

Chapter one

1-1 Introduction:

The gallbladder stores and concentrates the bile secreted by the liver. It is globular or pear-shaped organ with capacity of 50ml and consists of three parts: fundus, body and neck. It lies in the gallbladder fossa on the visceral surface of the right lobe of the liver. Adjacent to the quadrant lobe. (M.Y. Sukkar & M. year 2000).

The gallbladder is an ideal organ for sonography, the procedure is more cost effective than oral cholecystography, the diagnostic accuracy is said to be high (96%) , but less operators will not achieve this success .

From gallbladder diseases which have characteristic appearance with ultrasound: cholecystitis either a calculous which cause intensive echoes with obvious posterior shadows, tumors appear as a mass within the gallbladder or as diffuse shadow along the wall (Qurashi M.Ali 1993)

1-2 General objective of study:

To study of gallbladder lesions in Sudan using Ultra sound

1-3 Specific objectives of the study are to:

- Assess the gallbladder lesions in Sudan relation to sex and age.
- Evaluate ultrasound appearance of the gallbladder pathologies.
- Evaluate the gallbladder lesions in Sudan relation occupation and residence.

1-4 Problem of study:

Gallbladder disease helps clinicians assess morbidity and the presence of some hepatobiliary diseases.

1-5 Overview of the study:

Chapter (1): introduction

Chapter (2): Literature review: -

Anatomy, Physiology and pathology of the Gallbladder.

Chapter (3): Research methodology.

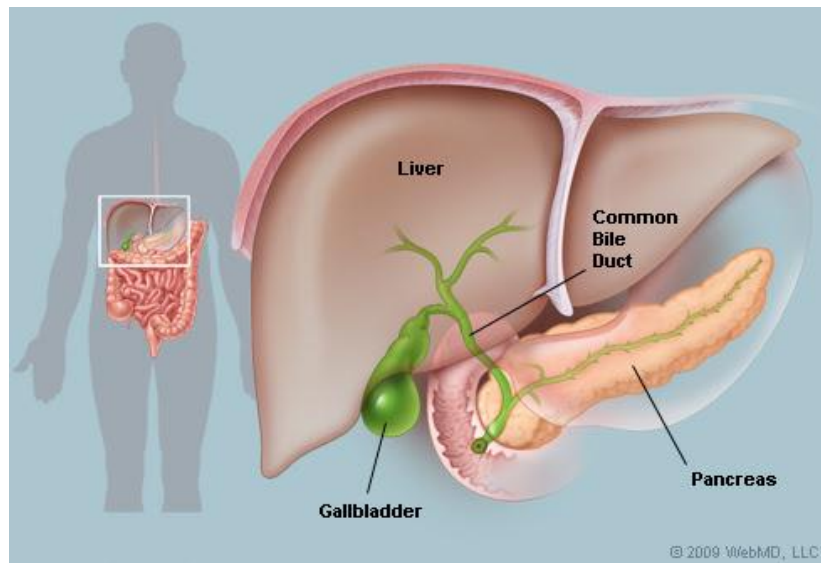
Chapter (4): The research results.

Chapter (5): Discussion, Conclusion and recommendations.

Chapter two

Literature review

2-1 Anatomy of the gallbladder:



Fig(2-1) Anatomy of the gallbladder

The gallbladder is part of a network of structures known collectively as the biliary tree which includes the cystic duct, the right and left hepatic ducts, and the common hepatic and common bile ducts, as well as a series of microscopic biliary vessels.

The gallbladder is pear-shaped organ located under the surface of the liver, bound by vessels, connective tissue, and lymphatics. The gallbladder has a surface epithelium, lamina propria, smooth muscle, subserosal connective tissue and serosa. The gallbladder lacks a muscularis mucosae and submucosa (**William F. 2001**).

- The luminal folds are lined by a single layer of columnar epithelium. The lamina propria contains loose connective tissue. The smooth muscle does not form well-developed layers. Only one muscularis is present.

- The adventitia consists of dense connective tissue, and is continuous with Glisson's capsule.

Rokitansky-Aschoff sinuses are herniations of the epithelium into the underlying muscle layer (**RICHARD SNELL 2003**).

Gallbladder has four regions: the **fundus**, **body**, **infundibulum**, and the **neck**. The gallbladder terminates in the cystic duct and then enters the extrahepatic biliary tree. The **fundus** is the round, blind edge of the organ. It is composed of fibrotic tissue and projects just beyond the right lobe of the liver. The fundus leads to the body of the gallbladder, the largest part. The superior surface of the body is attached to the visceral surface of the liver, unless a mesentery is present. This close relationship allows for the direct spread of inflammation, infection, or neoplasia into the liver parenchyma. The infundibulum is the tapering area of the gallbladder between the body and neck. This portion and the free surface of the **body** of the gallbladder lies close to the first and second portions of the duodenum, and in close proximity to the hepatic flexure and right third of the transverse colon. The infundibulum is attached to the right transverse colon surface of the second part of the duodenum by the cholecystoduodenal ligament. The neck of the gallbladder is 5–7 mm in diameter and often forms an s-shaped curve. It is superior and to the left, narrowing into a constriction at the junction with the cystic duct (**Chummy S. 1999**).

The cystic duct:

Represents the continuation of the gallbladder neck. It is about 2-3 cm long

And 2-3mm in diameter ,connects the neck of the gallbladder to the common hepatic duct to form the common bile duct, it is usually somewhat S-shape and descends for a variable distance in the right free margin of the lesser omentum. The mucous membrane of the cystic duct is raised to form spiral fold (spiral Valve)

which keeps the lumen constantly open. There are some variation in cystic duct fig(2-2).

