments, glandular tissue, and aductal system that work together to provide fluid transport. The ductal system is critical in the transport of fluids within the breast. The ductal system is also where many pathologic conditions originate.(Muirs-2008)

An important function of the breast during the reproductive years is to make milk from nutrients and water taken from the bloodstream. Milk is produced within the acini and is carried to the nipple by the ducts. During lactation, the transport of milk depends on the action of the two epithelial cells that make up the ductal network: luminal cells, which secrete the milk components into

the ductal lumen, and myoepithelial cells, which contract to aid in the ejection of milk. The female breast is remarkably affected by changing hormonal levels during each menstrual cycle and is further affected by both pregnancy and lactation (breastfeeding).Breast development begins before menarche and continues until the female is approximately 16 years old.(Sandra-2012).

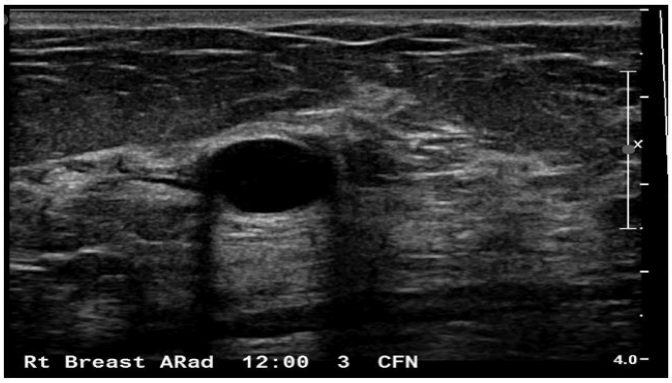
**2-3 Pathology:**

The most common pathologic lesions of the female breast are, in order of decreasing frequency, fibrocystic disease, carcinoma, fibroadenoma, intraductal papilloma, and duct ectasia. Benign lesions are the most common breast lesions, representing 70% of proved lesions in biopsies after they are removed. Several parameters, including the patient's age, physical characteristics of the mass, and previous medical history, must be considered when a dominant mass has been palpated. Lesions common to younger women are fibrocystic disease and fibroadenomas. Older or postmenopausal women are more likely to have intraductal papilloma, duct ectasia, and cancer.(Sandra - 2012)

**2-3-1Cysts:**

Cysts are commonly seen in women 35 to 55years of age. Symptoms include history of changing withthe menstrual cycle, pain (especially when the cyst isgrowing rapidly), recent lump, and tenderness. Smallcysts may not regress completely and may persist fromone cycle to the next(Sandra - 2012). Simple cysts are anechoic, round or oval, and surrounded completely by a thin, echogenic wall or capsule with enhanced sound transmission and thin-edge shadows .They form from dilation of the acini in the TDLU. When multiple acini dilate, they can form a group of small microcysts.hey can then coalesce together to form a solitary cyst. Cysts that meet strict criteria for being simple are "definitively benign" and do not require further follow-up.

Aspiration of simple cysts is generally reserved for relief of pain and tenderness in very tense simple cysts. Demonstrating that a benign simple cyst causes a palpable lump or mammographic nodule is by far the most valuable in ding demonstrable on sonography because the negative predictive value is 100%. (Sandra – 2012)




Figre8:Cystic lesion(Sandra-2012)

**2-3-2 Fibrocystic:**

Fibrocystic changes produce histologic alterations in the terminal ducts and lobulesof the breast in both epithelial and connective tissue. Fibrocystic changes are usually accompanied by pain ortenderness in the breast and represent normal physiologic processes of breast tissue that fluctuate under theinfluence of normal female hormonal cycles.(Sandra – 2012)

**2-3-3Lipoma:**

A pure lipoma consists entirely of fatty tissue. Other forms of lipoma consist of fat with fibrous andglandular elements interspersed (fibroadenolipoma). A lipoma may grow to a large size before it is clinicallydetected. It is usually found in middle-aged or menopausal women. Clinically, on palpation, a large, soft,poorly demarcated mass is felt that cannot be clearly separated from the surrounding parenchyma. No thinningor fixation of the overlying skin is noted. Sonographically, it may be difficult or impossible to detect alipoma in a fatty breast. Lipomas typically have smooth walls, are

hypoechoic, and appear similar to fat. Theyoften demonstrate posterior enhancement and are easilycompressible. (Sandra - 2012)

### 2-3-4 Fat Necrosis:

Fat necrosis may be caused by trauma to the breast, surgery, radiation treatments, or plasma cell mastitis or may be related to an evolutional process or other disease present in the breast, such as cancer. It is more frequently found in older women. Clinical palpation reveals a spherical nodule that is generally superficial lunder a layer of calcified necrosis. Sonographically, fat necrosis appears as an irregular, complex mass with low-level echoes.(Rumack-2011)

### 2-3-5 Acute Mastitis:

Acute mastitis may result from infection, trauma, mechanical obstruction in the breast ducts, or other conditions. It often occurs during lactation, beginning in the lactiferous ducts and spreading via the lymphatics or blood. Acute mastitis causes an enlarged, reddened, tender breast, and is often confined to one area of the breast. Diffuse mastitis results when infection is carried via the blood or breast lymphatics and thus affects the entire breast.(Rumack-2011)

### 2-3-6 Chronic Mastitis:

An inflammation of the glandular tissue is considered to be chronic mastitis. This is very difficult to differentiate by ultrasound; the echo pattern is mixed and diffuse with sound absorption. The condition is usually found in elderly women. Thickening of the connective tissue results in narrowing of the lumina of the milk ducts. The cause is inspissated intraductal secretions, which are forced into the periductal connective tissue. Clinically, the patient usually has a nipple discharge; frequently, the nipple has retracted over a period of years. Palpation reveals some subareolar thickening, but no dominant mass.(Muirs-2008)

### 2-3-7Hamartoma:

Hamartomas are relatively uncommon lesions which are formed from a disordered collection of lobules, stroma and fat. They may occur at any age but are predominantly seen in pre- or perimenopausal women, who present with a well-defined mass. They are, however, surprisingly often impalpable and may only be detected mammographically. Hamartomas vary in size from 1 cm to 25 cm at presentation.(Muirs-2008)

### 2-3-8Papillomas:

Are true benign neoplasms, occurring predominantly in middle-aged women. In many cases the presenting symptom is single duct discharge from the nipple; the discharge may be blood stained.(Muirs-2008)

### 2-3-9CystosarcomaPhyllodes:

Cystosarcomaphyllodes is a rare, predominantly benign breast neoplasm. It accounts for less than 1% of all breast neoplasms, yet it is the most frequent sarcoma of the breast. It is more commonly found in women in their 50s and usually is unilateral. It may arise from a fibroadenoma.(Muirs-2008)

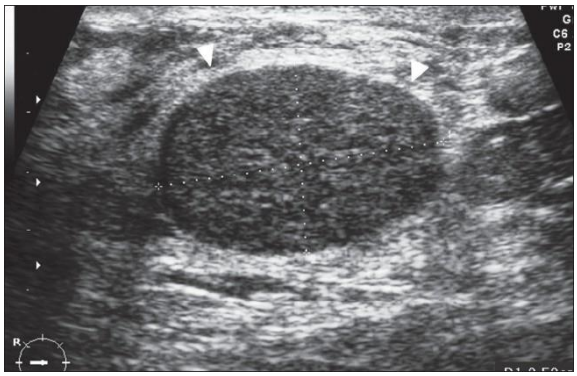
### 2-3-10Interested cases:

### 2-3-10-1Fibroadenoma:

The most common benign breast tumors are **fibroadenomas,** and they occur primarily in young women. They may be found in one breast or in both breasts. The growth of a fibroadenoma is stimulated by estrogen. Under normal circumstances, hormonal influences on the breast (estrogen) result in the proliferation of epithelial cells in lactiferous ducts and in stromal tissue during the first half of the menstrual cycle. Clinically, a fibroadenoma is firm, rubbery, freely mobile, and clearly delineated from the surrounding breast tissue . It is round or ovoid and smooth or lobulated, and usually does not cause loss ofcontour of the breast unless it develops to a large size. It rarely causes mastodynia, and it does not change sizeduring the menstrual

cycle. Fibroadenomas tend to grow very slowly. A sudden increase in size with acute painmay be the result of hemorrhage within the tumor. Calcification may follow hemorrhage or infarction; thus thetumor may have calcifications and may mimic the appearance of a carcinoma on mammography.**Sonographically**, fibroadenomas have benign characteristics with smooth, rounded margins and low-level homogeneous internal echoes and may demonstrate intermediate posterior enhancement. Fibroadenomas are normally hypoechoic, but occasionally are **hyperechoic**to the fat within the breast.(Sandra - 2012).

