Chapter one

1. Introduction

1.1Introduction:

Breast cancer is a malignant tumor that starts in the cells of the breast, malignant tumor is a group of cancer cells that can grow into (invade)Surrounding tissues or spread (metastasize) to distant areas of the body. The Disease occurs almost entirely in women, but men can get it, too. (Steven halls, 2015).

Malignancies generally develop over a long time. It is not unusual for several years to pass from the first appearance of atypical hyperplasia to the final diagnosis of in situ cancer. Malignant cells grow along a line of least resistance, such as in fatty tissue. In fibrotic tissue, most cancer growth occurs along the borders. Lymphatic's and blood vessels are frequently used as pathways for new tumor development. If the tumor is encapsulated, it continues to grow in one area, compressing and distorting the surrounding architecture. When the carcinoma is contained and has not invaded the basal membrane structure, it is considered in situ. 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 retro areolar 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.(Sandra 2012).

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. In 2005 alone, 519 000 deaths were

recorded due to breast cancer. This means that one in every 100 deaths worldwide and almost one in every 15 cancer deaths were due to breast cancer. 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 cancer. However, these strategies cannot eliminate the majority of breast cancers. Therefore, early detection in order to improve breast cancer outcome and survival remains the cornerstone of breast cancer control. Breast cancer screening is one way of reducing morbidity and mortality and improving the survival rate. (Gokhale'S 2009)

The Federal Ministry of Health initiated a breast cancer screening program in1995.

The program follows international guidelines using a combination of US and a mammography every two years after the age of 40. (Elobaid, Y. E., Aw, T. C., Grivna, M., & Nagelkerke, N 2014)

Ultrasound has accuracy and helpful in characterize the malignant tumors, also it is low-cost, available and save. (Hussy, 1985)

1.2 Problem of the study:

Breast masses are common disease in women and it could be benign and malignant and to know which is which, it should be proved by biopsy which is invasive method. toreduce these biopsies ultra sono graphic was suggested as noninvasive method as it. its ability to diagnose the masses without any un necessary biopsy.

1.3 Objectives of the study:

1.3.1 General objective:

- To evaluate the characterization of the breast cancer using medical ultra sound.

1.3.2 Specific objectives

- To measure the size, shape, and alignment of the breast cancer.
- To evaluate the breast cancer Echogenicity and texture.
- To evaluate the relation between the breast cancer and age.
- To evaluate the side of breast cancer.
- To evaluate the relation between breast cancer, family history and parity.

Chapter Two

2. Theoretical background and literature review

2.1 Breast Anatomy and physiology:

The breasts consist of mammary glands and associated skin and connective tissues. The mammary glands are modified sweat glands in the superficial fascia anterior to the pectoral muscles and the anterior thoracic wall. The mammary glands consist of a series of ducts and associated secretary lobules. These converge to form 15 to 20 lactiferous ducts, which open independently onto the nipple. A well-developed, connective tissue stroma surrounds the ducts and lobules of the mammary gland, in certain regions this condenses to form well-defined ligaments, the suspensor ligaments of breast (Cooper's ligaments), which are continuous with the dermis of the skin and support the breast (Richard et al. 2012).

2.1.1 Arterial supply:

laterally, vessels from the axillary artery-superior thoracic, thoraco acromial, lateral thoracic, and sub scapular arteries, medially, branches from the internal thoracic artery, The second to fourth inter costal arteries via branches that perforate the thoracic wall and overlying muscle (Richard et al. 2012).

2.1.2 Venous drainage:

Veins draining the breast parallel the arteries and ultimately drain into the axillary, internal thoracic and inter costal veins (Richard etal. 2012).

2.1.3Innervation:

Innervation of the breast is via anterior and lateral cutaneous branches of the second to sixth inter costal nerves. The nipple is innervated by the fourth inter costal nerve (Richard et al. 2012).

2.1.4 Lymphatic drainage:

Approximately 75% is via lymphatic vessels that drain laterally and superiorly into axillary nodes. most of the remaining drainage is into Para sternal nodes deep to the anterior thoracic wall and associated with the internal thoracic artery.

some drainage may occur via lymphatic vessels that follow the lateral branches of posterior inter costal arteries and connect with inter costal nodes situated near the heads and necks of ribs (Richard et al. 2012).

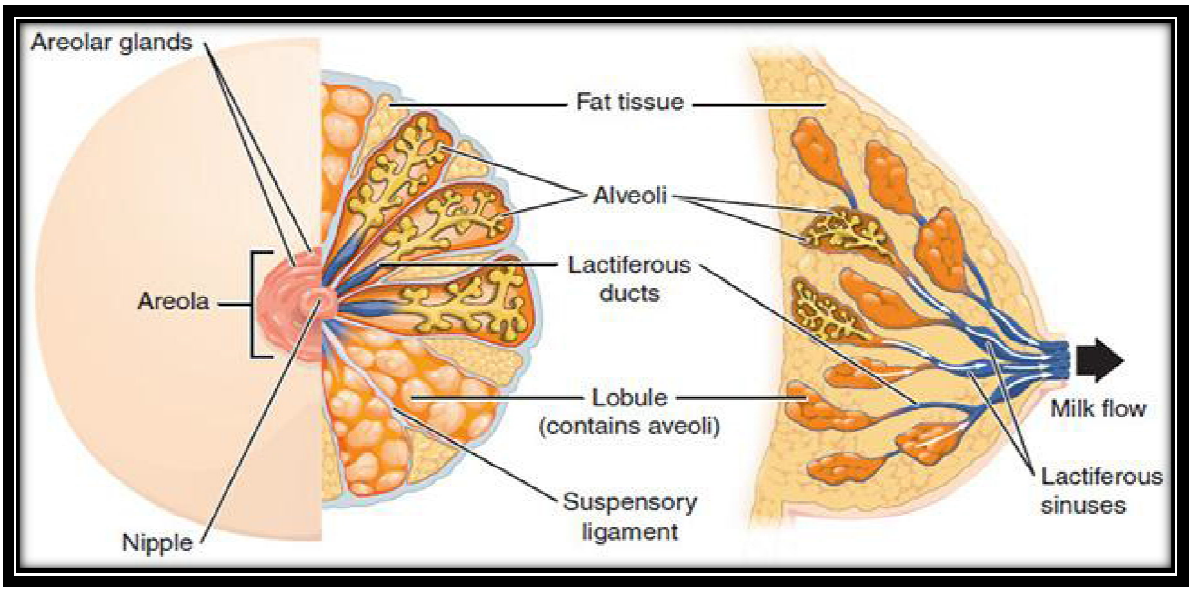


Figure 2.1: Mammary glands within the breast(Richard 2012).

2.1.5 Classification of breast tissues:

2.1.5.1 Pre puberty:

The neonatal breast contains lactiferous ducts but no alveoli. Until puberty, little branching of the ducts occurs, and any slight mammary enlargement reflects the growth of fibrous stroma and fat (Susan 2008).

2.1.5.2 Puberty:

In the post pubertal female, the ducts stimulated by ovarian estrogens, become branched. The ends of the branches form solid spheroidal masses of granular polyhedral cells, the potential alveoli.

Breast enlargement at puberty is largely a consequence of lipid accumulation (Susan 2008).

2.1.5.3 Changes during menstrual cycle:

In the follicular phase (days 3-14) the stroma becomes less dense. Various changes including luminal expansion take place in the ducts. In the luteal phase (days 15-28) there is a progressive increase in stromal density and the ducts have an open lumen that contains secretion.

There are also changes in blood flow, which are greatest at mid cycle and an increase in water content of the stroma in the second half of the menstrual cycle (Susan 2008).

2.1.5.4 Postmenopausal:

Progressive atrophy of lobules and ducts occur after the menopause, and there is fatty replacement of glandular breast tissue. A few ducts may remain. The stroma becomes much less cellular and collagenous fibers decrease. The breast may return to a condition similar to the pre pubertal state (Susan 2008).

2.1.6 Changes associated with pregnancy and lactation:

2.1.6.1 Pregnancy:

As the output of estrogen and progesterone produced first by the corpus luteal and later by the placenta rises during pregnancy the interlobular ductal epithelium proliferates and the cells increases in size. Alveoli develop at their termini and expand as their cells and Lumina fill with newly synthesized and secreted milk.

Secretary activity in the alveolar cells rises progressively in the latter half of pregnancy(Susan 2008).

2.1.6.2 Lactation:

True milk secretion begins a few days after parturition as a result of a reduction in circulating estrogen and progesterone, a change which appears to stimulate production of prolactin by the anterior hypo physics. Milk distends the alveoli so that the cells flatten as secretion increases. On hormonal stimulation by oxytocin myo epithelial cells contracts to expel alveolar secretions into the ductal system in readiness of suckling. (Susan 2008).

2.1.6.3 Post-lactation:

When lactation ceases, the secretary tissue undergoes some involution, but the ducts and alveoli never return completely to the pre-pregnant state. Two major processes are responsible for the regression of the alveolar-ductal system; a reduction in epithelial cell size and a reduction is cell numbers (Susan 2008).

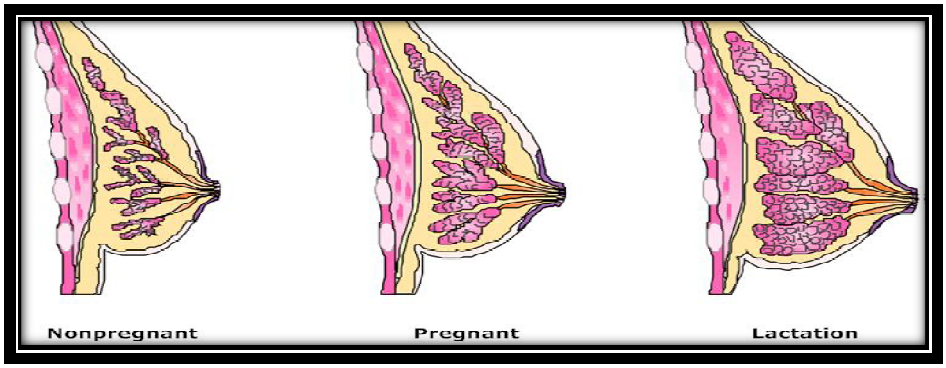


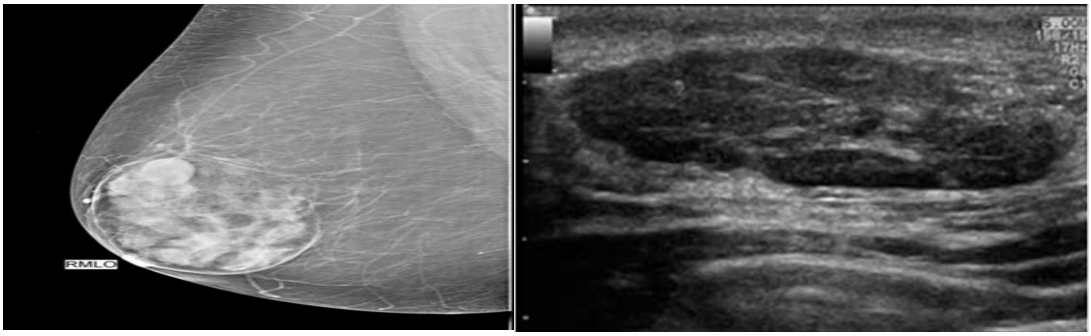
Figure2.2: Changes in breast during pregnancy and lactation(Susan 2008).

2.2 Breast pathology:

General pathology:

2.2.1 Hamartoma:

Hamartoma are discrete lesions, usually firm and sharply circumscribed. The lesion appears as a well-defined density surrounded by a narrow zone of radiolucency. often gives the appearance of being encapsulated (Carol 2005).