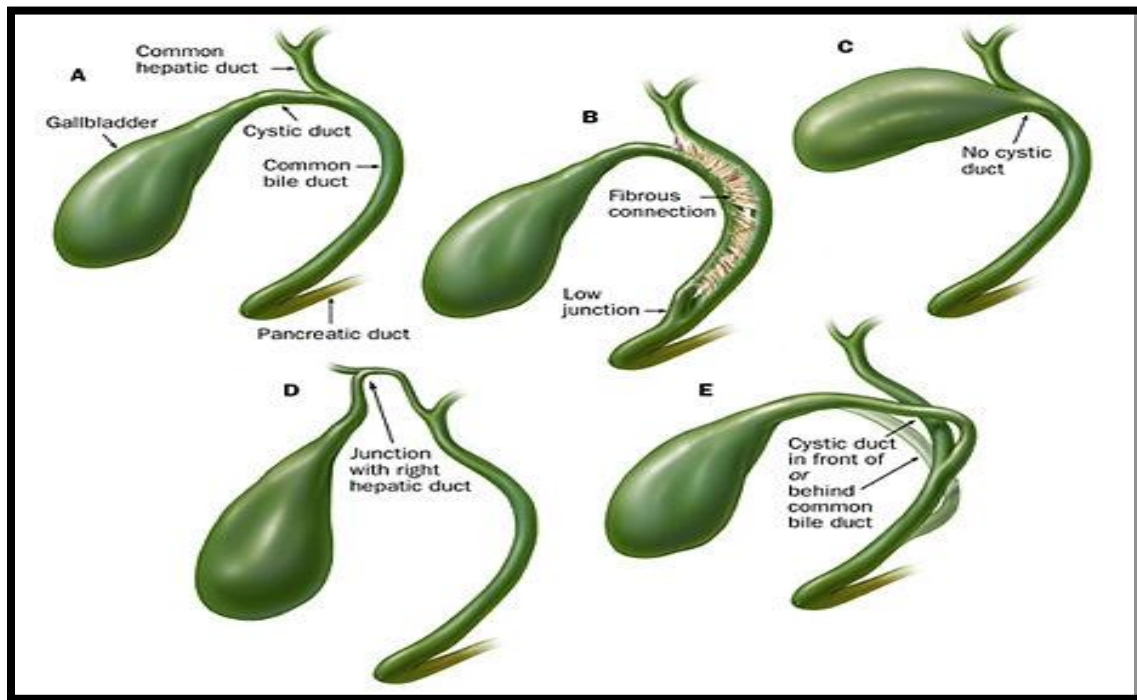


Figure (2-2): Variations in the anatomy of the gallbladder and biliary tree.

Common bile duct:

It is about 8cm long and 6cm in diameter, described in three parts: the (supra duodenal) third lies in the free edge of lesser omentum in front of the right margin of portal vein and right to hepatic artery. The middle (retro duodenal) third runs behind the first part of the right of gastro duodenal artery. the n lower (Para duodenal) third slop further to the right in groove between the back of the head of pancreas and the second part of duodenum, and in front of the right renal vein. Here it comes into contact with the main pancreatic duct.

The bile duct ends below by piercing the medial wall of the second part of duodenum, it usually joined by the main pancreatic duct, and open together into

the ampulla of Vater, the terminal part of both duct and ampulla are surrounded by circular muscle known as the sphincter of Oddi (**Chumma. S. 1999**).

2-1-1 Blood supply of the gallbladder

The gallbladder is supplied by the cystic artery which is usually a branch of the right hepatic artery. Variations in the origin of artery are common it may arise from the main trunk of the hepatic artery or from the gastroduodenal artery.

Venous drainage is by multiple small veins in gall bladder bed into the substance of liver and so into the hepatic veins. One or more cystic veins may be present. But are uncommon, they run from the neck of the gallbladder into the right branch of the portal vein. Cystic veins do not accompany the cystic artery.

Lymphatic drainage:

Lymphatic channels from the gallbladder drain to the porta hepatis to the epiploic foramen. From these nodes lymph passes to the coeliac group of preaortic nodes.

Nerve supply:

The nerve supply is from sympathetic and parasympathetic vagal fibers from the celiac plexus. (parasympathetic fibers stimulate contraction of the gallbladder and relax the ampullary sphincter. And sympathetic fibers inhibit contraction (**Chumma S 1999**)). **The gallbladder variation:**

- Variation in shape ovoid, spherical, elongated.
- variable position.
- prominent mucosal folds, pyloric cap
- absent gallbladder (rare).
- double gallbladder.

2-2 Physiology of the gallbladder

The function of the gallbladder is to provide a reservoir for the storage and concentration of bile.

Bile is viscous golden –yellow or greenish fluid secreted by the hepatocytes. Composed largely of bile salts, bile pigments and small amounts of organic materials such as cholesterol, lecithin, fatty acid and mucin. Bile salts are essential for the digestion and absorption of fat in the small intestine. Bile pigments are the end product of the breakdown of hemoglobin during the destruction of old red blood cells. Most of the bile secreted between meals is diverted to the gallbladder. Production of bile ranges from 250-1,000 mls per day, and is regulated by the concentration of bile salts in the blood, and the secretion of fluids in which bile salts are dissolved. The gallbladder is capable of storing approximately 50 mls of bile, and can increase the concentration of bile by five to tenfold. Contraction of the gallbladder is induced by cholecystokinin produced by the enter endocrine cells of the lining of the small intestine and is released in response to dietary fats in the small intestine . (M.Y. Sukkar &M. year2000).

Table (2--1) composition of human bile (mmol/liter).