Fibroadenomas are entirely benign lesions which confer no significant predisposition to subsequent carcinoma. Indeed, many surgeons avoid surgical excision once the diagnosis has been established on clinical grounds and confirmed either cytologically or histologically by needle core biopsy. Rarely, *in-situ* carcinoma, mainly of lobular type, may develop within a fibroadenoma, but this probably means that its epithelium, like that of normal breast, is not immune to carcinogenic agents. (Muirs - 2008)



Figre9: Fibroadenoma. Transverse image reveals a typical largertransverse than anteroposterior diameter, homogenous echotexture,and a thin capsule (arrowheads)(Sandra-2012)

**2-3-10-2Malignant condition :**

Cancer of the breast is of two types: sarcoma and carcinoma. Sarcoma refers to breast tumors that arise from supportive or connective tissues. Sarcomas tend to grow rapidly and invade fibrous tissue. Carcinoma refers to breast tumors that arise from the epithelium, in the ductal and glandular tissue, and usually has tentacles.(Muirs-2008)

Other malignant diseases affecting the breast result from systemic neoplasms, such as leukemia or lymphoma(.Sandra- 2012)

Carcinoma of the breast may occur at any age, but is rare before 25 years and most common between 40 and 70 years. About 50% of invasive carcinomas occur in the upper outer quadrant of the breast (where there is the greatest proportion of breast parenchyma), the remainder being distributed equally throughout the rest of the breast.(Muirs - 2008)

Most cancer originates in the terminal ductal lobular units, whereas a smaller percentage originates in the glandular tissue. The breast lobules are concentrated in the upper outer quadrant of the breast, and so it is not surprising that a majority of breast cancers (50%) are found there, followed by lesser incidence in the retroareolar area (17%), upper inner quadrant (15%), lower outer quadrant (10%), and lower inner quadrant (5%). Multifocal masses are least common and occur in approximately 3% of cases.(Muirs-2008)

**2-3-10-2-1 Ductal Carcinoma In Situ (DCIS):**

DCIS is also known as intraductal carcinoma. DCIS is characterized by cancer cells that are present inside the ducts but have not yet spread through the walls of the ducts into the fatty tissue of the breast .(Sandra-2012)

**2-3-10-2-2 Invasive Ductal Carcinoma (IDC):**

IDC accounts for nearly 80% of breast cancers. Similar to DCIS, these cancers begin in the ducts, but in contrast to DCIS, they invade the fatty

tissue of the breast and have the potential to metastasize via the bloodstream or the lymphatic system.(Sandra-2012)

### 2-3-10-2-3Invasive Lobular Carcinoma (ILC):

ILC begins in the lobule, where it extends into the fatty tissue of the breast. Similar to IDC, invasive lobular carcinoma has the potential to metastasize and spread to other parts of the body.( Sandra-2012)

### 2-3-10-2-4 Papillary Carcinoma:

Papillary carcinoma is a tumor that initially arises as an intraductal mass. It may also take the form of an intracystic tumor, which is rare. The early stage of papillary carcinoma is noninvasive. The tumor occasionally arises from a benign ductal papilloma. It is associated with little fibrotic reaction. (Sandra-2012)

### 2-3-10-2-5Paget's Disease:

**Paget's disease** arises in the retroareolar ducts and grows in the direction of the nipple, spreading into the intraepidermal region of the nipple and areola, and has a rashlike appearance that may be confused with a melanoma. (Sandra-2012 )

### 2-3-10-2-6 Medullary Carcinoma:

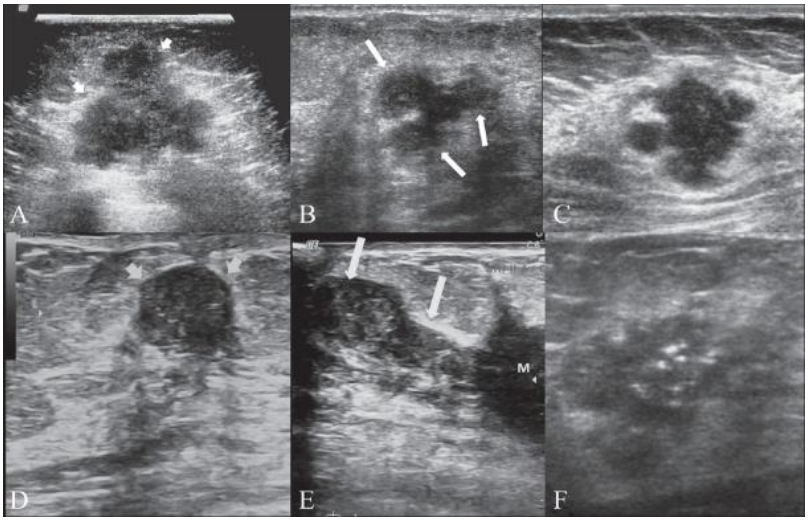
Medullary carcinoma is a densely cellular tumor that contains large, round, or oval tumor cells. It usually is a well-circumscribed mass, with the center frequently necrotic, hemorrhagic, and cystic. Medullary carcinomas are relatively rare, accounting for less than 5% of breast cancers.( Sandra-2012)

### 2-3- 10-2-7 Colloid Carcinoma:

Colloid carcinoma (mucinous) is a relatively rare type of ductal carcinoma that accounts for approximately 3% of breast carcinomas. The cells of the tumor produce secretions that fill lactiferous ducts or stromal tissues in which the tumor cells are invading. (Rumack-2011)

**2-3-10-2-8 Tubular Carcinoma:**

Tubular carcinoma represents an extremely well-differentiated form of **infiltrating (invasive)ductal carcinoma** usually less than 2 cm in dimension. Tubular carcinoma occurs in women with an average age of 50 and has a favorable prognosis with a low rate of recurrence or metastasis. Death is rare. Tubular carcinoma typically has poorly circumscribed margins and a hard consistency. . (Rumack-2011)




Figre10: Malignant lesions. Transverse scan (A) shows a typical malignant nodule that is taller than wide, with hypoechoicechotexture. Arrowheads indicate irregular spiculated margins. Some of the nodules may reveal a branching pattern (arrows in B). Sagittal view (C) shows a nodule with multilobulated margins; the presence of more than 3–4 lobulations is suspicious for malignancy. Sagittal (D) and transverse (E) scans show duct extension (arrows). 'M' indicates the primary site. Duct extension appears smooth in outline in cross-section (arrowheads in E). Transverse scan (F) shows a typical malignant lesion with irregular spiky margins, microcalcifications and a branching pattern. This lesion is classifiable as US-BIRADS category 4. . (Rumack-2011)

## 2-4 Screening Mammography:

Sonography is the best diagnostic tool for assessing mammographic abnormalities that do not contain suspicious calcifications. These mammographic abnormalities range from discrete masses to focal asymmetrical densities. As with palpable abnormalities, sonography will demonstrate either asymmetrical normal tissues or definitively benign abnormalities, such as simple cysts, in most mammographic abnormalities. In a smaller percentage of patients, sonography will show findings that are more suspicious or malignant appearing than suggested by mammography. (Rumack2011 )

In women aged 40 and over who are **asymptomatic** (without clinical signs of possible breast cancer), annual screening by mammography is recommended. Usually less than 10% of these women will have abnormalities detected on the screening examination that require further workup. When a breast lesion is identified by mammography, it is normally described using guidelines contained within the **breastimaging reporting and data system (BI-RADS**). TheBI-RAD system was developed by the American Collegeof Radiology (ACR).

(Sandra 2012)

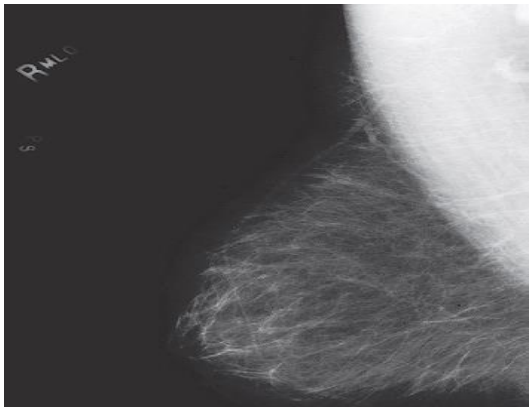


Figure6: Mamograghy of the breast(Sandra 2012)

## 2-5 BIRADS Risk Categories:

The official **Breast Imaging Reporting and Data System (BIRADS)** ultrasound lexicon has been developed by theACR to standardize reporting and data. We believe inusing BIRADS risk categories for the final assessment ofevery sonogram. Because most sonograms are targeted toclinical or mammographic abnormalities that require thepreceding mammogram to be characterized as "BIRADS0" (incomplete assessment), any final assessment in apatient who has undergone diagnostic sonography willbe based on combined ultrasound and mammographyfindings. BIRADS categories are also important to assessand improve sonographic performance. If each sonographic category carries the same risk as the corresponding mammographic BIRADS category, the rules for managing sonographic lesions may be identical to the mammographic rules for the same category.