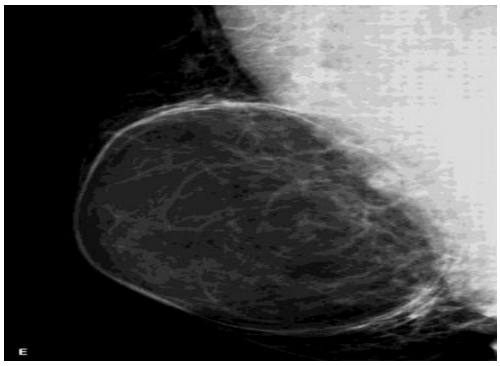


(A) (B)

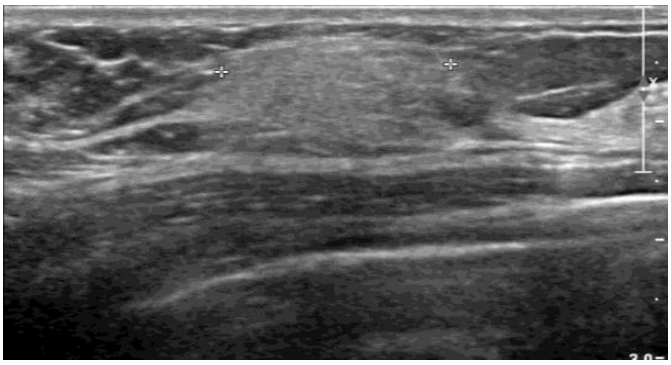
Figure *2.3:* Breast Hamartoma mammogram (A) and ultrasound ((Betty 2007) .

2.2.2 Lipoma:

It presents as a solitary mass that is soft and freely movable, and usually well delineated. Microscopically, Lipoma are composed of the typical round mature lipocytes (Carol 2005).



(A)

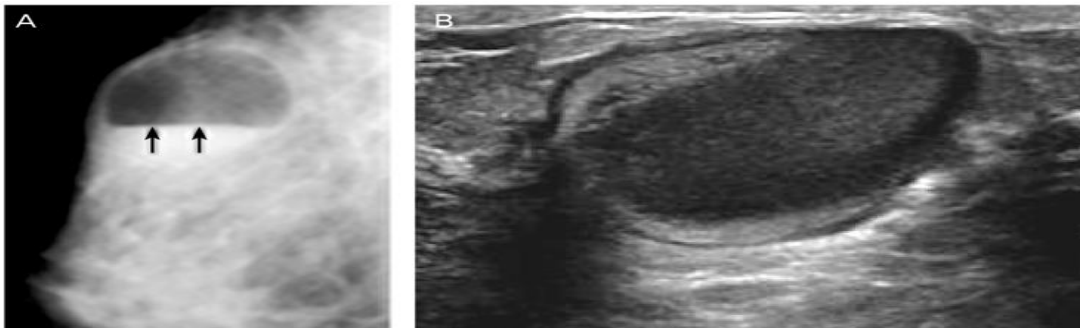


(B)

Figure 2.4: BreastLipoma mammogram (A) and ultrasound (B) (Elisabetta 2013).

2.2.3 Galactocele:

Galactocele is a milk-filled cyst, probably formed by over distension of a lactiferous duct. It usually presents as a firm, occasionally tender mass, commonly in the upper quadrants beyond the areola border. Usually, these lesions occur in younger woman and develop during or after lactation. In U/S appears as an anechoic mass with sharply demarcated smooth margin (Carol 2005).



(A)(B)

Figure *2.5:*Breast galactocele mammogram (A) and ultrasound (B)(Carol 2005).

2.2.4 Mastitis:

Acute no epidemic mastitis, formerly called (puerperal mastitis) refers to breast soreness, fever, and flulike symptoms that may develop any time during lactation (Carol 2005).

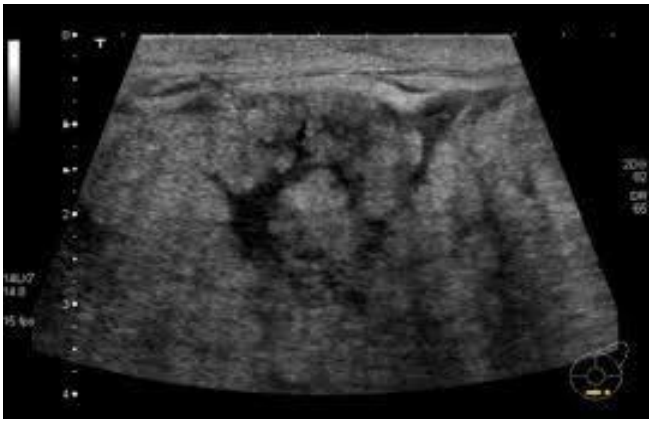


Figure *2.6*: breast U/S with interstitial edema suggestive of mastitis. (Betty 2007)

2.2.5 Abscess:

Abscesses may be single or multiple. Acute abscesses have a poorly defined border, whereas mature abscesses are well encapsulated with sharp borders. A definite diagnosis cannot be made from a mammogram alone. Aspiration is

necessary. Clinical findings include pain, swelling, and reddening of the overlying skin (Sandra L. 2012).

Figure *2.7:*U/S image showBreast abscess. (Elisabeth2013)

2.2.6 Cyst:

A breast cyst is a fluid-filled sac within the breast. They are echo-free, roundish or oval, with well-defined anterior and posterior margins and posterior enhancement. They are usually aspirated (Carol 2005).

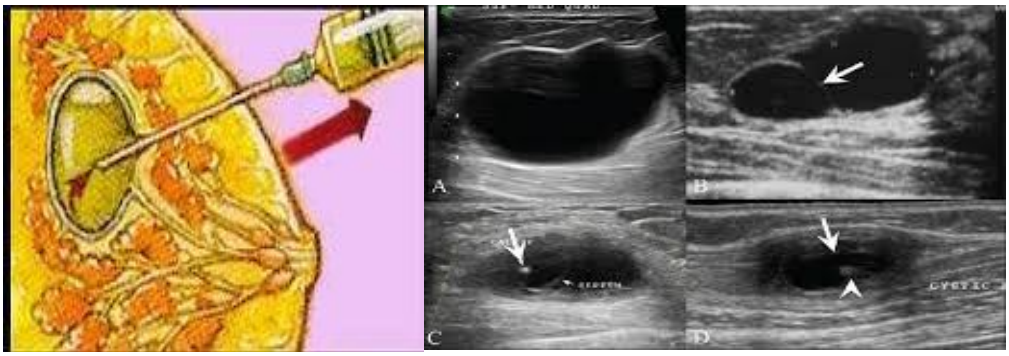
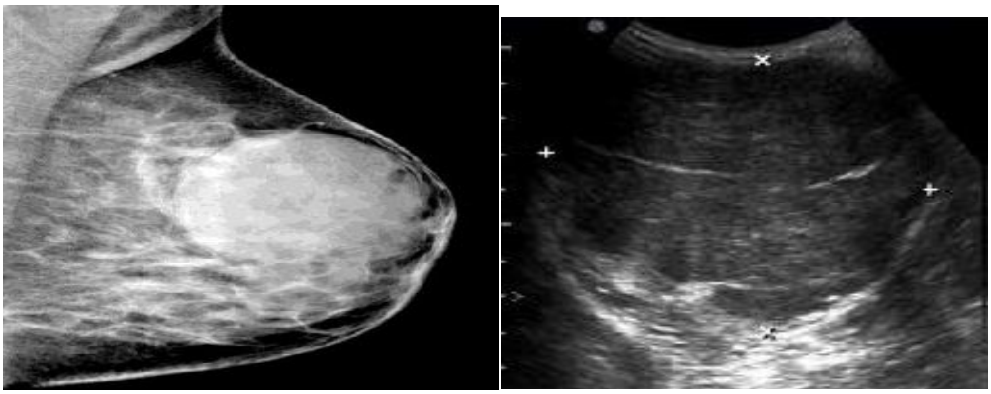


Figure *2.8:* U/S image showBreast cyst

2.2.7 Fibro adenoma:

Fibro adenoma is a well-demarcated benign fibro epithelial tumor with a relative balance between stromal and epithelial components. It contains elongated ducts surrounded by stroma (Werner 2006).



(A) (B)

Figure *2.9:*FA (A) mammogram (B) U/S (Waqaret al 2009).

2.2.8 Phyllodes tumor:

Phyllodes tumor applies to mixed epithelial-mesenchyme lesions with often a foliated structure, a double layered epithelial component and an overgrowth of the stromal component. The latter shows increased cellularity and proliferative activity, or even a sarcomata's appearance (Gokhale's 2009).

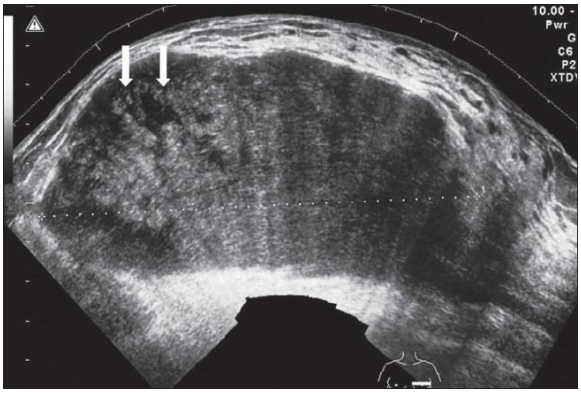


Figure *2.10:* U/S image showPhyllodes tumor (Gokhale's 2009).

2.2.10 Intra ductal Papilloma:

An intra-ductal Papilloma is a small, benign tumor that grows within the acini of the breast. It occurs most frequently in women 35 to 55 years of age (Sandra 2012).

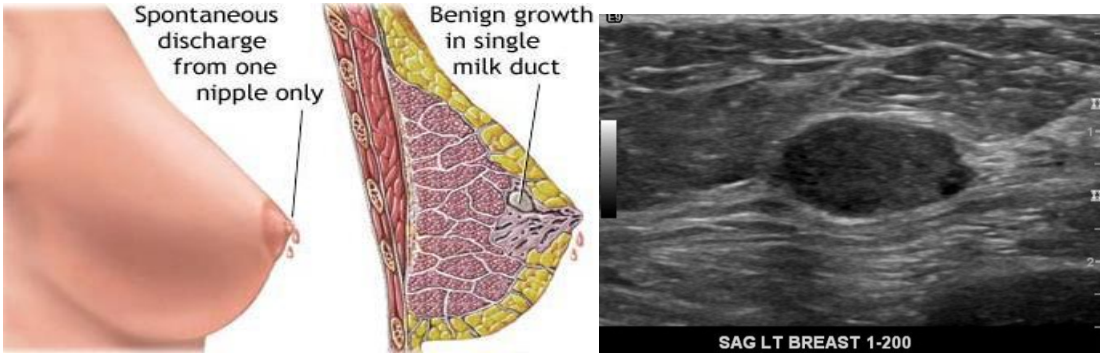
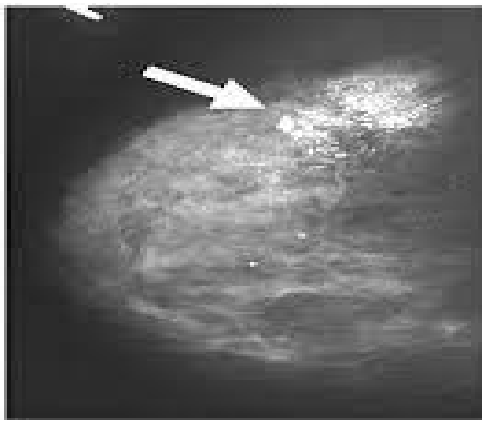


Figure *2.11*:U/Simage showIntraductal papilloma (Werner 2006).