	Hepatic Bile	Liver Bile
WATER	98.0%	89%
Total solids	2-4%	11%
Bile salts	26%	145
Bilirubin	0.7%	5.0
Cholesterol	26	16
Phospholipids(lecithin)	0.5	4.0
Na ⁺	145	130
K ⁺	5	12
Ca ²⁺	5	23
Cl ⁻	100	25
Hco ₃	28	10
Ph	8.3-0.3	7.3-0.3

2-2-1Neutralization of acid chime:

NaHCO_3 in Bile is responsible for alkaline reaction and participate with pancreatic and duodenal secretion in the neutralization of acid chyme delivered from stomach.

Fat digestion and absorption:

The bile salts are essential for the emulsification and absorption of fats. Since absorption of fat-soluble vitamins is closely related to the absorption of fats in general.

Bile salts are also important for the absorption of vitamins A, D, E and K, (the bile salts are sodium and potassium salts of bile acids synthesized in the liver from cholesterol).

Bile acids have negative feedback effect on the release of cholecystokinin hormone from the upper intestine cells and thus contribute to the regulation of pancreatic secretion and the discharge of bile into intestine (**M.Y. Sukkar M.S M 2000**).

2-2-2-Control of discharge of bile into the intestine:

Contraction of gallbladder is followed almost immediately by relaxation of the sphincter of oddi.

The sphincter is kept closed by cholinergic mechanism and relaxed by the hormone cholecystokinin.

The passage of peristaltic wave down the duodenum also causes opening of the sphincter of oddi. This allows bile in bile ducts to enter in spurts during period of duodenal relaxation. Stopping during contraction.

This mechanism may be of value after cholecystectomy.

Discharge of bile into the duodenum is regulated by nervous and hormonal mechanisms. The nervous component mediated by the vagus nerve and follows psychic influences and food ingestion during this phase. Bile is range for only a brief period into the duodenum. The main pouring in bile occurs when the chyme

reaches the upper intestine and the mechanism is mainly hormonal, being mediated by cholecystokinin (CCK).the presence of digestive products of fat and proteins releases CCK from the upper intestine into the blood .CCK contracts the gallbladders smooth muscles and relaxes the sphincters of oddi. Thereby discharge bile into the duodenum generally. Substances that lead to pouring of bile into intestine by contracting gallbladder and relaxing sphincter are called cholagogues. When the gallbladder is remove .the sphincter of oddi loses tonus. And pressure with the common bile ducts drops to that of intra abdominal pressure. Bile is no longer returned into the bile duct but is free to flow in the duodenum during fasting and digestive phases (**William F. Ganong 2001**).

2-3 GALLBLADDER PATHOLOGY

The most classic symptoms of gallbladder disease is right upper quadrant (RUQ) abdominal pain. Usually occurring after ingestion of greasy food. Nausea and vomiting sometimes occur and may indicate the presence of stone in common bile duct. Gallbladder attack may cause pain in the right shoulder (**R N M Mac Sween and k W Haley, 1992**).

2-3 -1Gallstones (cholelithiasis):

Mechanisms of stone formation remain debatable, and it seems likely that change in the composition of bile. Local factors in the gallbladder and biliary tract infection are predisposing causes.

2-3-1-1Composition of bile:

Gallstones tend to form when there is relative excess of cholesterol to bile acids and phospholipids-“lithogenic bile” –this may result either from an increase in bile cholesterol or a decrease in the bile acid pool. But although lithogenic bile can be found in both patients with and without gall stones .it is curious that cholesterol will form tiny micro crystals in bile from patients with gall in stones much more rapidly in spite of similarities in lithogenicity .

2-3-1-1-1 Local factor in the gallbladder:

The part played in stones formation by the gallbladder mucosa the mucus and glycoprotein which it secretes and the effects of local stasis are not known .there may also be leedback effect on bile composition from gallbladder and lithogeneic bile shows a return to more normal composition following cholecystectomy.(**R N M Mac Sween and k W Haley 1992**).

Infection:

It is doubtful whether infection is involved in the formation of stones.

The bile is sterile in most patients with gall stones. Infection may however, enhance the effect of local factors already mentioned and thus contribute to increase in size of the stone and the formation of additional stones and mixed ones.

2-3-1-2 Type of gallstones:

- **Cholesterol Stones:** this can be classified as mixed or laminated. Pure and combination or compound cholesterol stones:
- **Mixed or laminated gallstones :** these are the commonest type, are always multiple and often very numerous they vary greatly in size from 1cm or more in diameter to the size of the sand grains, they are irregular in shape and often faceted. On sections we find layers consist of cholesterol, bile pigment calcium salts and organic materials.
- **The pure cholesterol stones:** Is usually solitary, oval and may reach over 3cm in length. On section stone shows a crystalline structure composed of sheaves of cholesterol crystals which radiate outwards from the center there is no trace of lamination. Some solitary cholesterol stones, however have laminated cortex due to the secondary deposition of bile pigment and calcium salts which occur when gallbladder becomes inflamed by super added bacterial infection, these are called combination or compound cholesterol stones they constitute the largest gallstones(**SANDRY.HANGEN 2001**).

- **(2-3-1-2-4) Bile pigment stones:** They are usually multiple, black or brown, irregular in form, 2-3mm in diameter, represented about a quarter of gall stones removed at cholecotomy, about a half are radio-opaque. They are often present in chronic hemolytic anaemias, and are usually due to excess of bile pigment in the bile. They may also be associated with parasitic infestations, e.g., malaria, the gall bladder usually appears normal (**SANDRY.HANGEN 2001**).
- **Calcium carbonate stones:**
These are rare, multiple, small pale, yellowish and fairly hard.
- **The Ultrasound Finding:**
The evaluation of gall stones with real - time has proven to be an extremely useful procedure ,the gallbladder is evaluated for increased size wall thickness, presence of internal reflection with lumen ,and posterior acoustic shadowing fig(1)frequently patient with gallstones have dilated gallbladder. Stones that less than 1-2 mm may be difficult to separate from one another by ultrasound, so they are reported as gall stone.