The sonographic**BIRADS 1** category corresponds to sonographically normal tissues that cause mammographic or clinical abnormalities. The sonographic**BIRADS 2** category corresponds to benign entities and includes intramammary lymph nodes, ectatic ducts, all simple and many complicated cysts, and definitively benign solid nodules, such as lipomas and hamartomas. The **BIRADS 3** category corresponds to "probably benign" lesions that have a 2% or less risk of malignancy and includes some complicated and complex cysts, small intraductalpapillomas, and a subset of fibroadenomas. We divide the large ACR **BIRADS 4** category that is termed "suspicious" into three subcategories. Rules for subdividing BIRADS 4 into the optional 4a, 4b, and 4c subcategories have not been developed. The **BIRADS 4a**definicategory is "mildly suspicious" and carries a greater than 2% to 10% risk of malignancy. **BIRADS 4b** is "moderately suspicious" and

carries a risk of greater than 10% to 50%. The **BIRADS 4c** risk of malignancy is greater than 50% to less than 95%. The **BIRADS** category is termed "malignant" and indicates a 95% or greater risk of malignancy.(Rumack - 2011)

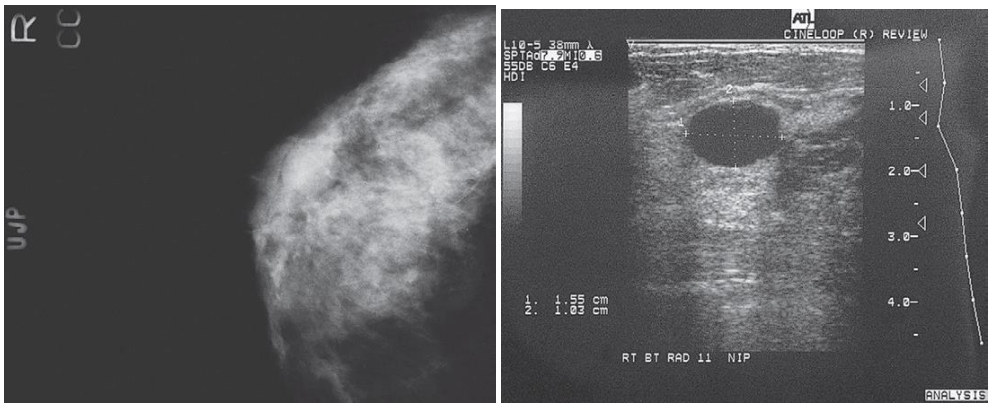



**FIGURE7 Examples of benign (breast imaging reporting and data system [BI-RADS] category 2) masses. (Sandra 2012)**

## 2-6 SONOGRAPHIC TECHNIQUE:

For optimal scanning of the breast, the patient should be positioned supine with the arm on the side of interest relaxed up by the side of the head. Images should be acquired using the highest frequency probe that allows penetration of the targeted area. Initial images should include the pectoralis muscle to ensure that the entire depth of the breast has been imaged. he gain should be set such that the fat is a midlevel gray. (Sandra 2012)

## 2-7 Patient Position:

Breast sonographic evaluation depends heavily on special **dynamic** and **positional** maneuvers performed during the examination.Dynamic maneuvers include:

-**varying compression** to assesscompressibility and mobility.

- **Ballottement** (alternating compression and compression release) can be helpful to demonstrate mobility of echoes with ectatic ducts or complex cysts.

- **Heeling and toeing of the transducer** can minimize critical angle shadowing arising from Cooper ligaments and better demonstrate the thin, echogenic capsule on the ends of solid nodules, an important sign of a noninvasive lesion margin.

- Positional changes are important in assessment of complex cysts.

-**Fluid-debris levels, milk of calcium,** and **fat-luid levels** can all be shown to change sonographically between supine and upright or lateral decubitus positions. (Sandra 2012)

## 2-8 Special Breast Techniques:

### *DOPPLER SONOGRAPHY:

One of the main purposes of Doppler ultrasound is to help classify masses seen on ultrasound as benign or malignant. Once a breast malignancy exceeds about 3 mm in size, it must stimulate neovascularity to continue to grow. To accomplish this, tumors elaborate a variety of angiogenesis factors. A net of peripheral neovessels forms to nourish the rapidly proliferating periphery of the tumor. Studies have been performed evaluating the presence or absence of low, the distribution and pattern of vessels, vessel density, peak systolic velocity (PSV), pulsatility index, and resistive index (RI) and have found conlicting results, some demonstrating that these measures could predict malignancy, but others showing substantial overlap of indings.As a result, Doppler cannot be used independently to classify solid masses as benign or malignant but rather should be used to supplement the routine ultrasound evaluation. Had being said, Doppler ultrasound can be used to differentiate solid masses from those that are cystic. Some markedly hypoechoic solid nodules can have a pseudocystic appearance. Demonstratingan internal vessel on color Doppler ultrasound indicates that the lesion is either solid or a cyst completely illed by a papillary lesion . Similarly, Doppler sonography can be useful in distinguishing between an

echogenic lipid layer or tumefactive sludge within a cyst and a true intracystic papillary lesion. (Sandra 2012)

**Doppler ultrasound assessment** of the breast depends greatly on using as little compression pressure as possible. Blood low in a breast lesion can easily be decreased or even completely ablated if compression is too vigorous.

**2-9 previous study:**

Vladimir Egorov, Thomas Kearney, Stanley B. Pollak, Chand Rohatgi, NouneSarvazyan, SurenAirapetian, Stephanie Browning, ArmenSarvazyan 2010 are said: The multisite clinical study demonstrated the capability of ultrasound imaging for characterization and differentiation of benign and malignant breast lesions.

A recent study done in 5 NOV 2015 has apprroved that fibroadenoma of the breast had the highest diagnosis accuracy of 85.71%, followed by carcinoma of the breast 81.25% (Ashish etal.2015)

Hana mohammed in 2015 said: Ultrasound is the modality of today and tomorrow because it can differentiate between benign, suspicious and malignant breast masses.

Tahany Ibrahim in 2011 said: masses with mammograghic finding that are suspicious or highly suggestive of malignancy, or masses with suspicious or typically benign calcifications, donot require ultrasound for assessment, though ultrasound can be used to guide needle biopsy if the mass is seen sonographically.

This study will help in limiting the misdiagnosing and difficulties of diagnosis breast fibroadenoma, and carcinoma, as well as it reduce the cost and timeof examination.

# Chapter Three

## Material & Method:

# Chapter Three

# Material & Method:

## 3-1 Type of the study:

This is prospective study deals with the women complaining of abnormal breast masses that come to ultrasound department.

## 3-2 Population of the study:

Women with abnormal breast mass present to ultrasound department in Khartoum city in the period from August to December 2018.

## 3-3Study sample:

The sample size consist of 54 cases of Sudanese women were selected randomly.

## 3-4Machine:

Real time ultrasound machine General Electric with 7 MHz or 10MHz.

## 3-5Method of data collection:

When the patient come to ultrasound department with abnormal breast mass firstly I asked her when the mass begins, and if the mass mobile or not painful or not, then asked her from past history or family history .

US examination of 54 cases of pathological confirmed by (FNA, Core biopsy, and accessional biopsy), breast masses( carcinoma and fibro adenoma) was done by an expert sinologist.

## 3-6 Inclusion Criteria:

- Women age between 20 to 80 years old.
-Menopausal or menstrual female.
- Female with or without family history of breast masses.
-Female with or without symptoms.

**3-7Exclusion criteria:**

Women younger than 20 years old or above 80 years old should be excluded in this study.

**3-8Technique:**

Patient having breast examinations require special care and attention. Patients are often well informed on breast lesion detection, management and outcomes, and can be anxious and demanding. Sonographer should takecare to explain to the patient the examination procedure and the process by which the patient will receive the results before starting the examination. This will hopefully avoid difficult questions from the patient at the end of the examination.

Patient unclothes in the upper part of the body, then patient lays in the couch and the hand under the head. The operator scans the whole breast from quadrant to another then, areolar region and axilla. The breast needs to be spread evently across the chest wall to allow for auniform depth of the field and to reducebreast thickness. The reduce thickness allows optimization of focusing. The degree of obliquity required varies with the size and position of the breast on the chest wall. Placing the bilateral hands behind the head will assist in spreading the breast further. This allows access to the axilla. (Griffiths, T. 2000)

**3-9 Duration of the study:**

The study began from the August toDecember 2018.

**3-10Data collection :**

The Data was collected by master sheets using the following variable: age, weight, the breast (right or left), the quadrant (upper or lower medial or lateral), echogenicity, the outline (regular or irregular), multiple iesion or single, family history (yes or no).

### 3-11 Ethical consideration:

-No identification or individual are published.

- No information or patient details will be disclosed or used for other reasons than the study.

### 3-12 Data storage :

The data was stored on:

- personal computer.

-patient data collection sheets.

# Chapter 4

## Results

# Chapter 4

## Results

This study includes54 patient aged between 20-80 years old all were complaining of breast lump.

Statistical Methods: comparative analytical methods were used, using the SPSS statistical program based descriptive statistics and comparative hypothesis tests (0.05 sig. level), to demonstrate the differences in **breast tumors** (Carcinoma and Fiberoadenoma) with respect to (Age, breast site, family history and past history).The test was used for chi-square test to study the hypothesis which states that **breast tumor**(Carcinoma and Fiberoadenoma)significantly different with respect to (Age, breast site, family history and past history).