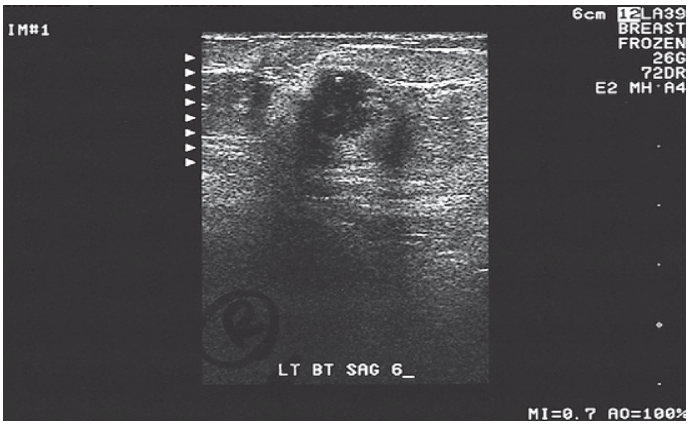
Specific pathology

2.2.11Ductal Carcinoma in Situ (DCIS):

DCIS is also known as intra ductal 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).



(A)



(B)

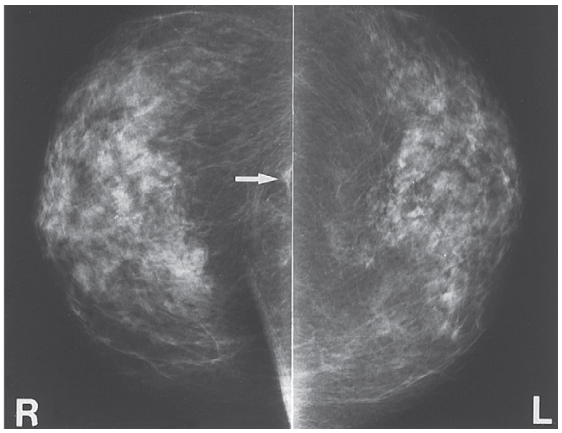
Figure *2.12:*DCIS (A) mammogram (B) U/S (Werner 2006).

2.2.12 Invasive Ductal Carcinoma (IDC):

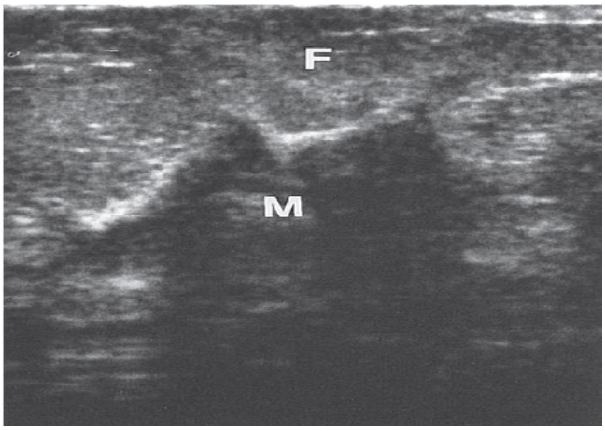
IDC accounts for nearly 80% of breast cancers. Similar to DCIS, these cancers begin in the ducts, but in contrast to DCIS, they invade the fatty tissue of the breastand have the potential to metastasize via the bloodstream or the lymphatic system (Sandra 2012).

2.2.13 Lobular Carcinoma:

Arise from the lobules classified into lobular carcinoma in situ and invasive lobular carcinoma (Carol 2005).



(A)



(B)

Figure *2.13:* Lobularcarcinoma (A) mammogram (B) U/S (Sandra 2012).

2.2.14 Papillary Carcinoma:

Papillary carcinoma is a tumor that initially arises as an intra-ductal mass. It may also take the form of an intra-cystic tumor, which is rare (Sandra 2012).

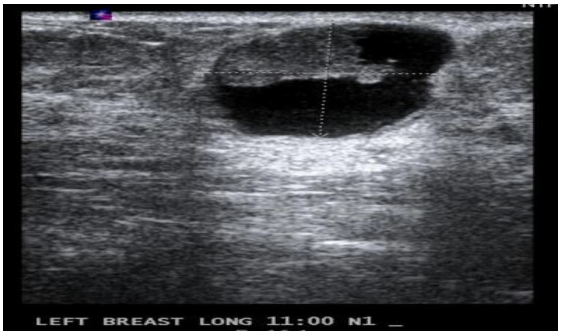


Figure *2.14:*Papillary breast carcinoma U/S (Prasad et al 2013).

2.2.15 Paget’s disease:

Paget’s disease arises in the retro areolar ducts and grows in the direction of the nipple, spreading into the intra epidermal region of the nipple and areola ,Any ulceration, enlargement, or deformity of the nipple and areola should suggest Paget’s disease (Sandra 2012).

Figure *2.15* shows Paget's disease (Prasad et al 2013).

2.3 diagnostic ultrasound of the breast:

Ultrasound is a non-invasive, non-painful technique performed with high frequency sound waves, unable to be heard by the human ear. The use of ultrasound in addition to clinical examination and mammography may result in an increased rate of breast cancer detection. USG is useful to differentiate cystic from solid abnormalities of the breast. 2.3.1 Equipment: Breast ultrasound requires the use of high-resolution ultrasound equipment. The sonographer must select the appropriate transducer for the area to be examined. Lower frequency transducers may be required for a large breast masses. The image first must be optimized using electronic focusing, overall gain, and time gain compensation (TGC) adjustment. The goal is to balance the image from the low-level echoes

of the subcutaneous fat to the low-level echoes of the retro mammary fat. This should result in an image that clearly shows all levels of the breast from the skin level through the echogenic breast core and the deeper echogenic chest wall layers. Moderate compression applied with the transducer during scanning will improve detail and decrease the depth of tissue (Carol et al 2011).

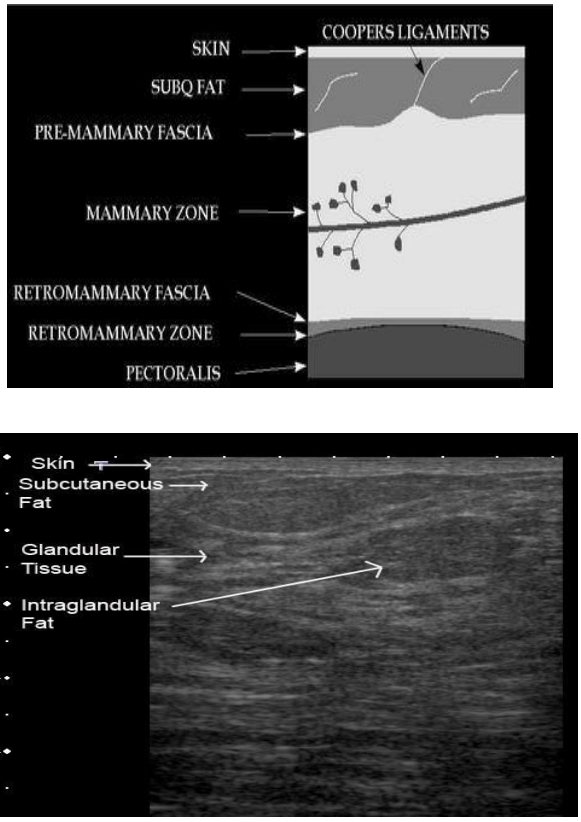


Figure *2.16:*Normal breast U/S (Carol et al 2011).

2.3.2 Positioning:

Patients are usually scanned in the supine position with the use of a hand-held, high-resolution transducer. The patient is positioned with her arm behind her head on the side of the breast to be examined. This spreads the breast tissue more evenly over the surface of the chest and provides a more stable scanning surface and easier access to the axilla. When the medial portion of the breast is scanned, a supine position works well. For the lateral margin of the breast, the patient can be rolled slightly toward the opposite side (approximately 30 to 45

degrees) andstabilized with a cushion under her shoulder and hips (Sandra 2012).

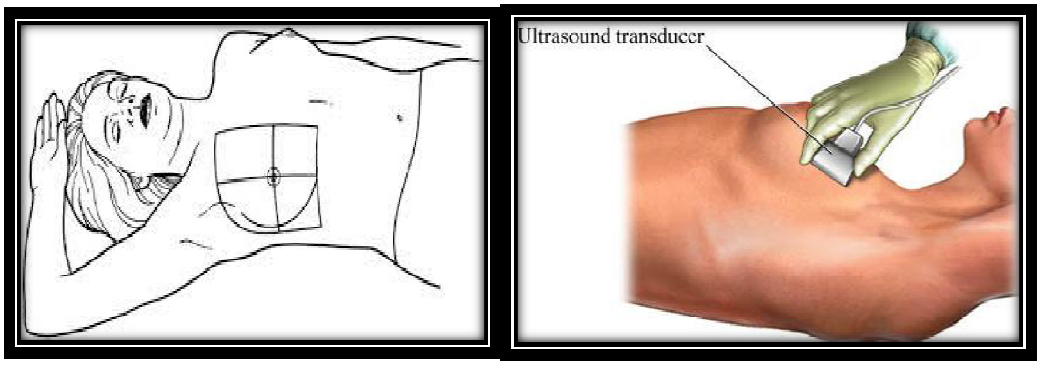


Figure *2.17:* Patient position for breast U/S (Sandra 2012).

2.3.3 Technique:

The most common scanning technique is to initially scan using the grid scanning pattern, followed by a radial (clock face) technique for the hard copy imaging.

2.3.3.1 Grid scanning pattern:

- Scan up and down the breast in rows, making sure you overlap each row slightly to ensure no breast tissue is overlooked.
- Begin in the upper outer quadrant, scanning in transverse. Slide inferiorly from top to bottom.
- Move across and repeat the sweep inferior to superior.
- Repeat this across the breast.
- Rotate into a sagittal plane and repeat the pattern.

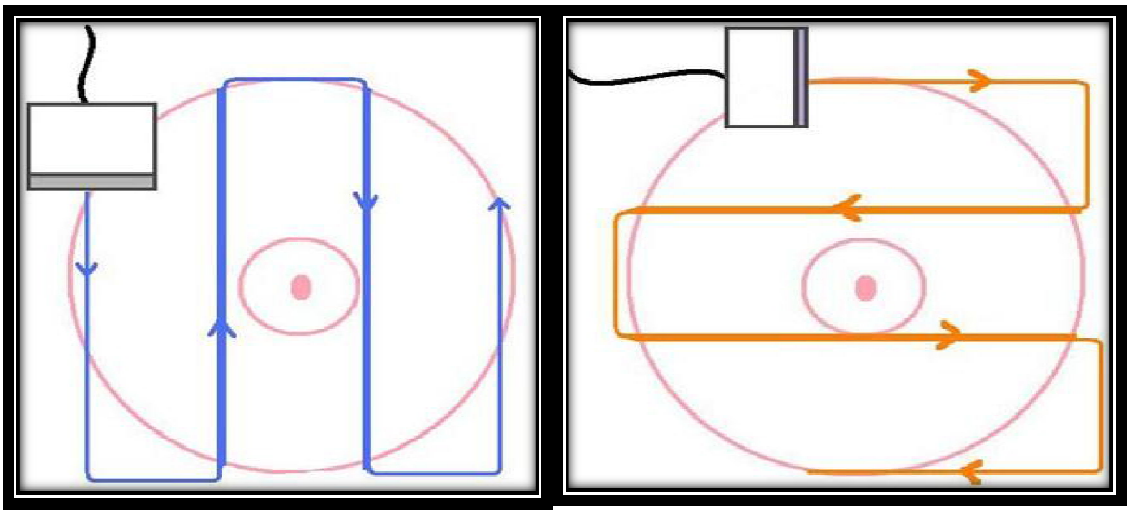


Figure *2.18:*Grid scanning pattern for breast U/S (Ultra sound paedia 2016).

2.3.3.2 Radial scanning pattern (Clock-face):

- The breast is scanned and described as a clock-face.
- Begin at 12 o'clock in a sagittal plane with the toe of the probe at the nipple.
- Scan by rotating the probe around the nipple.
- Depending on breast size, a second pass further from the nipple may be required.
- If pathology is identified, rotate the probe 90degrees in the 'anti-radial' plane (Ultrasound paedia 2016).