Fig(2-3) Gall stones appearance

Wall echo shadowing (W.E.S):

Appears when the gallbladder is completely packed full of the stones here we can image only the anterior border of the gallbladder.

With stones casting distinct a costing shadow known as the wall echo shadowing sign.

To demonstrate presence of gall stone, patient position should be shifted during the procedure and we will see that stones shift to the most dependent area of the gallbladder.

The factors that produce a shadow were attributed to acoustic impedance of gall stone.

Reflection through them or diffraction around hem .their size, central or peripheral location and position in relation to the focus of the beam .and intensity of the beam (Qurashi M.Ali 1993),

2-3-2CHOLECYSTITIS:

Inflammation of the gallbladder can be: **acute cholecystitis and chronic cholecystitis**

-Type of acute cholecystitis:

-Acute acalculous cholecystitis: Occurs in 10-14%of cases of acute cholecystitis. It is more common in men than women (3:1) and usually occurs in patient 50-60 of years of age. The pathogenesis of acalculous cholecystitis is multifactorial and includes ischemia. Gallbladder stasis sepsis, and toxins. Ischemia occur due to hypertension or hypovolemia. Especially in post-operative or post traumatic patients or in patient with severe pancreatitis or burns. Atherosclerosis has also been implicated as cause of ischemia in acute acalculous cholecystitis .Gallbladder stasis, which occurs in the setting of prolonged fasting parenteral nutrition, and narcotic use ,is another pre disposing factor as bile slates become

concentrated ,chemical inflammation of the gallbladder wall ensues ,leading to cholecystitis.Sepsis also is hypothesized as a cause of acute acalculous cholecystitis.

-Ultra sound finding:

Sonographic findings associated with acute acalculous cholecystitis including wall thickening lumen distention ,peri-cholecystic fluid a positive Murphy's sign lack of gallbladder contraction in response to cholecystokinin, and the presence of sludge.However,most of these finding are specific .and are not very sensitive in diagnosing acute acalculous cholecystitis , gallbladder wall thickening may be normal in some cases especially early in course of the disease and also the thickening may be to other etiology like hypoalbuminemia or ascites(**Qurashi M.Ali 1993**).

- Acute calculous cholecystitis:

Represent approximately 90%of cases of acute cholecystitis. Occurs in women more than in men initially there is obstruction to the neck of the gallbladder of the cystic duct by an impacted stone ,leading to distention and inflammation of the gallbladder which may cause continuous epigastric or right upper quadrant pain vomiting , fever, local peritonism or gallbladder mass.If the stone move to the common bile duct jaundice may occur.

- **Ultra sound finding:** Sonographic findings associated with acute calculous cholecystitis including the posterior wall shadows, sonographic murphy's sign gallbladder thickening, peri-cholecystic fluid and gallbladder dilatation.

-Emphysematous cholecystitis: It is due to ischemia from cystic artery narrowing –secondary infection occurs from gas, forming organism like E coli occurs in approximately 1%of cases of acute cholecystitis. It is more common in men than women and usually occurs in patient 50-70 years of age .Diabetes mellitus and

choleclithiasis are present in the majority of patient with emphysematous cholecystitis. Also gangrenous changes occur in most cases.

- Ultra sound finding: Several sonographic features have been described in patient with emphysematous cholecystitis .Including intramural and intra luminal gas. Intra mural gas will case the gallbladder wall to be hyper echoic with posterior reverberation producing comet tail or ring down artifact .how ever these sonographic finding may be caused by other pathologic conditions. Wall floating cholesterol crystal may stimulate the appearance of internal gas.

-Gangrenous cholecystitis:

It is considered present when there is histologic evidence of congolative necrosis (surface ulceration or transmual necrosis) and acute or chronic inflammation.

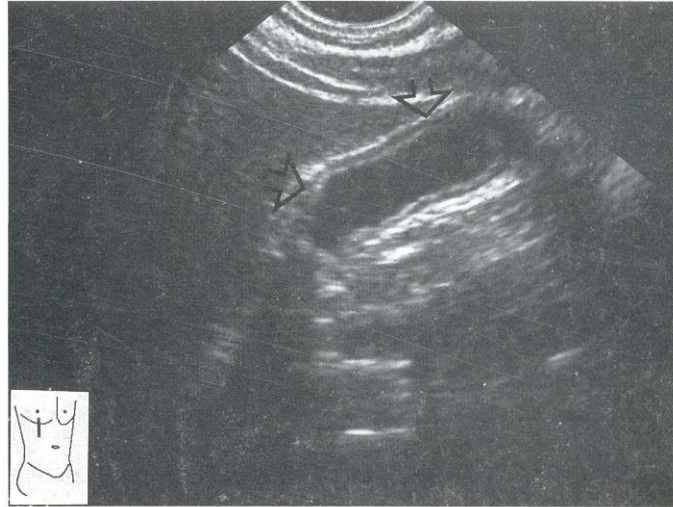
-Ultra sound finding: Several sonographic finding have been described in patient with gangrenous cholicystitis including absence of sonographic Murphy's sign, internal membranes, wall irregularity and intra mural perforation, gallbladder wall striations, and peri-chlicystic fluid collection.