The results of ultrasonic examination were as follows:

**Table 4.1: distribution of participants with respect to age:**

| Age | Frequency | Percent |
|---|---|---|
| 20-30 years | 12 | 22.2 |
| 31-40 years | 16 | 29.6 |
| 41-50 years | 14 | 25.9 |
| 51-60 years | 5 | 9.3 |
| 61-70 years | 4 | 7.4 |
| More than 70 years | 3 | 5.6 |
| **Total** | **54** | **100.0** |

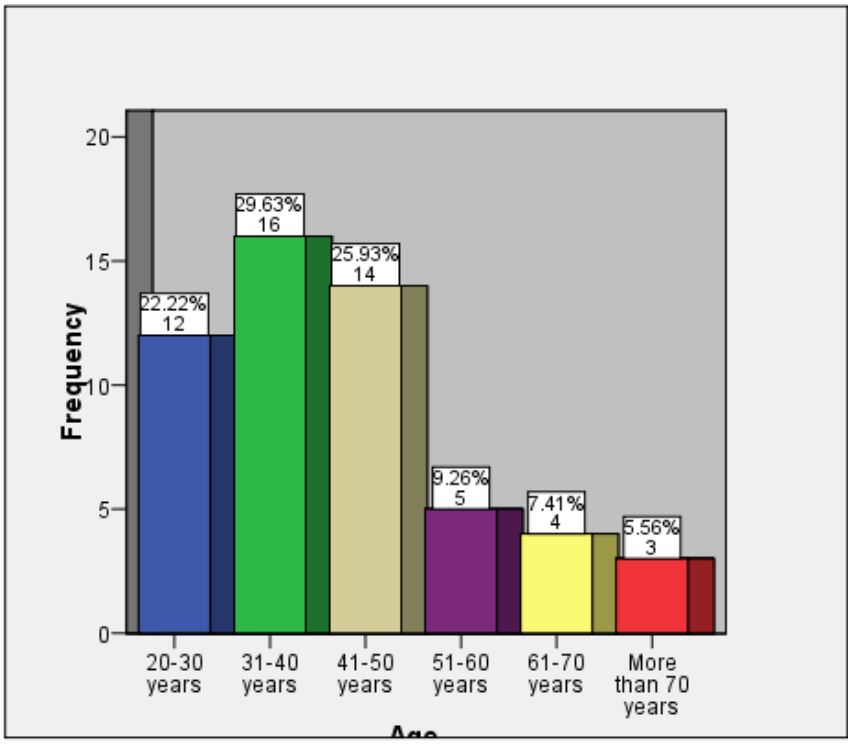



**Figure 4.1: distribution of participants with respect to age Table 4.2:**

**Distribution of participants with respect to breast site:**

| Breast | Frequency | Percent |
|---|---|---|
| Right | 27 | 50.0 |
| Left | 27 | 50.0 |
| **Total** | **54** | **100.0** |

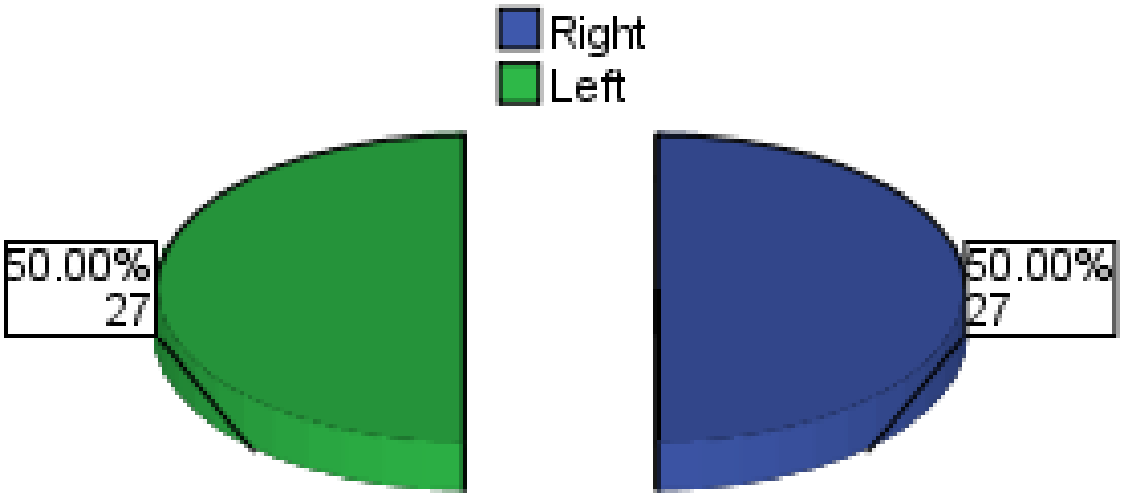



**Figure 4.2: distribution of participants with respect to breast site**

**Table 4.3: distribution of participants with respect to family history:**

| Family history | Frequency | Percent |
|---|---|---|
| Yes | 12 | 22.2 |
| No | 42 | 77.8 |
| **Total** | **54** | **100.0** |

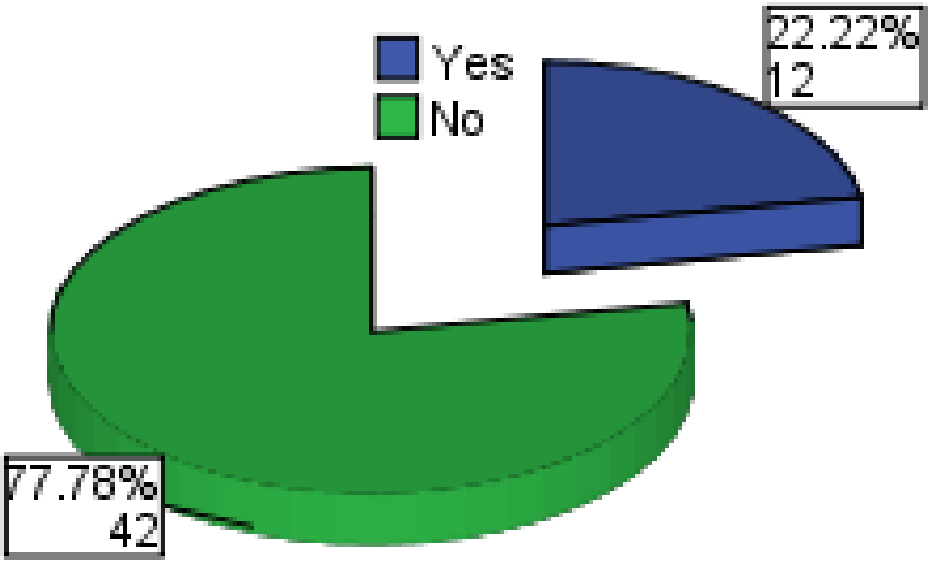



**Figure 4.3: distribution of participants with respect to family history**

**Table 4.4: distribution of participants with respect to past history:**

| Past history | Frequency | Percent |
|---|---|---|
| Yes | 12 | 22.2 |
| No | 42 | 77.8 |
| **Total** | **54** | **100.0** |