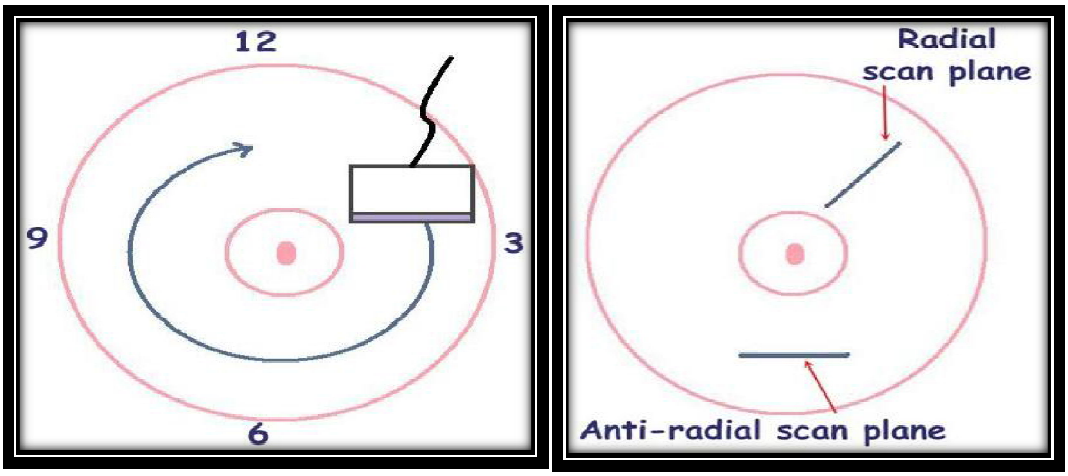


Figure *2.19:*Radial scanning pattern for breast U/S (Ultrasound d paedi 2016).

2.3.4 :Documentation:

Labeling son graphic images of the breast is extremely important in the identification and correlation of breast images with images from other modalities.

2.3.4.1Quasi-grid pattern:

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.

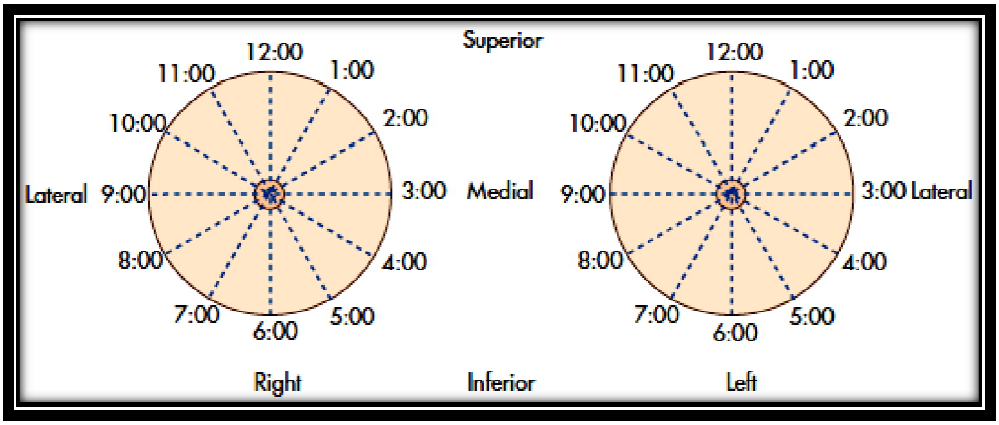


Figure *2.20:*Quasi-grid pattern (Sandra 2012).

2.3.4.2Clock method:

Many imaging centers will further subdivide the breast with three concentric circles, with the center being the nipple. The first ring circles one third of the breast tissue, encompassing the area just outside the nipple, or zone 1. The second ring is about two thirds of the breast surface from the nipple, or zone 2. The final ring is to the breast periphery, or zone 3. Lesions located close to the nipple are labeled “A,” lesions in the middle of the breast are labeled “B,” and lesions located at the outer margin of the breast are labeled “C” (Sandra 2012).

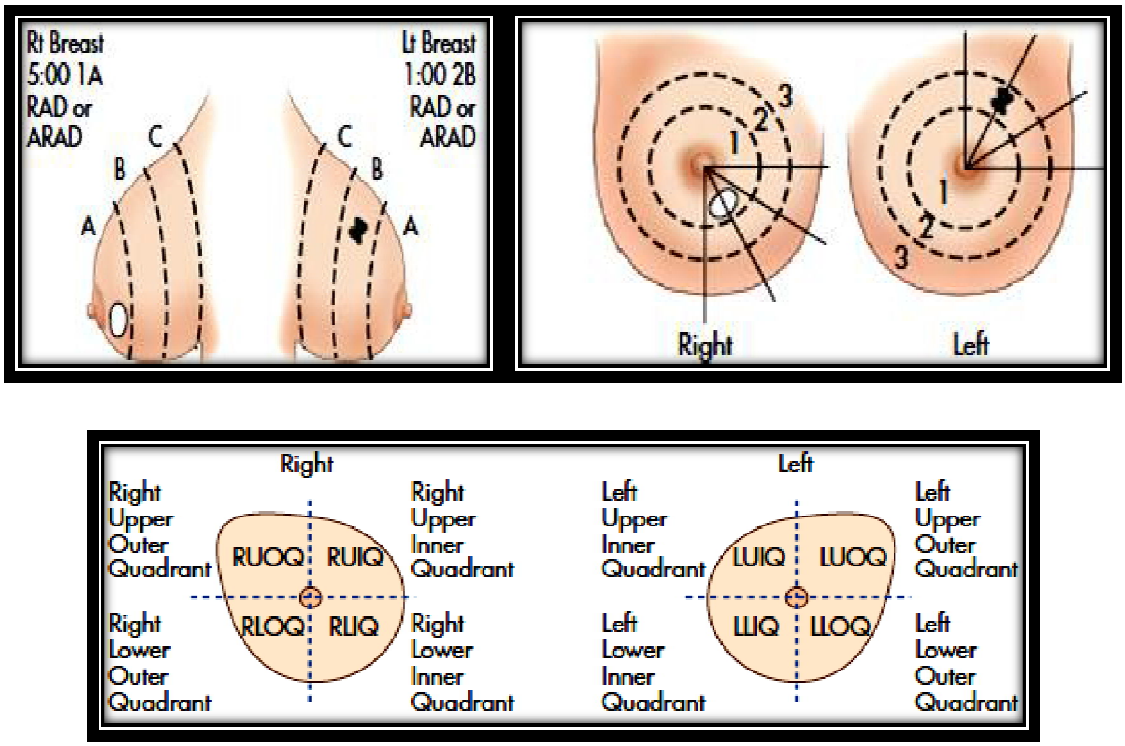


Figure *2.21:*Breast anatomy is described by two methods: the quadrant method (right/left, upper/lower, and inner/outer quadrants) and the clock face method (Sandra 2012).

2.3.4.3Depth labeling:

Finally, the depth of any pathologic condition is documented. The breast again is divided into thirds from the skin to the pectorals major. Depth A is the most superficial third of the breast, depth B is the middle layer, and depth C is the deepest third of the breast. Superficial lesions located close to the skin surface

are labeled “1,” lesions in the middle of the breast are labeled “2,” and deeper lesions located toward the chest wall are labeled “3” (Sandra 2012).

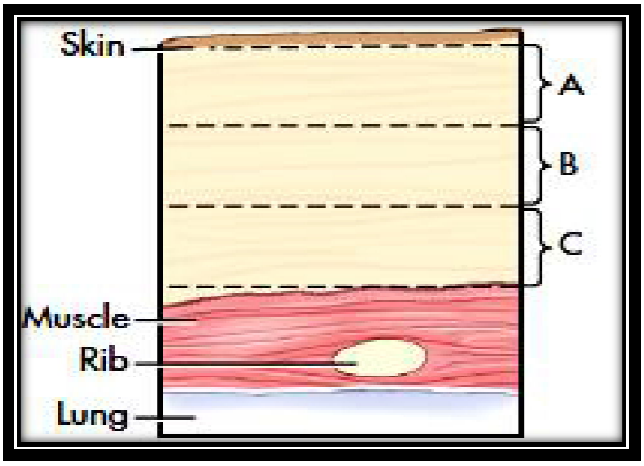


Figure *2.22:* Labeling of breast lesion depth (Sandra 2012).

2.4 Previous study:

Study done by **ShaliniSaraswat**(2014), inMoradabadstudy aimed to evaluate the characterization of breast lumps. With complementary X-ray mammography and USfor further evaluation and diagnosis of breast masses, Histo pathological confirmation was done in all the cases by FNAC/ excision biopsy. And thus avoids unnecessary breast surgeries in benign conditions study, samples were 64 patients with ultrasound findings in various breast lumps and pathologies. Study revealed distribution of lesions was found to be Fibro adenoma (31.1%), Breast cyst (20.7%), Intra ductal papilloma (5.2%), Lipoma (3.4%), Breast abscess (3.4%), Galactocele (3.4%), Cyst sarcoma phyllodes (3.4%), Hamartoma Fibro Aden Lipoma (3.4%) & Fat necrosis (3.4%), Invasive ductal carcinoma (17.4%), Invasive lobular carcinoma (5.2%).

Study done by**Deise Santiago** in Brazil from November 2008 to August 2012. to detect the breast cancer features in women under the age of 40 years Study Objective is to describe the clinical features, imaging findings and pathological aspects of breast cancer diagnosed in women under the age of 40 years, (120)

patients were included, of whom 112 underwent mammography, 113 underwent ultrasonography, and 105 underwent magnetic resonance imaging (MRI). The histo pathological data was obtained in most cases from post-surgical analysis, which was available for 113 patients;the mean age at diagnosis of primary breast cancer was 34 years. Only 11 patients (9.0%) had a family history of breast or ovarian cancer in first-degree relative. (92) Patients sought medical attention after showing breast symptoms, and the presence of a palpable nodule was the main complaint. (122) primary tumors were diagnosed, of which 112 were invasive (95%). The most common histological type was invasive ductal carcinoma (73.8%). Luminal B was the predominant molecular subtype (42.6%). Ultrasonography was positive in 94.5% of the cases and the most common finding were nodules (94.8%).: Most cases of breast cancer diagnosed in patients under the age of 40 years, in that population, had symptoms at diagnosis and tumor with more aggressive biological behavior.

Katrina N.Glazebrook, the study enrolled2, 809women from 21site (in the United States, Canada, and Argentina) between Aprils 2004and February 2006 the average age of participants at enrollment was 55years. Of the 2,637eligible participant for whom the investigators have been able to compile complete set of date, 1,400(53%)had personal history of breast cancer and 1,812(69%)had a family history of breast cancer.

Cancer was diagnosed in 1.5%of eligible study participants (40women) with complete data ,did the combination of mammography and ultrasound discover more cancer than mammography alone ,mammography alone showed 20cancer (50percent of all cancer detected)for cancer detection rate of 7.6per 1.000 women screened ,the combination of both exam revealed 31cancer (78percent of all cancer detected)for a cancer detection rate of 11.8 cancer per 1,000women screened.

Sandra L. Hagen-Ansert and M. Elizabeth Glenn2012Shown If a mass measures longer in the antero posterior dimension (height) than in the transverse or sagittal plane (width), it has a vertical orientation, is usually described as “taller-than-wide,” and is suspicious for malignancy. Malignant lesions tend to be highly hypo echoic relative to fat and usually have weak internal echoes. Malignant tumors are often stone hard and irregular with a gritty feel. posterior acoustic shadowing, non-compressible and hyper vascular.

Chapter Three

3. Materials andMethod

3.1 Materials:

3.1.1 Machine:

All patients where scanned on philipHD7ultrasound machine using linear high frequency transducer (7.5-12 MHz) and curve linear transducer (5MHZ) for large masses assessment.

Figure 3.1:philipHD7u/s machine

3.1.2 Patient:

Study cases were 50 pathological confirmed breast cancer that underwent US examinations. They were all female, age29-79 years. All cases had single breast lesion.