-General ultrasound signs of acute cholecystitis;

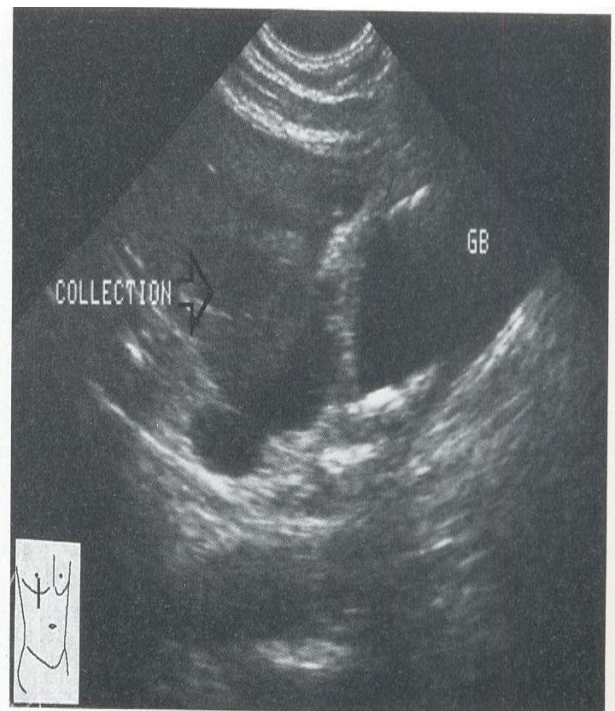
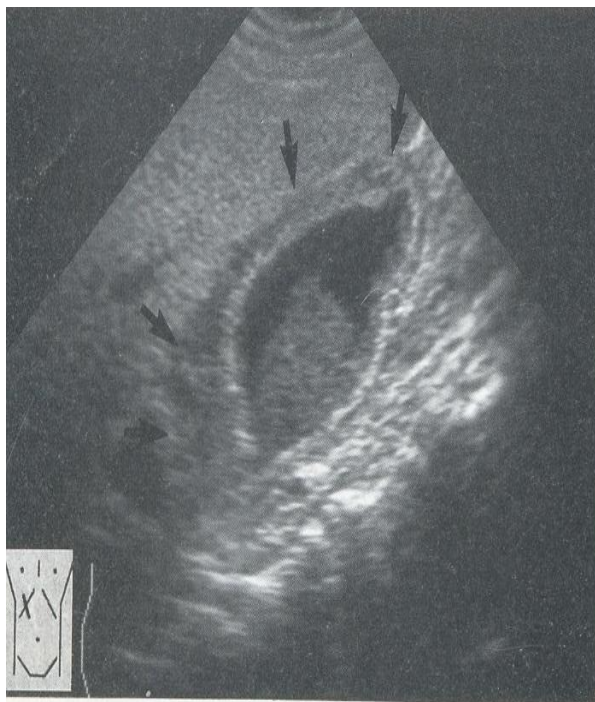
-Stones in the gallbladder, Edema of the gallbladder wall, Gas in the gallbladder wall

, Thickening of the gallbladder wall, Round gallbladder shape, Pericholecystic fluid

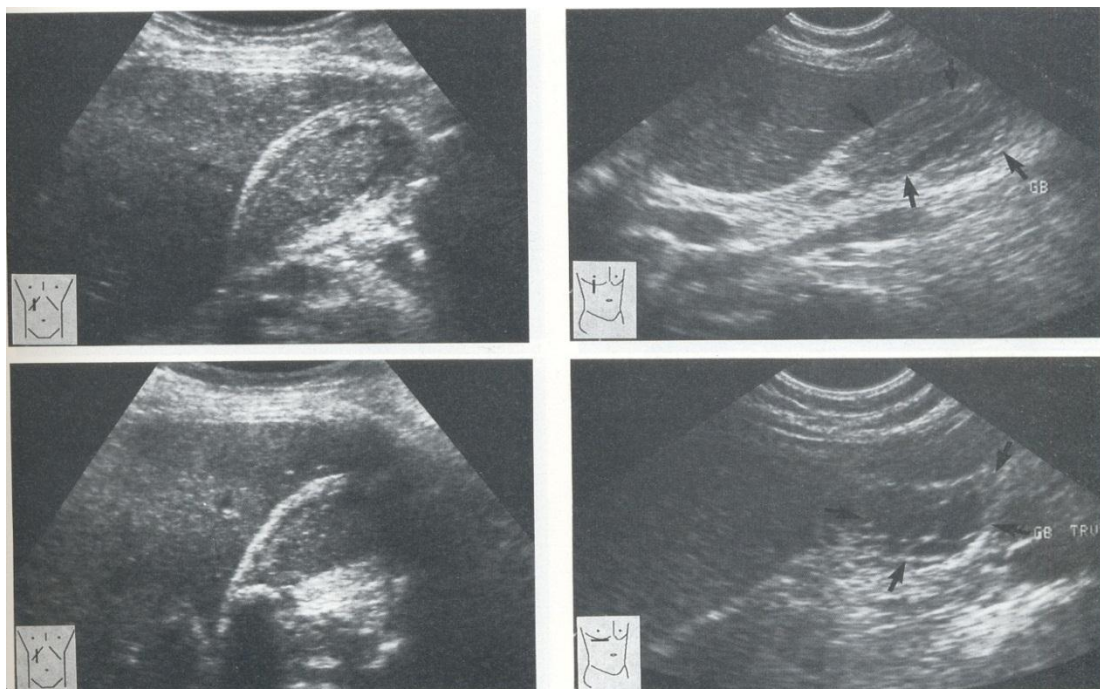
And Positive sonographic Murphy's sign. The fallowing figure show the us **signs of acute cholecystitis figure (2-4,2-5,2-6,2-7).**