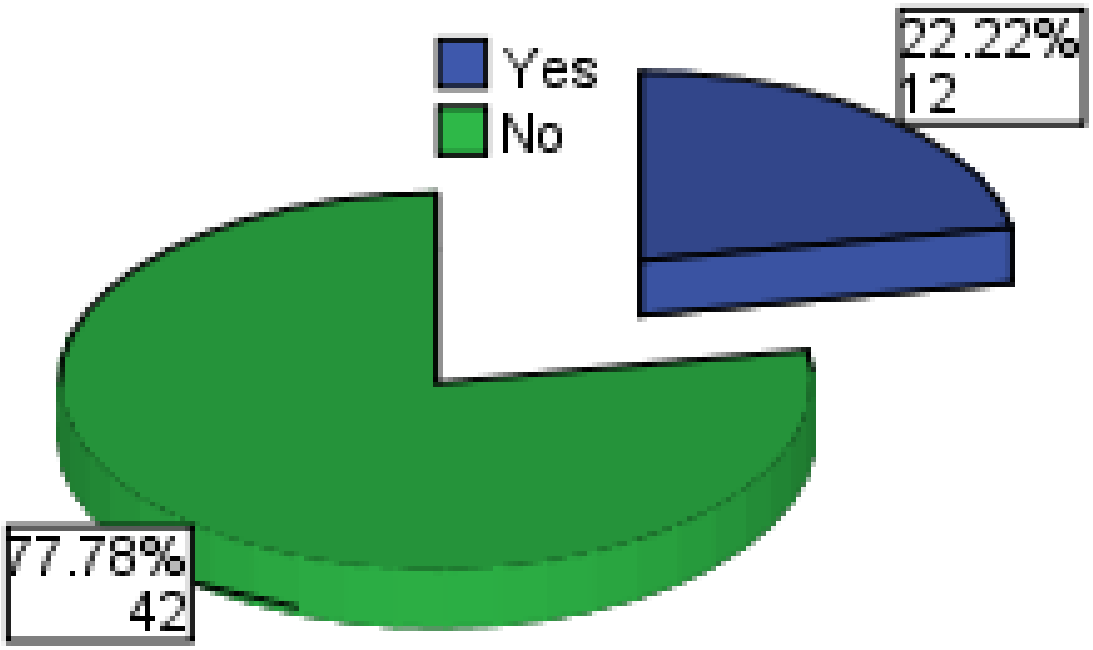



**Figure 4.4: distribution of participants with respect to past history**

**Table (4.5): Chi-square test for association of quadrate and (Age, breast site, family history and past history)**:

| | | | Quadrate | | | | Total | P-value |
|---|---|---|---|---|---|---|---|---|
| | | | Upper inner | Lower inner | Upper outer | Lower outer | | |
| Past history | Yes | Count | 1 | 1 | 6 | 4 | 12 | 0.827 |
| | | % | 8.3% | 8.3% | 50.0% | 33.3% | 100.0% | |
| | No | Count | 6 | 3 | 24 | 9 | 42 | |
| | | % | 14.3% | 7.1% | 57.1% | 21.4% | 100.0% | |
| Family history | Yes | Count | 2 | 1 | 6 | 3 | 12 | 0.967 |
| | | % | 16.7% | 8.3% | 50.0% | 25.0% | 100.0% | |
| | No | Count | 5 | 3 | 24 | 10 | 42 | |
| | | % | 11.9% | 7.1% | 57.1% | 23.8% | 100.0% | |
| Breast | Right | Count | 3 | 2 | 17 | 5 | 27 | 0.711 |
| | | % | 11.1% | 7.4% | 63.0% | 18.5% | 100.0% | |
| | Left | Count | 4 | 2 | 13 | 8 | 27 | |
| | | % | 14.8% | 7.4% | 48.1% | 29.6% | 100.0% | |
| Age | 20-30 years | Count | 0 | 4 | 5 | 3 | 12 | 0.029 |
| | | % | .0% | 33.3% | 41.7% | 25.0% | 100.0% | |
| | 31-40 years | Count | 1 | 0 | 10 | 5 | 16 | |
| | | % | 6.2% | .0% | 62.5% | 31.2% | 100.0% | |
| | 41-50 years | Count | 3 | 0 | 7 | 4 | 14 | |
| | | % | 21.4% | .0% | 50.0% | 28.6% | 100.0% | |
| | 51-60 years | Count | 2 | 0 | 3 | 0 | 5 | |
| | | % | 40.0% | .0% | 60.0% | .0% | 100.0% | |
| | 61-70 years | Count | 0 | 0 | 4 | 0 | 4 | |
| | | % | .0% | .0% | 100.0% | .0% | 100.0% | |
| | More than 70 years | Count | 1 | 0 | 1 | 1 | 3 | |
| | | % | 33.3% | .0% | 33.3% | 33.3% | 100.0% | |

**Table (4.6): Chi-square test for association of echogenicityand (Age, breastsite, family history and past history)**:

| | | | Echogenicity | | | Total | P-value |
|---|---|---|---|---|---|---|---|
| | | | Hypo | Hyper | Iso | | |
| Past history | Yes | Count | 11 | 0 | 1 | 12 | 0.767 |
| | | % | 91.7% | .0% | 8.3% | 100.0% | |
| | No | Count | 37 | 1 | 4 | 42 | |
| | | % | 88.1% | 2.4% | 9.5% | 100.0% | |
| Family history | Yes | Count | 10 | 1 | 1 | 12 | 0.215 |
| | | % | 83.3% | 8.3% | 8.3% | 100.0% | |
| | No | Count | 38 | 0 | 4 | 42 | |
| | | % | 90.5% | .0% | 9.5% | 100.0% | |
| Breast | Right | Count | 22 | 1 | 4 | 27 | 0.161 |
| | | % | 81.5% | 3.7% | 14.8% | 100.0% | |
| | Left | Count | 26 | 0 | 1 | 27 | |
| | | % | 96.3% | .0% | 3.7% | 100.0% | |
| Age | 20-30 years | Count | 12 | 0 | 0 | 12 | 0.700 |
| | | % | 100.0% | .0% | .0% | 100.0% | |
| | 31-40 years | Count | 14 | 1 | 1 | 16 | |
| | | % | 87.5% | 6.2% | 6.2% | 100.0% | |
| | 41-50 years | Count | 12 | 0 | 2 | 14 | |
| | | % | 85.7% | .0% | 14.3% | 100.0% | |
| | 51-60 years | Count | 4 | 0 | 1 | 5 | |
| | | % | 80.0% | .0% | 20.0% | 100.0% | |
| | 61-70 years | Count | 3 | 0 | 1 | 4 | |
| | | % | 75.0% | .0% | 25.0% | 100.0% | |
| | More than 70 years | Count | 3 | 0 | 0 | 3 | |
| | | % | 100.0% | .0% | .0% | 100.0% | |

**Table (4.7): Chi-square test for association of marginand (Age, breast site, family history and past history)**:

| | | | Margin | | Total | P-value |
|---|---|---|---|---|---|---|
| | | | Ill define | Well define | | |
| Past history | Yes | Count | 5 | 7 | 12 | 0.823 |
| | | % | 41.7% | 58.3% | 100.0% | |
| | No | Count | 16 | 26 | 42 | |
| | | % | 38.1% | 61.9% | 100.0% | |
| Family history | Yes | Count | 4 | 8 | 12 | 0.652 |
| | | % | 33.3% | 66.7% | 100.0% | |
| | No | Count | 17 | 25 | 42 | |
| | | % | 40.5% | 59.5% | 100.0% | |
| Breast | Right | Count | 10 | 17 | 27 | 0.780 |
| | | % | 37.0% | 63.0% | 100.0% | |
| | Left | Count | 11 | 16 | 27 | |
| | | % | 40.7% | 59.3% | 100.0% | |
| Age | 20-30 years | Count | 1 | 11 | 12 | 0.000 |
| | | % | 8.3% | 91.7% | 100.0% | |
| | 31-40 years | Count | 3 | 13 | 16 | |
| | | % | 18.8% | 81.2% | 100.0% | |
| | 41-50 years | Count | 6 | 8 | 14 | |
| | | % | 42.9% | 57.1% | 100.0% | |
| | 51-60 years | Count | 5 | 0 | 5 | |
| | | % | 100.0% | .0% | 100.0% | |
| | 61-70 years | Count | 4 | 0 | 4 | |
| | | % | 100.0% | .0% | 100.0% | |
| | More than 70 years | Count | 2 | 1 | 3 | |
| | | % | 66.7% | 33.3% | 100.0% | |

**Table (4.8): Chi-square test for association of numberof tumor massesand (Age, breast site, family history and past history)**:

| | | | Number of masses | | | |
|---|---|---|---|---|---|---|
| | | | Solitary | Multiple | Total | P-value |
| Past history | Yes | Count | 10 | 2 | 12 | 0.673 |
| | | % | 83.3% | 16.7% | 100.0% | |
| | No | Count | 37 | 5 | 42 | |
| | | % | 88.1% | 11.9% | 100.0% | |
| Family history | Yes | Count | 10 | 2 | 12 | 0.673 |
| | | % | 83.3% | 16.7% | 100.0% | |
| | No | Count | 37 | 5 | 42 | |
| | | % | 88.1% | 11.9% | 100.0% | |
| Breast | Right | Count | 21 | 6 | 27 | 0.034 |
| | | % | 77.8% | 22.2% | 100.0% | |
| | Left | Count | 26 | 1 | 27 | |
| | | % | 96.3% | 3.7% | 100.0% | |
| Age | 20-30 years | Count | 10 | 2 | 12 | 0.594 |
| | | % | 83.3% | 16.7% | 100.0% | |
| | 31-40 years | Count | 13 | 3 | 16 | |
| | | % | 81.2% | 18.8% | 100.0% | |
| | 41-50 years | Count | 13 | 1 | 14 | |
| | | % | 92.9% | 7.1% | 100.0% | |
| | 51-60 years | Count | 5 | 0 | 5 | |
| | | % | 100.0% | .0% | 100.0% | |
| | 61-70 years | Count | 3 | 1 | 4 | |
| | | % | 75.0% | 25.0% | 100.0% | |
| | More than 70 years | Count | 3 | 0 | 3 | |
| | | % | 100.0% | .0% | 100.0% | |