3.1.2.1Study design:

This study was a descriptive study.

3.1.2.2Study area:

Sudanesepopulation.

3.1.2.3Place of study:

This study will be conducting in two hospitals Zein medical complex and Dar Ale lagHospital.

3.1.2.4Inclusion criteria:

- Female aged between 29 years old to 79 years old
- Menopausal or menstrual female.
- Female with or without family history of breast cancer.
- Female with or without symptoms

3.1.2.5 Exclusion criteria:

. Women younger than 29 years old or above 79 years old should be exuded in this study.

3.1.2.6 Duration of study:

This study was in period from December 2016 to February 2017.

3.1.2.7Analysis of data:

All dose parameters will registered from Data collection sheet , then used as input to the Microsoft excel and SPSS software for analysis.

3.1.2.8Sample size:

50 patients (female) at age from (29-79) years old.

3.2 Method:

USG examination of 50 cases of pathological confirmed (FNA, Core biopsy & excisional biopsy), breast cancer was done by an expert Sonologist.

The department of radiology and the sonographic findings of the lesions were analyzed.

3.2.1 Technique:

The area for evaluation was fixed and skin adequately lubricated to facilitate ultrasound transmission. The transducer was gently applied and both longitudinal and transverse scans were taken.

3.2.2 Image interpretation:

The scans included sonographiclly information regarding the shape, margins, width antero-posterior, echogenicity, texture, lactate, parity , family history ,invasive lymph node.

Chapter Four

4. Results

4.1Results:

This study includes 50 patients aged between 29-79years all were complaining of breast lump, the results of ultrasonic examination were as follows:

Table 4.1: Shows age frequency:

Age groups	Frequency	Percent	Valid Percent	Cumulative Percent
25-40	7	14.0	14.0	14.0
41-55	25	50.0	50.0	64.0
56-70	12	24.0	24.0	88.0
71-85	6	12.0	12.0	100.0
Total	50	100.0	100.0	

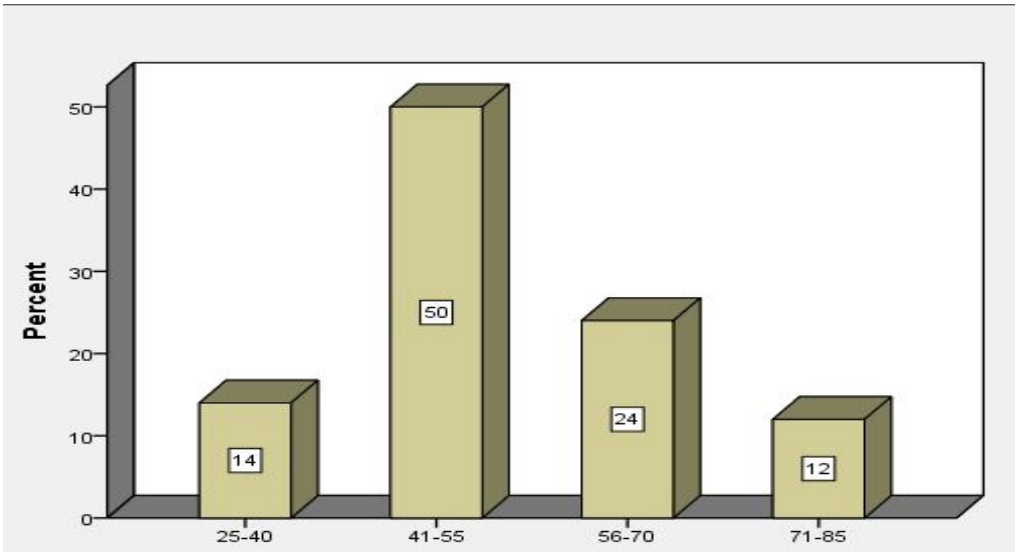


Figure 4.1shows Age distribution

Table 4.2: Shows lesion lengthmeasure in (cm) presented as frequency and percent

Lesion length(cm)	Frequency	Percent	Valid Percent	Cumulative Percent
1	6	12.0	12.0	12.0
2	11	22.0	22.0	34.0
3	12	24.0	24.0	58.0
4	9	18.0	18.0	76.0
5	3	6.0	6.0	82.0
6	3	6.0	6.0	88.0
7	1	2.0	2.0	90.0
8	2	4.0	4.0	94.0
9	1	2.0	2.0	96.0
10	2	4.0	4.0	100.0
Total	50	100.0	100.0	

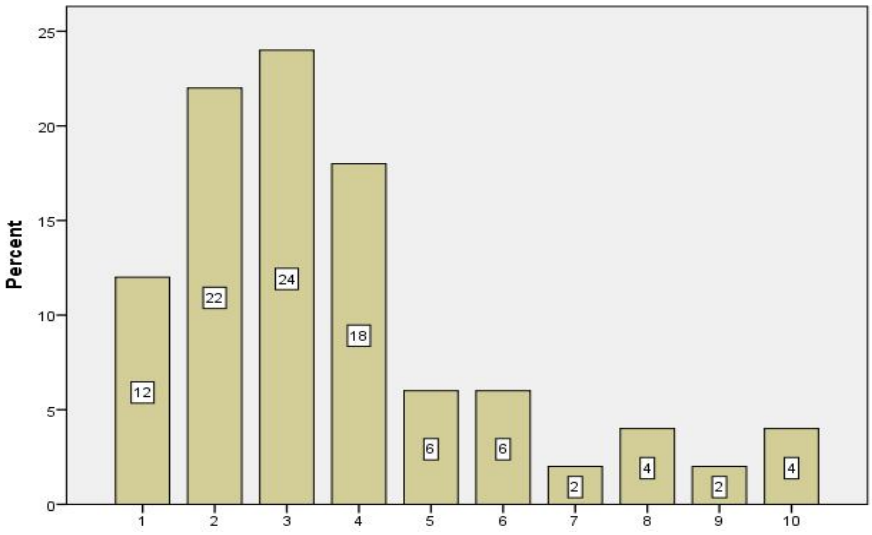


Figure 4.2lesion length measure in (cm) presented as frequency and percent

Table 4.3: Shows lesion width measure (cm) presented as frequency and percentage

Lesion widthmeasure (cm)	Frequency	Percent	Valid Percent	Cumulative Percent
0	1	2.0	2.0	2.0
1	8	16.0	16.0	18.0
2	19	38.0	38.0	56.0
3	7	14.0	14.0	70.0
4	7	14.0	14.0	84.0
5	3	6.0	6.0	90.0
6	1	2.0	2.0	92.0
7	2	4.0	4.0	96.0
10	1	2.0	2.0	98.0
11	1	2.0	2.0	100.0
Total	50	100.0	100.0	

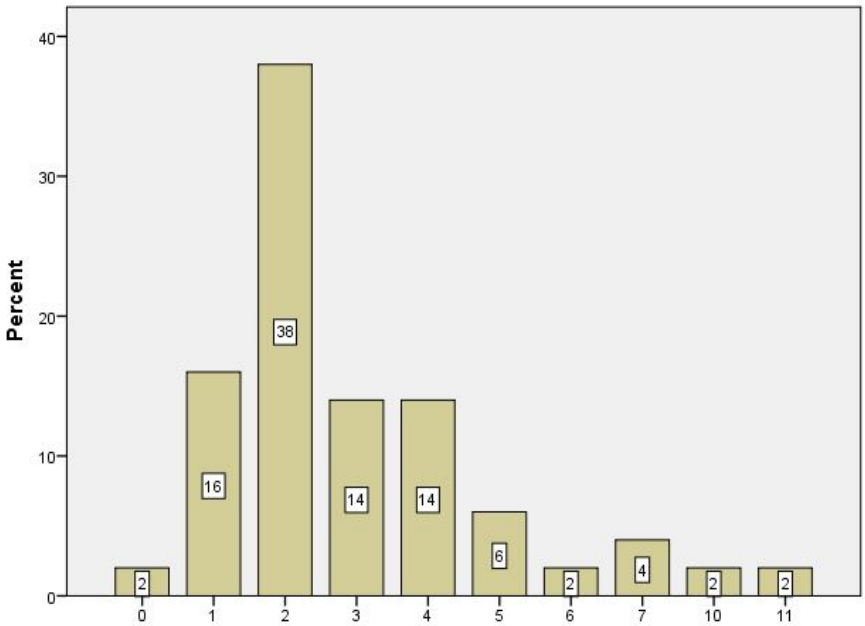


Figure 4.3 Shows lesion width measure presented as frequency and percentage

Table4.4: Shows distributed of mass according to breast side present as frequency and percent

Breast side	Frequency	Percent	Valid Percent	Cumulative Percent
Right breast	24	48.0	48.0	48.0
Left breast	26	52.0	52.0	100.0
Total	50	100.0	100.0	

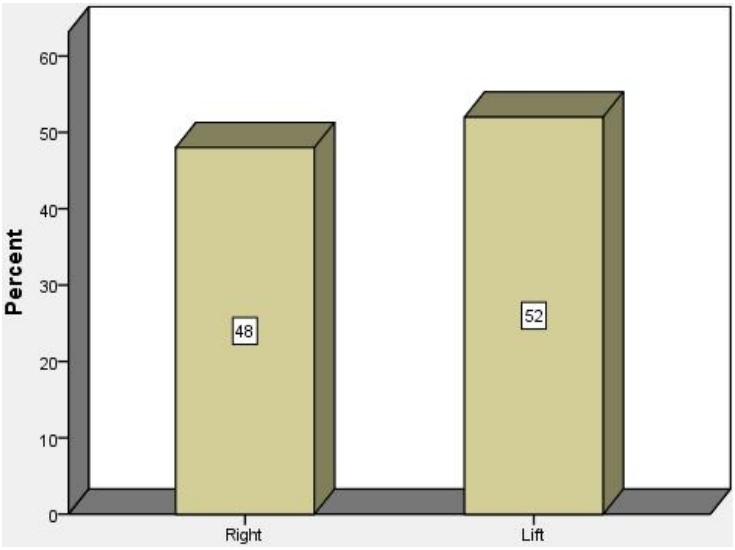


Figure 4.4 tumor breast side distribution

Table 4.5: Shows change of masses according to echogenicity present as frequency and percent

Echogenicity	Frequency	Percent	Valid Percent	Cumulative Percent
Hyper Echoic	1	2.0	2.0	2.0
Hypo Echoic	49	98.0	98.0	100.0
Total	50	100.0	100.0	

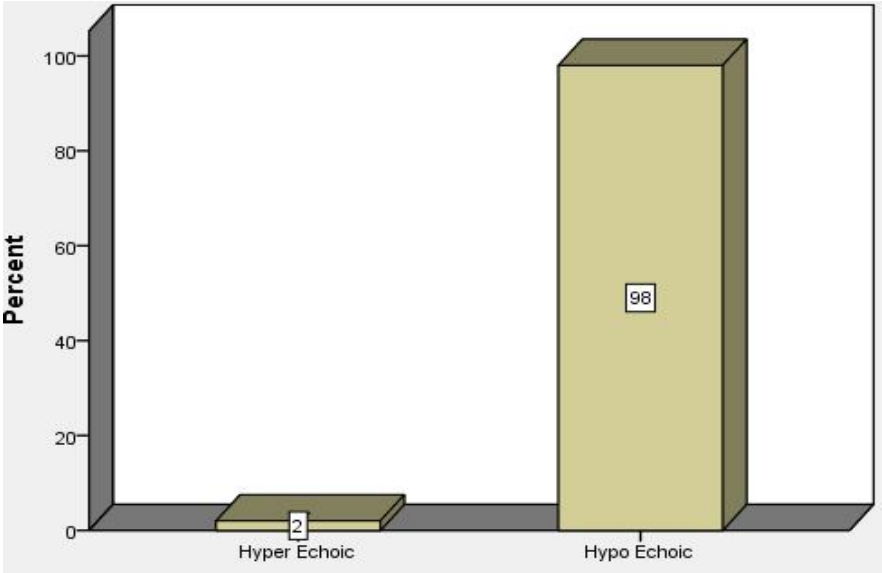


Figure 4.5change of masses according to echogenicity present as frequency and percent