Fig(2-4) Ultrasound appearance of acute cholecystitis



Fig(2-5) Acute cholecystitis



Fig(2-6) Empyema and Gangrenous cholecystitis

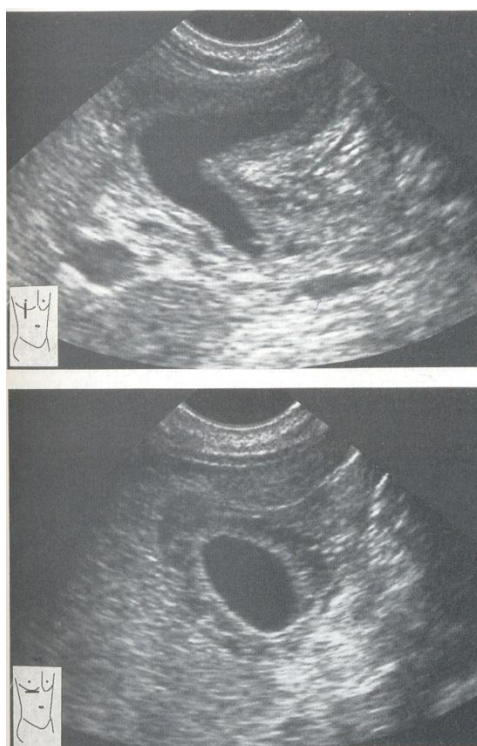
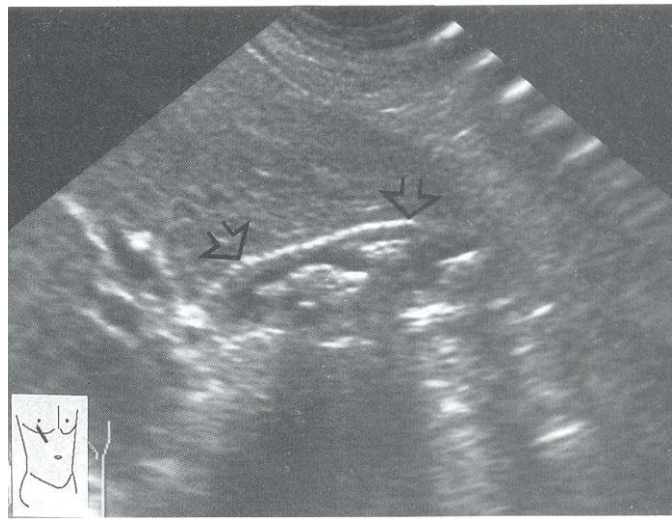


Fig (2-7) A calculus cholecystitis

2-3-2-2 chronic cholecystitis:

Sonographic appearance of chronic cholecystitis:

The gallbladder is usually smaller in size and an echogenic bile may be present, and thick gallbladder wall (greater than 3 mm), also usually associated with stones, and the gallbladder wall may become calcified. Figure (2-8) show chronic cholecystitis.



Fig(2-8)Chronic cholecystitis

(2-3-3)Sludge

When the contents of gallbladder are viscid slightly echogenic, they called sludge. Small stones submerged in the sludge are difficult to detect. Both move with the gravitational shift. The causes of sludge are many, it may be seen in normal asymptomatic people. It is usually seen in very ill patients as a result of prolonged fasting. Sludge should be considered an abnormal finding, because either a functional or a pathologic abnormality exists when calcium bilirubin or cholesterol precipitation in bile. (ref-6)

(2-3-3-1) Sonographic characteristics:

Low level non-shadowing echoes, move with gravity and

It is difficult to be differentiated from echogenic bile (due to pus or blood).

Figure (2-9) show Sonographic appearance of Sludge .

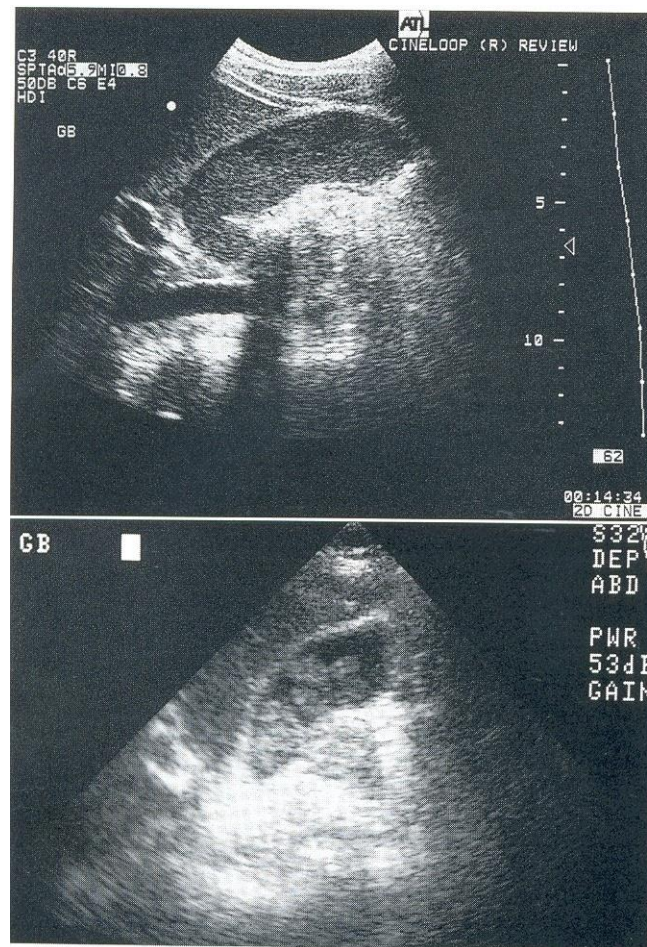


Fig (2-9) Sonographic appearance of Sludge .