**Table (4.9): Chi-square test for association of diagnosisand (Age, breast site, family history and past history)**:

| | | | Diagnosis | | Total | P-value |
|---|---|---|---|---|---|---|
| | | | Carcinoma | Fibero adenoma | | |
| Past history | Yes | Count | 6 | 6 | 12 | 0.462 |
| | | % | 50.0% | 50.0% | 100.0% | |
| | No | Count | 16 | 26 | 42 | |
| | | % | 38.1% | 61.9% | 100.0% | |
| Family history | Yes | Count | 5 | 7 | 12 | 0.941 |
| | | % | 41.7% | 58.3% | 100.0% | |
| | No | Count | 17 | 25 | 42 | |
| | | % | 40.5% | 59.5% | 100.0% | |
| Breast | Right | Count | 10 | 17 | 27 | 0.579 |
| | | % | 37.0% | 63.0% | 100.0% | |
| | Left | Count | 12 | 15 | 27 | |
| | | % | 44.4% | 55.6% | 100.0% | |
| Age | 20-30 years | Count | 1 | 11 | 12 | 0.000 |
| | | % | 8.3% | 91.7% | 100.0% | |
| | 31-40 years | Count | 3 | 13 | 16 | |
| | | % | 18.8% | 81.2% | 100.0% | |
| | 41-50 years | Count | 6 | 8 | 14 | |
| | | % | 42.9% | 57.1% | 100.0% | |
| | 51-60 years | Count | 5 | 0 | 5 | |
| | | % | 100.0% | .0% | 100.0% | |
| | 61-70 years | Count | 4 | 0 | 4 | |
| | | % | 100.0% | .0% | 100.0% | |
| | More than 70 years | Count | 3 | 0 | 3 | |
| | | % | 100.0% | .0% | 100.0% | |

**Table (4.10): Chi-square test for association of diagnosis and (quadrate, echogenicity, margin and number of masses)**:

| | | Diagnosis | | | | P-value |
|---|---|---|---|---|---|---|
| | | Carcinoma | | Fibro adenoma | | |
| | | Count | % | Count | % | |
| Quadrate | Upper inner | 6 | 27.30% | 1 | 3.10% | 0.002 |
| | Lower inner | 0 | 0.00% | 4 | 12.50% | |
| | Upper outer | 14 | 63.60% | 16 | 50.00% | |
| | Lower outer | 2 | 9.10% | 11 | 34.40% | |
| **Total** | | **22** | **100.00%** | **32** | **100.00%** | |
| Echogenicity | Hypo | 17 | 77.30% | 31 | 96.90% | 0.005 |
| | Hyper | 0 | 0.00% | 1 | 3.10% | |
| | Iso | 5 | 22.70% | 0 | 0.00% | |
| **Total** | | **22** | **100.00%** | **32** | **100.00%** | |
| Margin | Ill define | 21 | 95.50% | 0 | 0.00% | 0.000 |
| | Well define | 1 | 4.50% | 32 | 100.00% | |
| **Total** | | **22** | **100.00%** | **32** | **100.00%** | |
| Number of masses | Solitary | 19 | 86.40% | 28 | 87.50% | 0.903 |
| | Multiple | 3 | 13.60% | 4 | 12.50% | |
| **Total** | | **22** | **100.00%** | **32** | **100.00%** | |

# Chapter 5

## Discussion, conclusion, and recommendations

# Chapter 5

## Discussion, conclusion, and recommendations

### 5.1 Discussion:

Breast fibroadenoma and carcinoma are common tumors of the breast, detailed descriptions of their sonographic appearances are necessary for differentiate between fibroadenoma and carcinoma.

This study investigated 54 cases of breast masses (fibroadenoma and carcinoma) confirm by histopathological examination (FNA, Core biopsy, and excisional biopsy), the lumps underwent ultrasound scan done by sinologist in the department of radiology and the sonographic findings of the lesions were analyzed. This study was conducted in Khartoum state as descriptive study done in 54 patients their age between 20 to 80 years old. Table (4.1) and Figure (4.1) show that (22.2%) of participants were 20-30 years old, since (29.6%) of them 31-40 years, (25.9%) of them 41-50 years, (9.3%) of them were 51-60 and (7.4%) of them were 61-70 years old, while only (5.6%) of them were more than 70 years old. That means the ages between 31-40 is more frequently( 16 patient) and ages more than 70 years are less frequently.

Table (4.2) and Figure (4.2) show that (50%) of participants were complained on right breast, and (50%) of them on left breast.

Table (4.3) and Figure (4.3) show that most (77.8%) of participants don’t have breast tumor(Carcinoma and Fiberoadenoma) in their family history, while (22.2%) have breast tumor(Carcinoma and Fiberoadenoma) in their family history.

Table (4.4) and Figure (4.4) show that most (77.8%) of participants don’t have breast tumor(Carcinoma and Fiberoadenoma) in their history, while (22.2%) have breast tumor(Carcinoma and Fiberoadenoma) in their history.

Notes from the table (4.5), that the quadrate was mostly common on upper outer for both who have a past history or a family history and who don't have breast tumor(Carcinoma and Fiberoadenoma)history and for both breasts. The probabilities(P-values) of the chi-square test statistic were(0.827, 0.967 and 0.711) respectively for past history, family history and breast site, which are greater than the alpha level of significance of 0.05. Thus hypothesis that differences in "quadrate" is related to past history, family history and breast site is not supported and quadrate doesn't dependent on past history, family history and breast site, while quadrate is differ for different age groups since the probabilities(P-value) of the chi-square test statistic was(0.029), which is less than the alpha level of significance of 0.05 and hence the hypothesis that differences in "quadrate" are related to age is supported and quadrate dependents on age.

Notes from the table (4.6), that the echogenicitywas hypo for most of both who have a past history or a familyhistory and who don't have tumor (Carcinoma and Fiberoadenoma)history, for both breast and for different age groups.The probabilities(P-values) of the chi-square test statisticwere(0.767, 0.215, 0.161 and 0.700) respectively for past history, family history, breast site and age, which are greater than the alpha level of significance of 0.05. Thus hypothesis that differences in "echogenicity" is related to past history, family history, breast siteand age is not supported and quadrate doesn't dependent on past history, family history, breast site and age.

Notes from the table (4.7), that most margins were well defined for both who have a past history or a family history and who don't have tumor (Carcinoma and Fiberoadenoma) history and for both breast. The probabilities(P-values) of the chi-square test statistic were(0.823, 0.652 and 0.780) respectively for past history, family history and breast site, which are greater than the alpha level of significance of 0.05. Thus hypothesis that differences in "margins" are related to past history, family history and breast site is not supported and

margin doesn't dependent on past history, family history and breast site, while margin is differ for different age groups since the probabilities(P-value) of the chi-square test statistic was(0.000), which is less than the alpha level of significance of 0.05 and hence the hypothesis that differences in "margin" are related to age is supported and margin dependents on age.

Notes from the table (4.8), that number of tumor masses were solitary for both who have a past history and who don't have, for both breast and different ages. The probabilities(P-values) of the chi-square test statistic were(0.673, 0.673 and 0.594) respectively, for family history, breast site and age, which are greater than the alpha level of significance of 0.05. Thus hypothesis that differences in "number of masses" is related to past history, breast site and age, is not supported and margin doesn't dependent on past history, breast site and age, while number of masses is differ for who have a family history of tumor(Carcinoma and Fiberoadenoma)and who don't have, since the probabilities(P-value) of the chi-square test statistic was(0.034), which is less than the alpha level of significance of 0.05 and hence the hypothesis that differences in "number of masses" is related to family history is supported it is dependents on family history.

Notes from the table (4.9), that most of final diagnosis were fiberoadenoma for both who have a past history or a family history and who don't have tumor (Carcinoma and Fiberoadenoma) history and for both breast. The probabilities (P-values) of the chi-square test statistic were(0.462, 0.941 and 0.579) respectively for past history, family history and breast site, which are greater than the alpha level of significance of 0.05. Thus hypothesis that differences in "diagnosis" are related to past history, family history and breast site is not supported and diagnosis doesn't dependent on past history, family history and breast site. Whereas diagnosis is differ for different age groups, that it is carcinoma for who were 50 years or less, while it is fiberoadenoma for who were more than 50 years old, since the probabilities

(P-value) of the chi-square test statistic was(0.000), which is less than the alpha level of significance of 0.05 and hence the hypothesis that differences in “diagnosis” are related to age is supported and diagnosis dependents on age.

Notes from the table (4.10), that most of final diagnosis is differ for different quadrate, echogenicity and margin, since most of carcinoma tumors were at upper inner and upper outer, while most of fiberoadenoma tumors were at upper outer lower outer, most of carcinoma tumors were hypo or Iso, while the majority offiberoadenoma tumors were hypo, and the majority carcinoma tumors were ill defined, while all offiberoadenoma tumors were well defined, since the probabilities(P-values) of the chi-square test statistic were(0.002, 0.005 and 0.000), which is less than the alpha level of significance of 0.05 and hence the hypothesis that different “diagnosis” have different quadrates, echogenicities and margins is supported, and hence quadrate, echogenicity and margin dependent diagnosis.

Whereas the number of masses for both carcinoma and fiberoadenoma were solitary. The probability (P-value) of the chi-square test statistic was (0.903) greater than the alpha level of significance of 0.05 and diagnosis doesn’t are similar in number of masses.