Table 4.6: Shows change of masses according to echo texture present as frequency and percent

Echo texture	Frequency	Percent	Valid Percent	Cumulative Percent
Homogenous	4	8.0	8.0	8.0
Heterogeneous	46	92.0	92.0	100.0
Total	50	100.0	100.0	

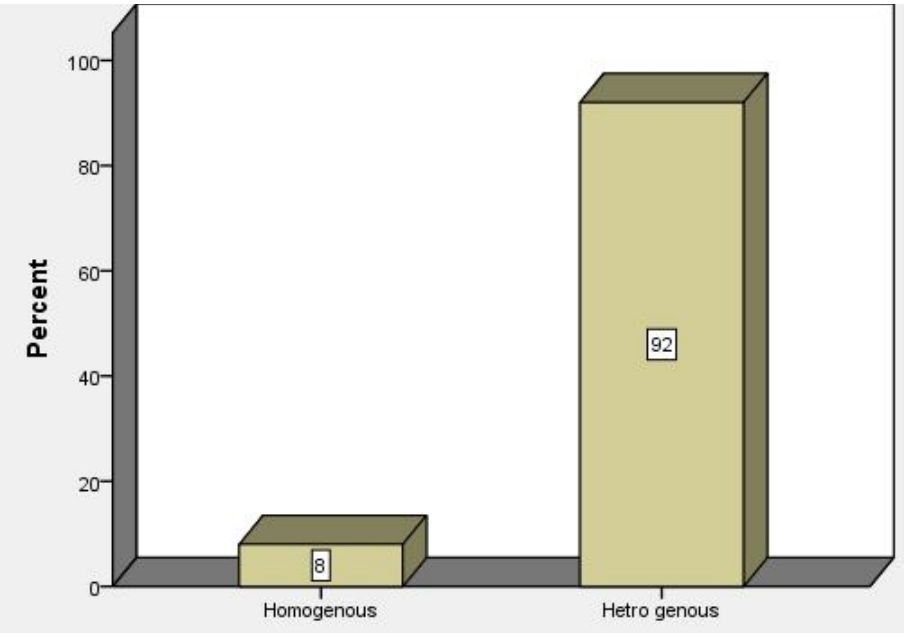


Figure 4.6 change of masses according to echo texture present as frequency and percent

Table 4.7: Showschange of masses according to shape

Shape of masses	Frequency	Percent	Valid Percent	Cumulative Percent
Rounded	5	10.0	10.0	10.0
Lobule	7	14.0	14.0	24.0
Irregular	38	76.0	76.0	100.0
Total	50	100.0	100.0	

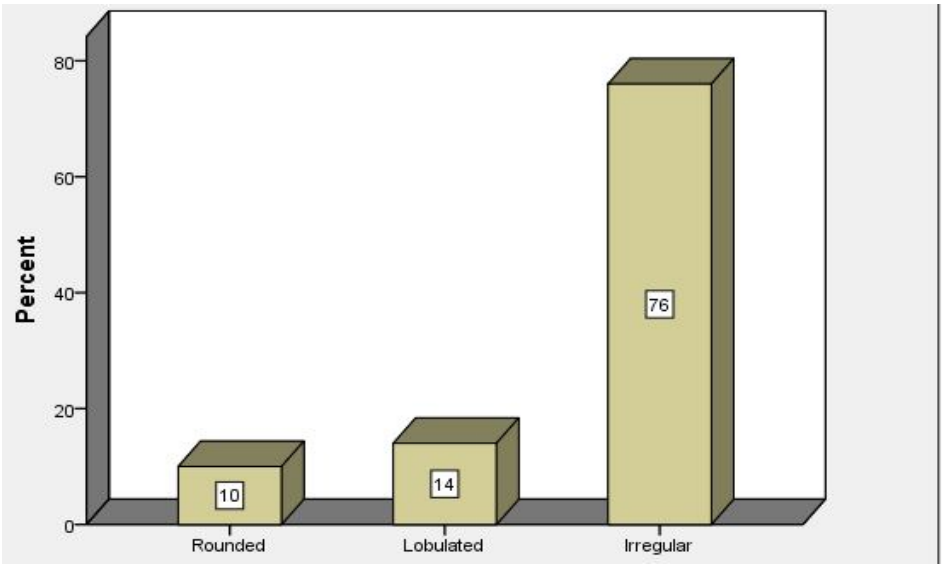


Figure4.7 change of masses according to shape

Table 4.8: Shows change of the sample according to lactation breast

The breast	Frequency	Percent	Valid Percent	Cumulative Percent
Not lactate	45	90.0	90.0	90.0
Lactate	5	10.0	10.0	100.0
Total	50	100.0	100.0	

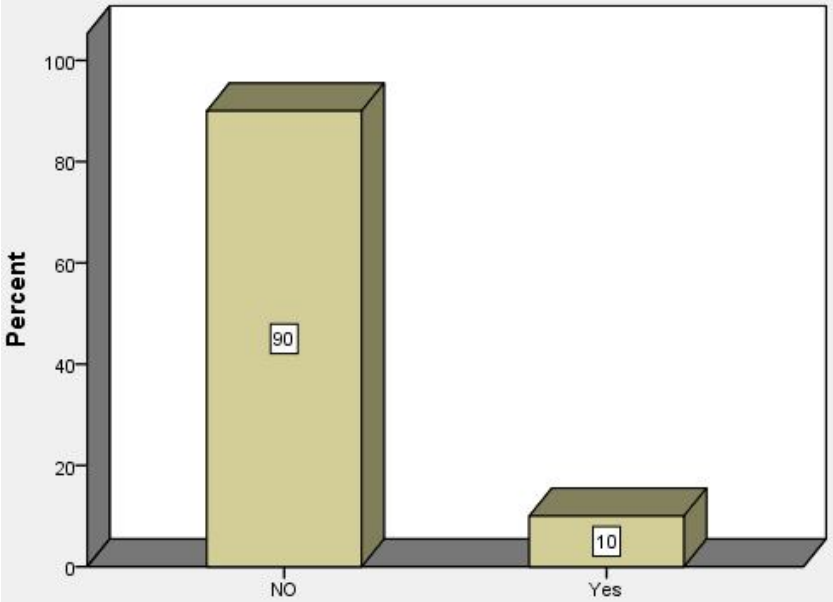


Figure 4.8 change of the sample according to lactation breast

Table 4.9: Shows change of sample and parity

Parity	Frequency	Percent	Valid Percent	Cumulative Percent
Null Para	30	60.0	60.0	60.0
Multi Para	20	40.0	40.0	100.0
Total	50	100.0	100.0	

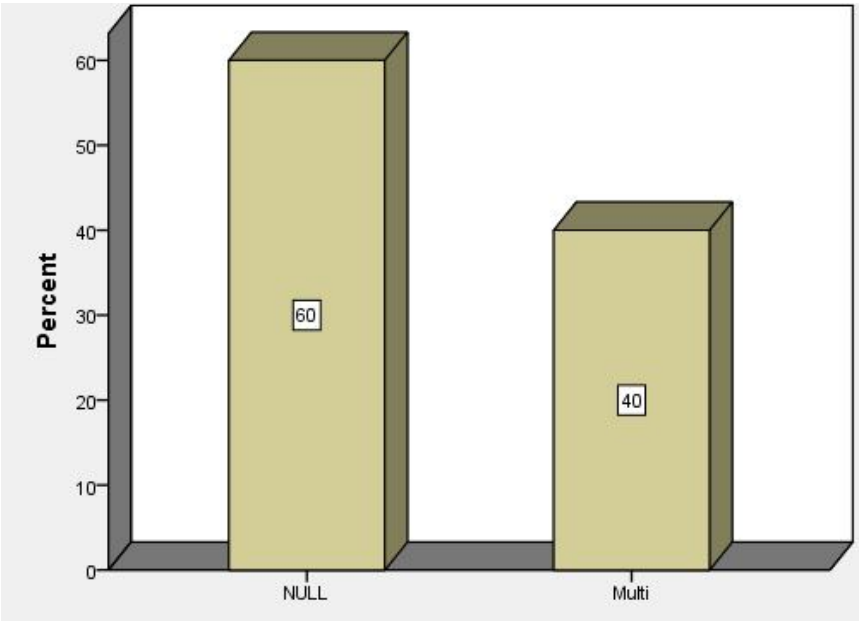


Figure 4.9change of sample and parity

Table 4.10: Shows change of sample and family history

Family history	Frequency	Percent	Valid Percent	Cumulative Percent
NO	20	40.0	40.0	40.0
Yes	30	60.0	60.0	100.0
Total	50	100.0	100.0	

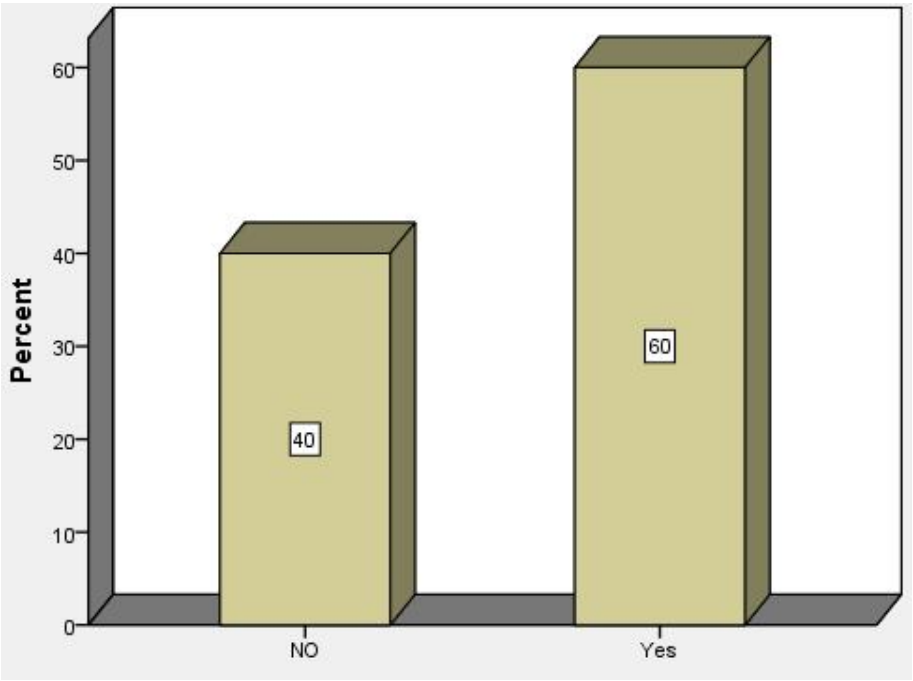


Figure 4.10 change of sample and family history

Table 4.11: Shows change of sample according to invasive of masses to lymph node

Lymph node	Frequency	Percent	Valid Percent	Cumulative Percent
NO	22	44.0	44.0	44.0
Yes	28	56.0	56.0	100.0
Total	50	100.0	100.0	