2-3-4Cholesterolosis

Is a condition in which cholesterol is deposited with in the lamina propria of gallbladder, the disease process is associated with cholesterol stone in 50% to 70% of

patient .it is often referred to as “strawberry gallbladder” .this condition will show cholesterol polyp.

Ultrasound finding:

Cholesterol polyps are small smooth wall projection seen to arise from the gallbladder wall. The polyps usually are multiple, do not shadow, and remain fixed to the wall with change in patient positions.

2-3-5 Adenomyomatosis: Is hyperplastic change the in gallbladder wall.papillomas may occur singly or in groups and may be scattered over a large part of mucosa surface of gallbladder. This papilloma is not precursor to cancer cholesterol polyp is the most pseudo tumor of gallbladder. Other masses that occur are mucosal hyperplasia inflammatory polyps. Mucous, cysts and granulomata (result from parasitic infection).

Sonographic appearance of Adenomyomatosis:

- Diffuse or segmental thickening of the GB wall
- The wall shows echo free areas due to the presence of bile
- Intramural diverticular are seen
- It shows a typical appearance of (Diamond Ring) in transverse section.

Figure(2-10) show **adenomyomatosis**.

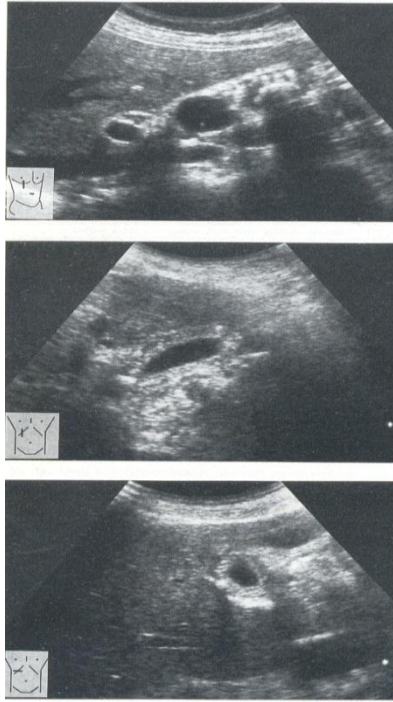


Fig (2-10) Sonographic appearance of adenomyomatosis

2-3-6 benign tumor:

True benign tumor of the gallbladder are very rare adenomas are most common type.

Ultrasound finding:

Adenomas occur as flat elevations located in the body of the gallbladder, always occur in or near the fundus and must be distinguish pathologically from adenomyomatosis.

2-3-7 malignant tumor:

Primary carcinoma of gallbladder is nearly always a rapidly progressive disease, with mortality rate approaching 100%.it associated with cholelithiasis in about 80%-90%of cases

(Although there is no direct proof that gallstones are the carcinogenic agent).

Patient with porcelain gallbladder have an increase incidence of gallbladder cancer.it is twice as common as cancer of the bile ducts and occurs most frequently in women 60years of age and older .A porcelain gallbladder exhibit extensive calcification of wall .this condition is associated with chronic gallbladder inflammation and nearly all patient have gallstones.

2-3-7-1Carcinoma: Carcinoma of gallbladder is very rare .the tumor arises in the body of the gallbladder or rarely in the cystic duct. The tumor infiltrates the gallbladder locally or diffusely and causes thickening and rigidity of the wall. The adjacent liver is often invaded by direct continuity extending through tissue spaces, the lymph channels, or some combination of these.

The gallbladder tumor is usually columnar cell adenocarcinoma, sometimes mucinous in type. Squamous cell carcinoma may occur but is unusual.mitastic carcinoma to the gall bladder

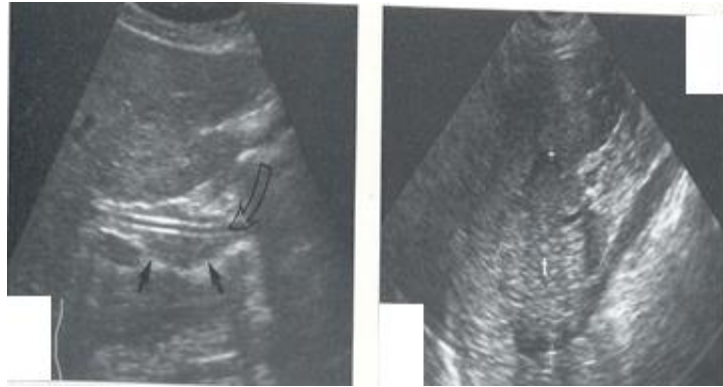
May occur secondary to melanoma. It usually is accompani by liver metastases ,most patentshave no symptoms that relate to the gallbladder unless there is complicating acute cholecystitis.

-Ultrasound finding:

Sonogrphic appearance of gallbladder (GB) carcinoma:

- Highly malignant and give early deposits
- Usually associated with stones and chronic cystitis
- Usually appear as hypo echoic masses.

Figure(2-11) show Sonographic appearance of the cholangiocarcinoma



Fig(2-11) Sonographic appearance of the cholangiocarcinoma

2-3-8 congenital disorders

In infants choledochal cysts are the most common cause of obstructive jaundice, but they may be found at any age. They are actually not cysts, but a dilatation of the common bile duct which may secondarily obstruct other biliary ducts or the duodenum . [**European Course Book, Christoph F. Dietrich**].