## 5.2 Conclusion:

This study was carried out in 50 patients in Khartoum city in Omer sawy hospital. This study is looking for ultrasound finding of differentiation between the breast carcinoma and breast fibroadenoma according to age, the breast side, quadrant, margin, echogenicity, past and family history.

The study show that the diagnosis is differ for different age groups, that it is carcinoma for who were 50 years or more, while it is fiberoadenoma for who were less than 50 years old.

That most of final diagnosis is differ for different quadrate, echogenicity and margin, since most of carcinoma tumors were at upper inner and upper outer, while most of fiberoadenoma tumors were at upper outer lower outer, most of carcinoma tumors were hypo or Iso, while the majority offiberoadenoma tumors were hypo, and the majority carcinoma tumors were ill defined, while all offiberoadenoma tumors were well defined.

In this study the common age is frequent to diagnosis in department of ultrasound of the breast carcinoma and fibroadenmabetween (31-40) which is (29.6%).

Awoman presenting with breast carcinoma breast fibroadenoma is common problem in all areas and tribes of sudan.

The life style, how to eat, what we eat and quantity, obesity,exposure to radiation and chemical factorsare most common reasons to be affected with breast masses than the past and family history.

U/S is the modality of today and tomorrow because it can differentiate between benign, suspicious and malignant breast masses.

## 5.3 Recommendation:

Self examination is very important to discover the masses early so the out put of treatment is best. The self exam is done after the menstrual cycle.

The patient who diagnosed with breast cancer must be examined with ultrasound every six months to detect any growing mass.

The further examination for young females with breast masses is MRI which is easy in differentiation between breast carcinoma and fibroadenoma , but mammograghy is best for woman above forty.

Specialized centers for breast care must be available for all female for early detection of the breast masses specially Ca breast which has high mortality rate between female.

In particular, there is concern for the operator dependence of freehand screening for it to be documented.

Importantly, recent reports have shown that consistent breast ultrasound examination performance and interpretation is possible with minimal training.

Ultrasound BIRADS categories should be applied for each patient in order to reach the correct diagnosis avoiding unnecessary biopsies, based in that all patients should be followed up.

In my opinion patients follow up will make big difference in detection any changes correctly.

And further studies should be applied with bigger sample size fallowed up for longer time .

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# Appendixes

# Data collection sheet

Date:

Patient data:

_patient number(  )

_Residence…….

_Occupation……..

_Age…….

Breast:

1.Rt(  )  2.Lt(  )

Quadrate:

1. Upper inner(  )
2. Lower inner(  )
3. Upper outer(  )
4. Lower outer(  )

Echogenicity:

1.Hypo(  )

2.Hyper(  )

3.Iso(  )

4.Complex(  )


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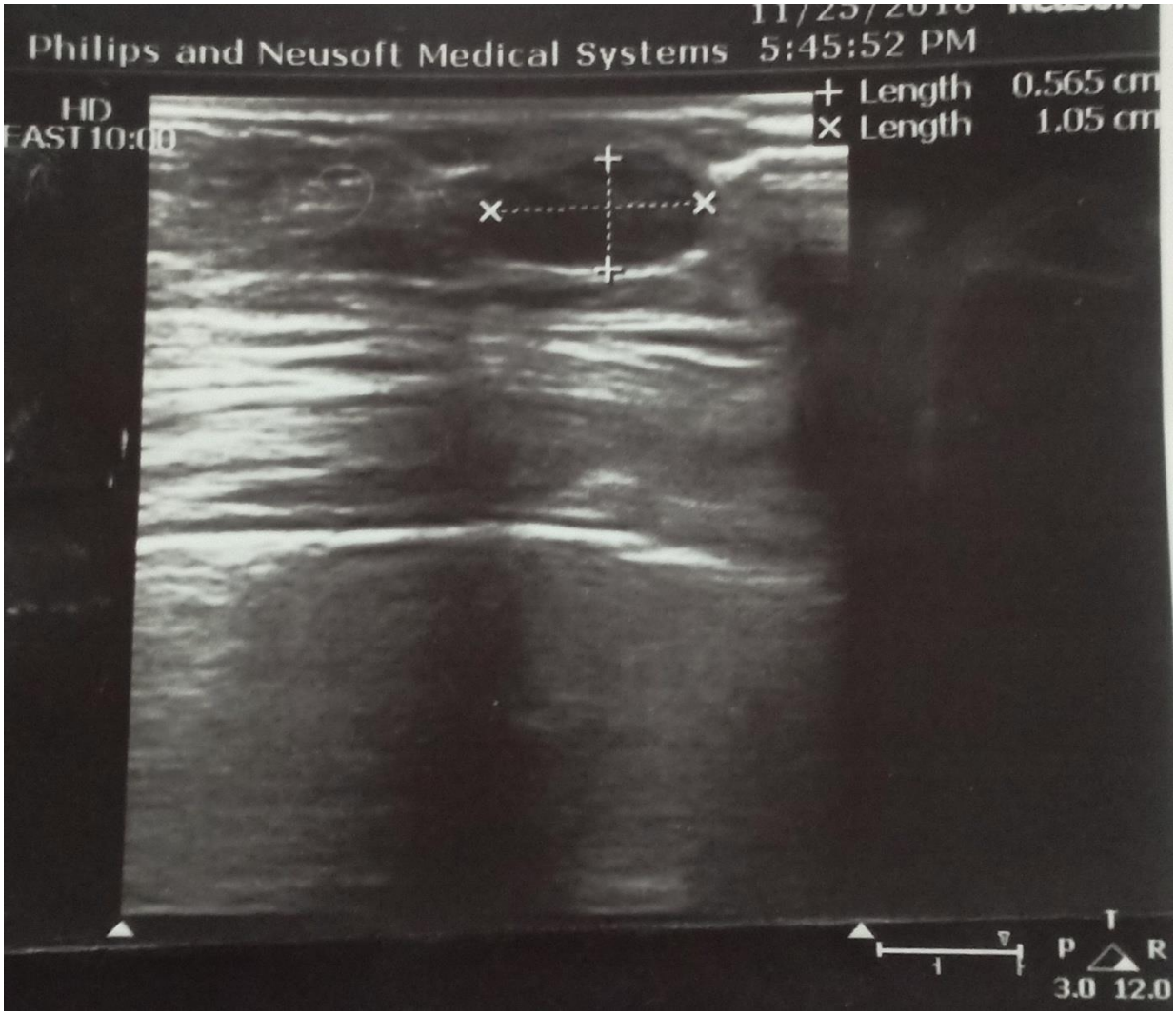
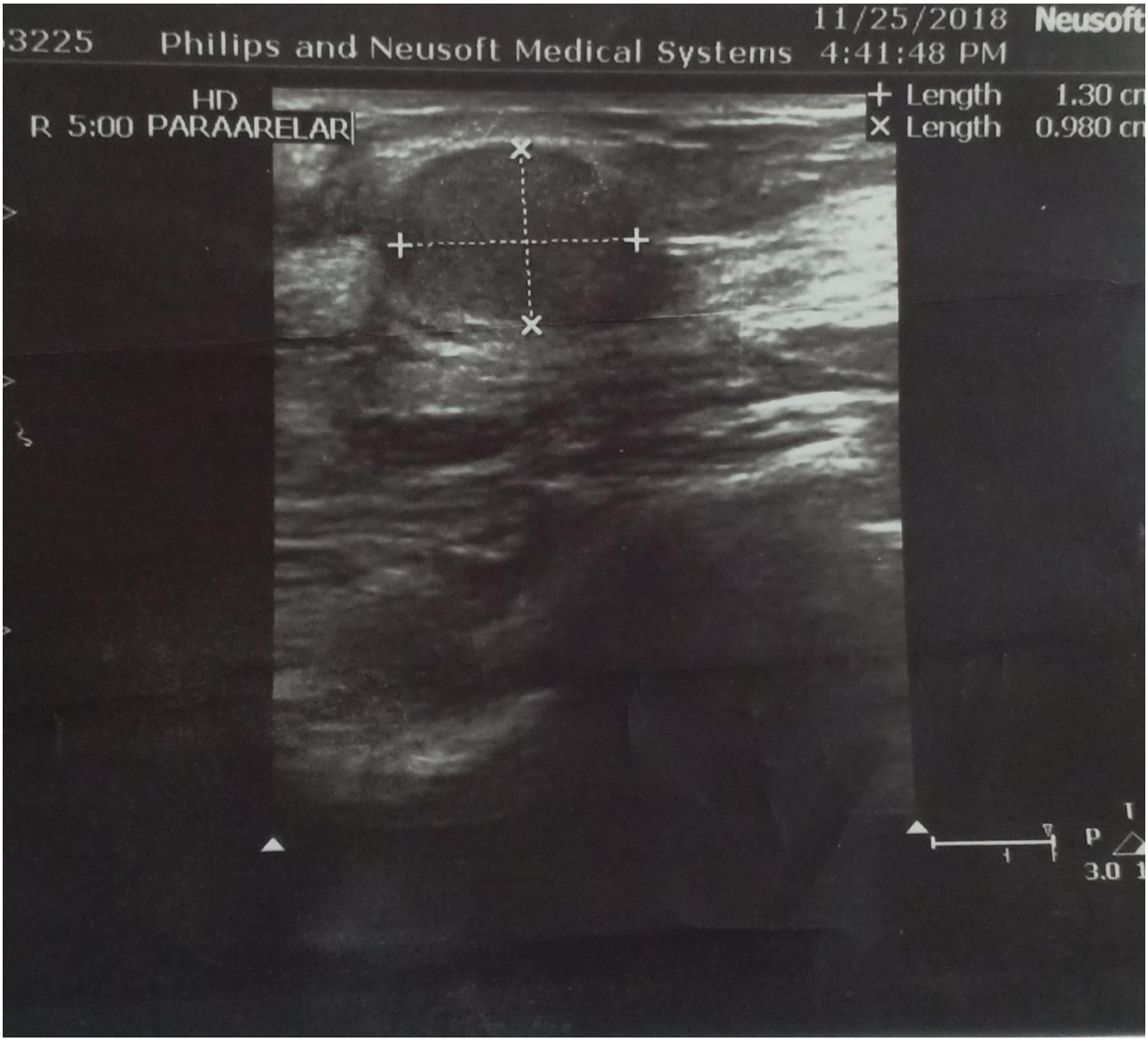
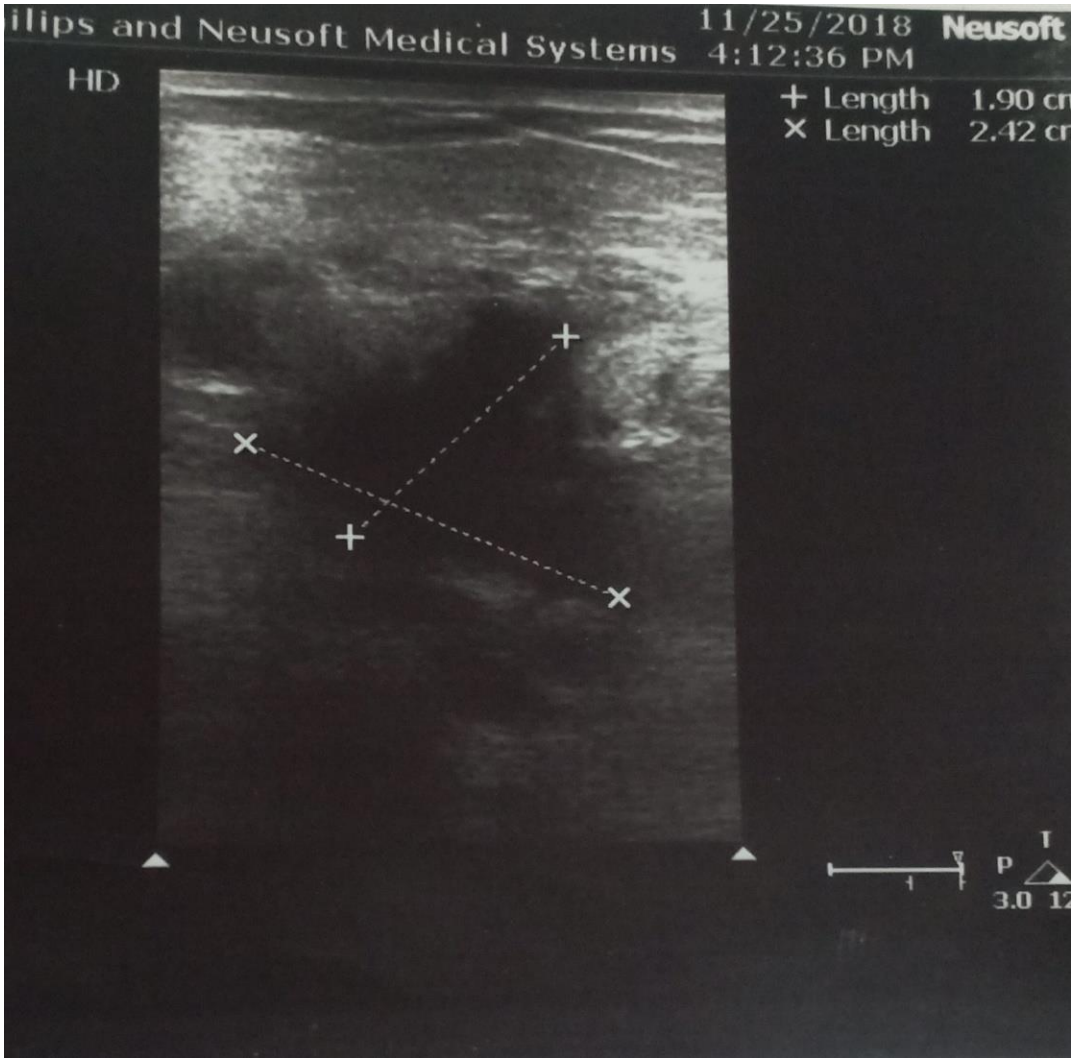