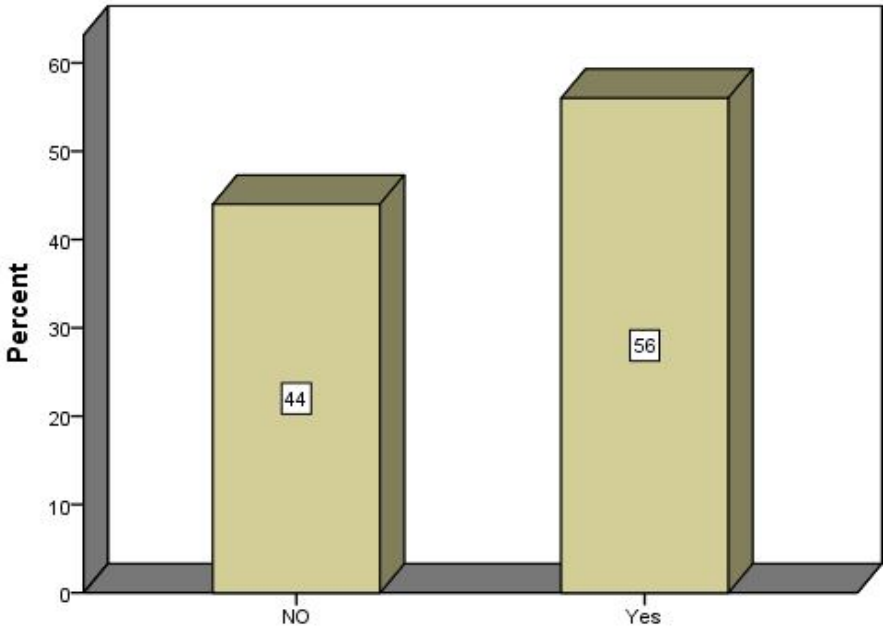


Figure 4.11change of sample according to invasive of masses to lymph node

Table.4.12: Show cross tabulation between age and breast side

Age	Side		Total
	Right	Left	
25-40	2	5	7
41-55	16	9	25
56-70	4	8	12
71-85	2	4	6
Total	24	26	50

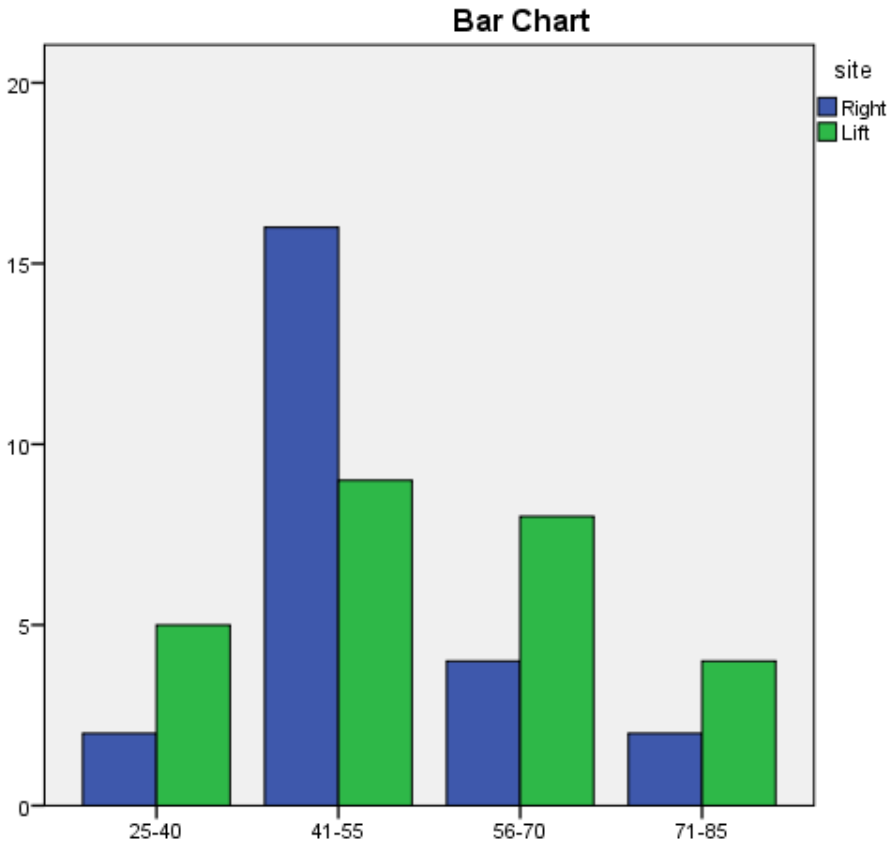


Figure 4.12: show cross tabulation between age and breastside

Table. 4.13: Show Cross tabulation between age and shape

Age	Shape			Total
	Rounded	Lobulated	Irregular	
25-40	0	0	7	7
41-55	4	5	16	25
56-70	1	1	10	12
71-85	0	1	5	6
Total	5	7	38	50

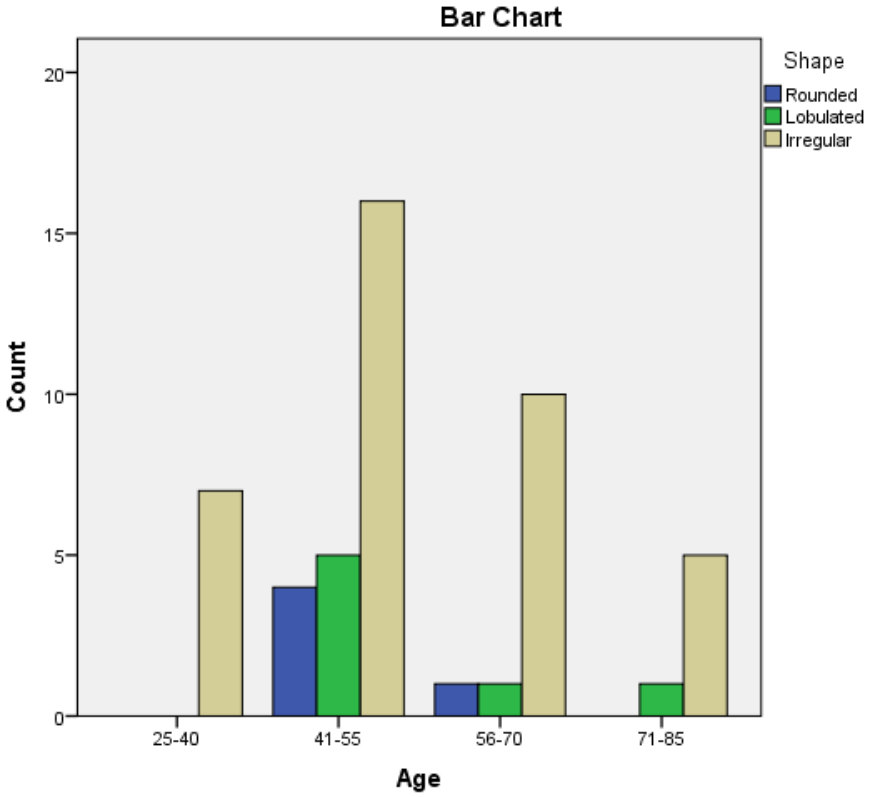


Figure.4.13show cross tabulation between age and shape

Table:4.14show cross tabulation between age and texture

Age	Texture		Total
	Homogenous	Heterogeneous	
25-40	1	6	7
41-55	1	24	25
56-70	0	12	12
71-85	2	4	6
Total	4	46	50

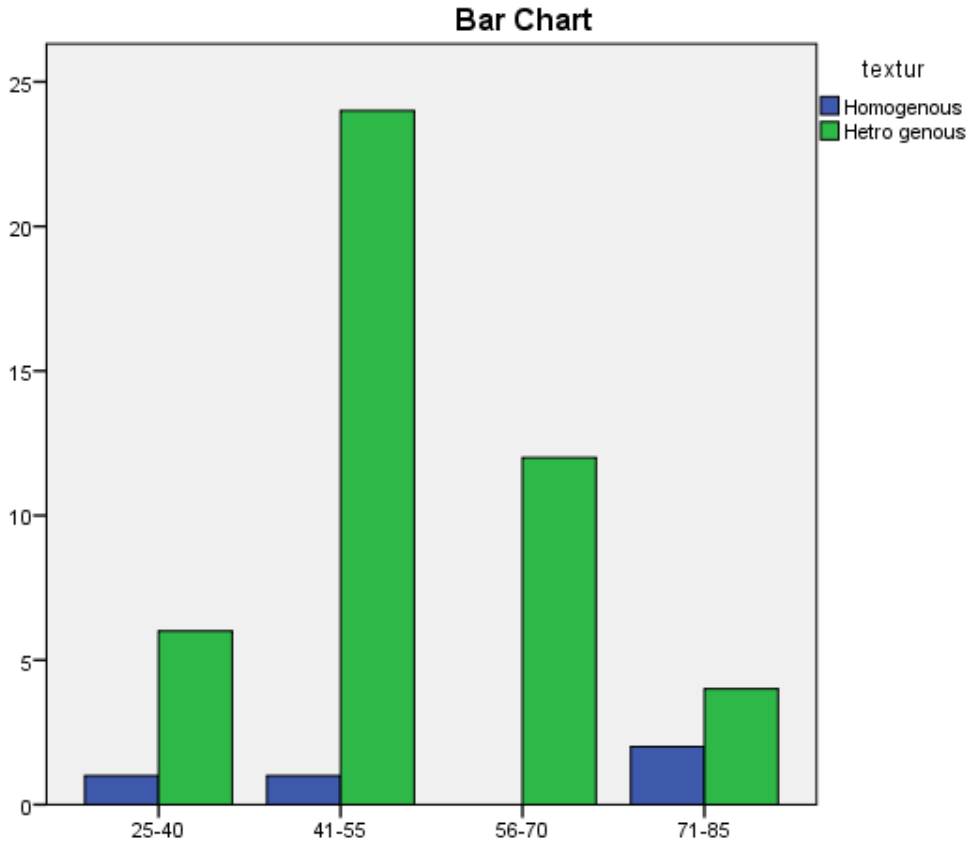


Figure.4.14: show cross tabulation between age and texture

Table .4.15: Show Cross tabulation between age and mass echogenicity

Age	Echogenicity		Total
	Hyper Echoic	Hypo Echoic	
25-40	0	7	7
41-55	1	24	25
56-70	0	12	12
71-85	0	6	6
Total	1	49	50

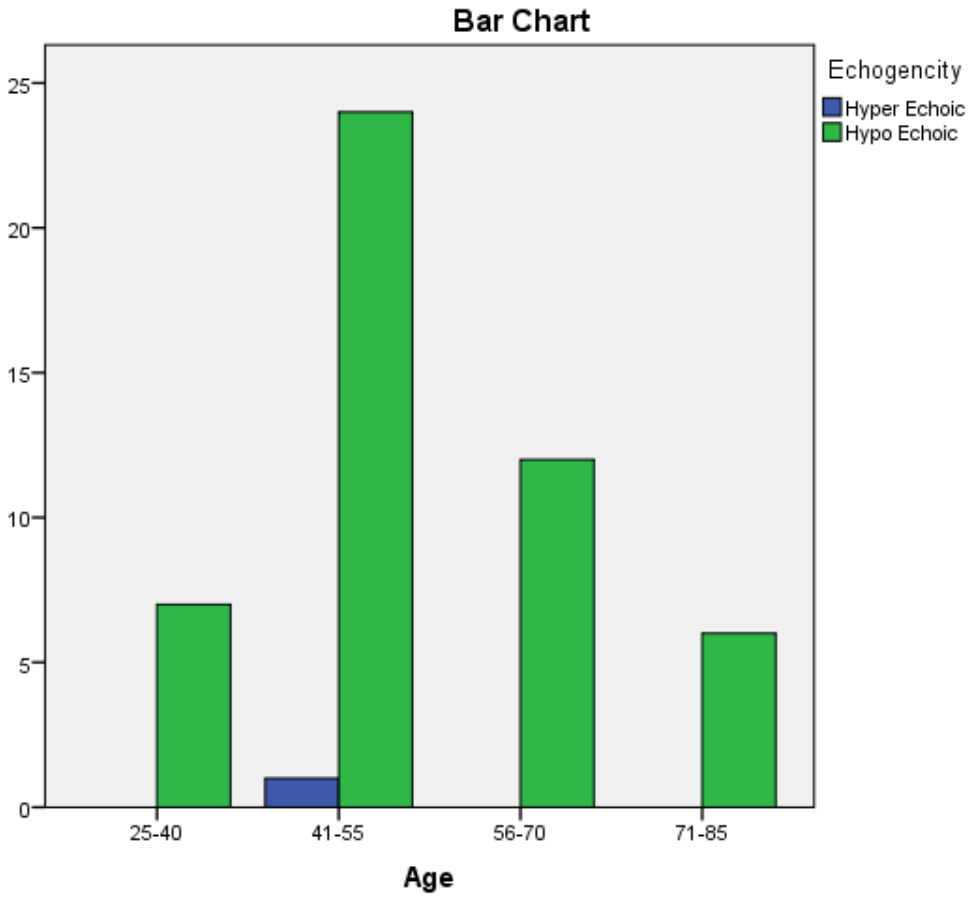


Figure.4.15:show cross tabulation between age andmass echogenicity

Table .4.16: ShowCross tabulation between age and family history

Age	Family history		Total
	NO	Yes	
25-40	0	7	7
41-55	7	18	25
56-70	7	5	12
71-85	6	0	6
Total	20	30	50