Fibroadenoma




Fibroadenoma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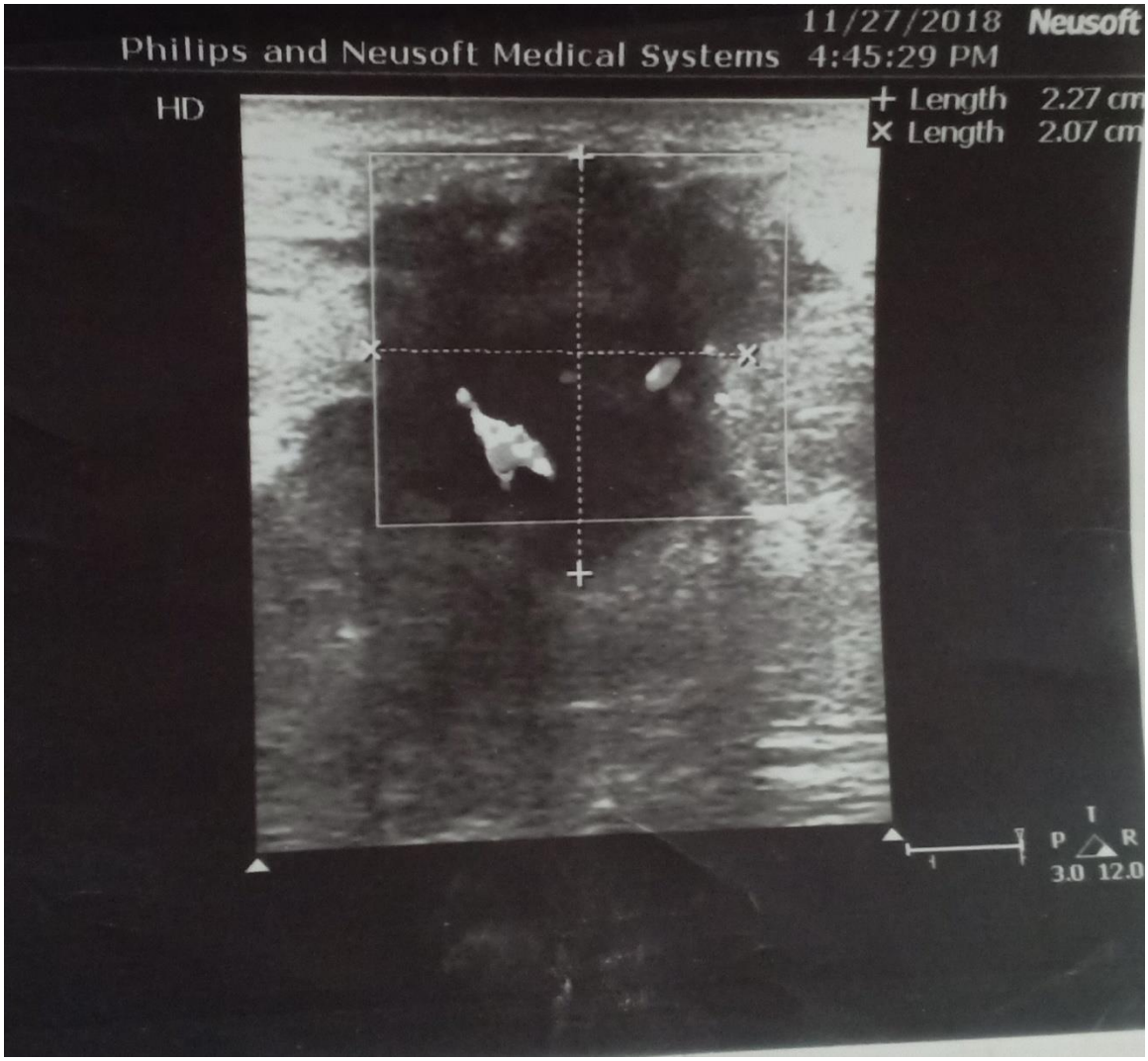
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