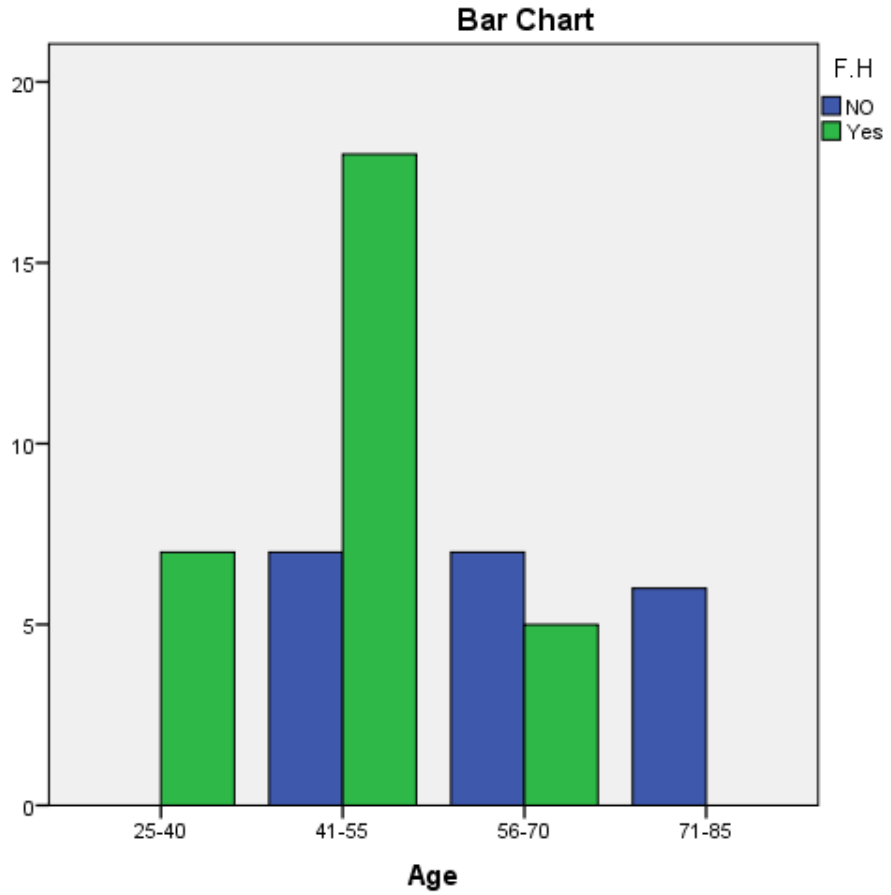


Figure .4.16:show cross tabulation between age and family history

Table .4.17: Show Cross tabulation between age and invasive masses to lymphnode

Age	L.N		Total
	NO	Yes	
25-40	2	5	7
41-55	12	13	25
56-70	5	7	12
71-85	3	3	6
Total	22	28	50

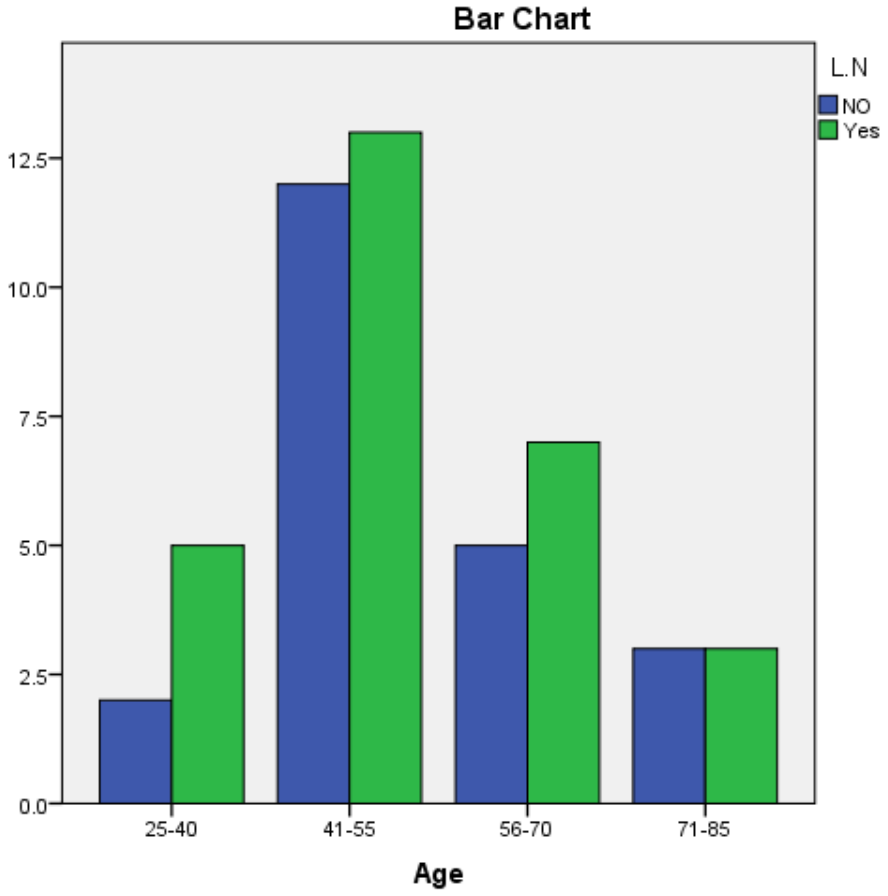


Figure .4.17: show cross tabulation between age and lymph node

Table 4.18: Shows ANOVA

		Sum of Squares	D f	Mean Square	F	P. value
Masses length	Between Groups	131.667	27	4.877	.846	.664
	Within Groups	126.833	22	5.765		
	Total	258.500	49			
Masses width	Between Groups	80.147	27	2.968	.427	.981
	Within Groups	152.833	22	6.947		
	Total	232.980	49			
Side	Between Groups	8.447	27	.313	1.706	.102
	Within Groups	4.033	22	.183		
	Total	12.480	49			
Texture	Between Groups	3.180	27	.118	5.182	.000
	Within Groups	.500	22	.023		
	Total	3.680	49			
Parity	Between Groups	7.367	27	.273	1.295	.270
	Within Groups	4.633	22	.211		
	Total	12.000	49			
L.N	Between Groups	5.287	27	.196	.612	.887
	Within Groups	7.033	22	.320		
	Total	12.320	49			
Shape	Between Groups	7.687	27	.285	.463	.971
	Within Groups	13.533	22	.615		
	Total	21.220	49			

Chapter five

5. Discussion, conclusion and recommendations

5.1discussion:

Breast cancer are common tumors, detailed descriptions of their sonographic appearances are necessary for differential diagnosis from other benign lesions .

This study investigated 50cases of breast cancer confirmed by histopathology examination (FNA, Core biopsy & excisional biopsy), the lumps underwent ultrasound scan done by Sonologist 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 50 patients their age between (29-79 years),Table (4.1) shows the age distribution were the range of (41-55) was more frequently (25) with 50% ,while range of (71-85) was lower frequently (6) with (12%) as shown in figure (4.1)our study is not confirm withStudy done by**Deise Santiago** thatshown the mean age at diagnosis of primary breast cancer was 34 years this differ refer to small sample size in our study and late discover of cancer in my country. Table (4.2) shows masses length of (3 cm) frequently (12) with (24%) ,while tumor length of (7 and 9cm) represent lower frequently of one (2%) as shown in figure (4.2), Table (4.3) shows the masses width of(2cm) frequently (19) with (38%),the lower width was (6,10,11cm) frequently one with (2%) as shown in figure (4.3). In accordance with previous results which showed that if a mass measures longer in the antero posterior dimension (length) than in the transverse or sagittal plane (width), it has a vertical orientation, is usually described as “taller-than-wide,” and is suspicious for malignancy.***M . Elizabeth Glenn2012*** The present study confirmed this observation .Table (4.4) shows the side frequency with most detected breast mass found in the left side frequently (26) with (52%) while in the right breast frequently (24) with(48%), as shown in figure (4.4). Malignant lesions tend to be highly hypo echoic relative to fat and usually have weak

internal echoes***Sandra L. Hagen-Ansert*** .this study is confirm our study in Table (4.5) shows echogenicity frequency the most appearance was hypo echoic frequently (49) with (98%) with less appearance of hyper echoic frequently (1) with (2%) as seen in figure (4.5). Echo texture commonly divided into homogenous and heterogeneous echo pattern, the heterogeneous texture may contain cystic areas or calcifications. In this study Table (4.6) shows texture frequency with high appearance of heterogeneous texture frequently (46) with (92%)while low appearance of homogenous texture frequently (4) with (8%) as shown in figure (4.6). Table(4.7) shows the shape frequency with irregular shape frequently (38) with (76%) while the lower shape rounded frequently (5) with (10%) ,as shown in figure (4.7) shape in our study confirm the study of ***Elizabeth Glenn*** inprevious studythat shown malignant tumors are often stone hard and irregular with a gritty feel.Table (4.8) shows lactate frequency with high percentage of non-lactating patient (90%) frequently (45) and (10%) frequently (5) of lactating patients as seen in figure (4.8), Table(4.9) shows the parity frequency with high frequency of null parity (30) (60%),while(20) (40%) were multi parity as shown in figure (4.9),In previous study the **Katrina N.Glazebrook**shown1,400**(**53%)had personal history of breast cancer and 1,812(69%)had a family history of breast cancer this study confirm our study in Table(4.10) shows family history frequency with frequently (30) have family history (60%),while frequently (20) with (40%) have no family history as mentioned in figure (4.10), Table (4.11) shows lymph node frequency with frequently (28) (56%) have lymph node while frequently (22) (44%) have no lymph node as shown in figure (4.11).Tables(4.12) (4.13) (4.14) (4.15) (4.16) 4.17)shows cross tabulation between age and masses side, shape ,echo texture, echo genicity ,family history and lymph node.According to p- value we found there are no significant relation between age and side ,shape, echogenicity,parity, family history and lymph node. but there are significant relation between echo texture and age.

5.2Conculsion:

Breast cancer is more common in the age between (41-55) years. The dominant sonographic presentation of breast cancer is a circumscribed taller than wider ,hypo echoic ,heterogeneous, irregular shape , presented in left side more than right side,non lactate women , woman with family history of breast cancer, Most breast cancer invasive to lymph node .

5.3 Recommendation:

1- Ultrasound is a simple, time saving tool for evaluation of breast masses. It should be the first investigation to be done in young females or pregnant women when mammography is not advisable.

2- The sonographic evaluation of a simple breast cancer with the typical sonographic features should eliminate the need for further invasive procedures including biopsy.

3- The role of ultrasound in the diagnosis of large breast masses needs further assessment.

4- Educating and training technologist sonographers and radiologists to perform optimum examination and correct interpreting are of prime importance.

5- The most profound limitation of the study was the small sample size. So we recommend that study with larger sample be considered.

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