Todani classification for choledochal cyst:

It is of importance that 2 – 10 % of the patients develop biliary tract carcinoma at a mean age of 35 years. Carcinomas may develop within the wall of the cyst, within the gallbladder or bile ducts. Therapeutically complete cyst removal with biliary reconstruction, usually with Roux-en-Y hepaticojejunostomy should be performed when a carcinoma is diagnosed in these patients.

The role of ultrasound techniques is not yet fully determined, due to low incidence of this disease in adults and limited clinical experience. Magnetic resonance imaging (MRI) and endoscopic retrograde cholangiography (ERC) are the diagnostic methods of choice. Endoscopic ultrasound should be considered because of the excellent resolution of the common bile duct. Choledochal cyst. Choledochal cysts are the most common cause of obstructive jaundice in infants and beyond infancy, but may be found at any age.

Chapter three

.Methodology

Consist of material s and methods

3.1 Materials

3.1 .1 Study Areas:

The study was done in Khartoum state. Khartoum is one of the eighteen states of Sudan. Although it is the smallest state by area (22,142 km²), it is the most populous (5,274,321 in 2008 census). It contains the country's largest city by population, Omdurman, and the city of Khartoum, which is the capital of the state as well as the national capital of Sudan. The capital city contains offices of the state, governmental and non-governmental organizations, 39 governmental and non-governmental hospitals.

3.1.2 Study population:

To verify the lesions of gallbladder in Sudan hundred subjects were examined. in deferent age, residences, tribe and occupations with different abdominal symptoms and signs. Screening done in different ultrasound department.

3.1.3 Machine used:

The study done in different ultra sound machines different modality. All used same Ultrasonic transducers

- MHrs,3.5 MHrs for normal patients
- Use 5.0 MHrs for thin patients
- Use sector and convex transducer

3.1.4 Study design:

Random population-based survey was done in Khartoum state hospitals. All subjects were individually interviewed during investigation. All subjects were already clinically investigated and all of them were fasting for at least 8-12 hours.

3.2 Method

3.2.1 Sample size calculation:

Hundred subjects randomly selected.

3.2.2 Technique used:

The patients is initially examined in the supine position with real- time sector scanner, transverse, sagittal and right oblique and right lateral position and some patient examend decubitus to saparted gallstone from the gallbladder wall .the interpretation of images were taken during scanning by real time scanners image .

3.2.3 Measurements: measurement to calculate gall bladder, liver size in AP medclavicular line, spleen and kidney all abdominal measurements were done.

3.2. 4 Type of study: Operative and quantitated study was chosen to assess the gallbladder lesions in Sudan using ultra sound.

3.2.5 Data collection:

Data was collected through:

- **Questionnaire**
- Questionnaire was designed to interview the patient
- **The questionnaire consists of three parts:**
- ***Part 1: General and demographic questions:***
- There were 4 questions in this part. The questions include gender, age, residence, tribe and occupation.

Part 2: -clinical symptoms& /or sings

Consist of these symptoms (RUQ pain jaundice liver inflammatory disease positive murphy's sign Recurrent symptoms of peptic ulcer and Others)

Part 3 : Ultrasound finding

- Normal
- chloleitiasis
- thickened wall
- sludge
- Acalculous
- cholecystitis
- polyp
- Hydrops
- Gallbladder carcinoma

3.2.7 Analysis of data:

Data was analyzed by computer using Excel Program.

Chapter four

Results

The tables and figures in this chapter explain the results and finding

Table (4-1): shows gender of the patients

Gender	No. of patients	%
Female	57	57
Male	43	43

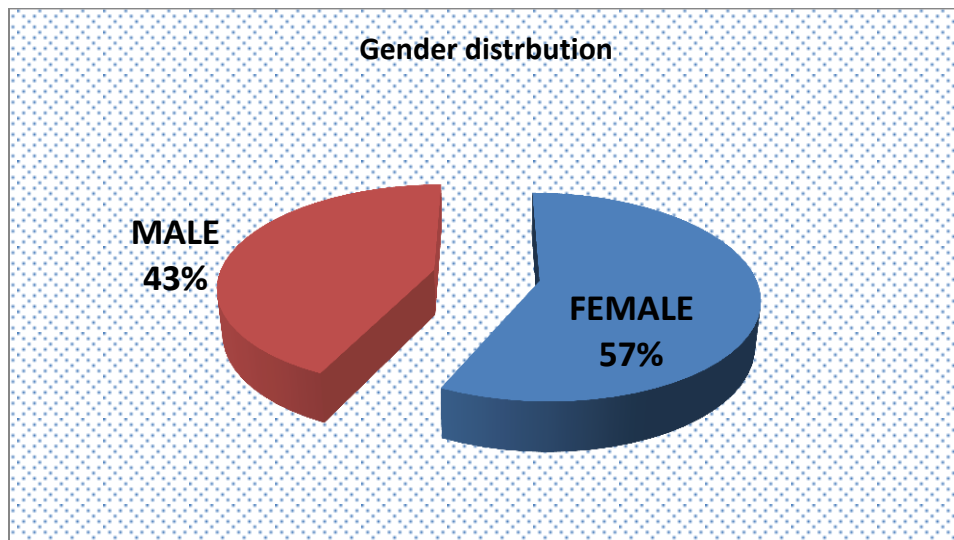


Figure (4-1): shows gender of the patients

Table (4-2): show age group per gender in 100 patients investigate with U/S for incidence pathologies in Sudan

SEX	Range of age	No of patients	Age percentage
Male	39-20	16	16%
Female	35-15	14	14%
Male	59-40	14	14%
Female	55-36	32	32%
Male	85-60	13	13%
Female	70-56	11	11%

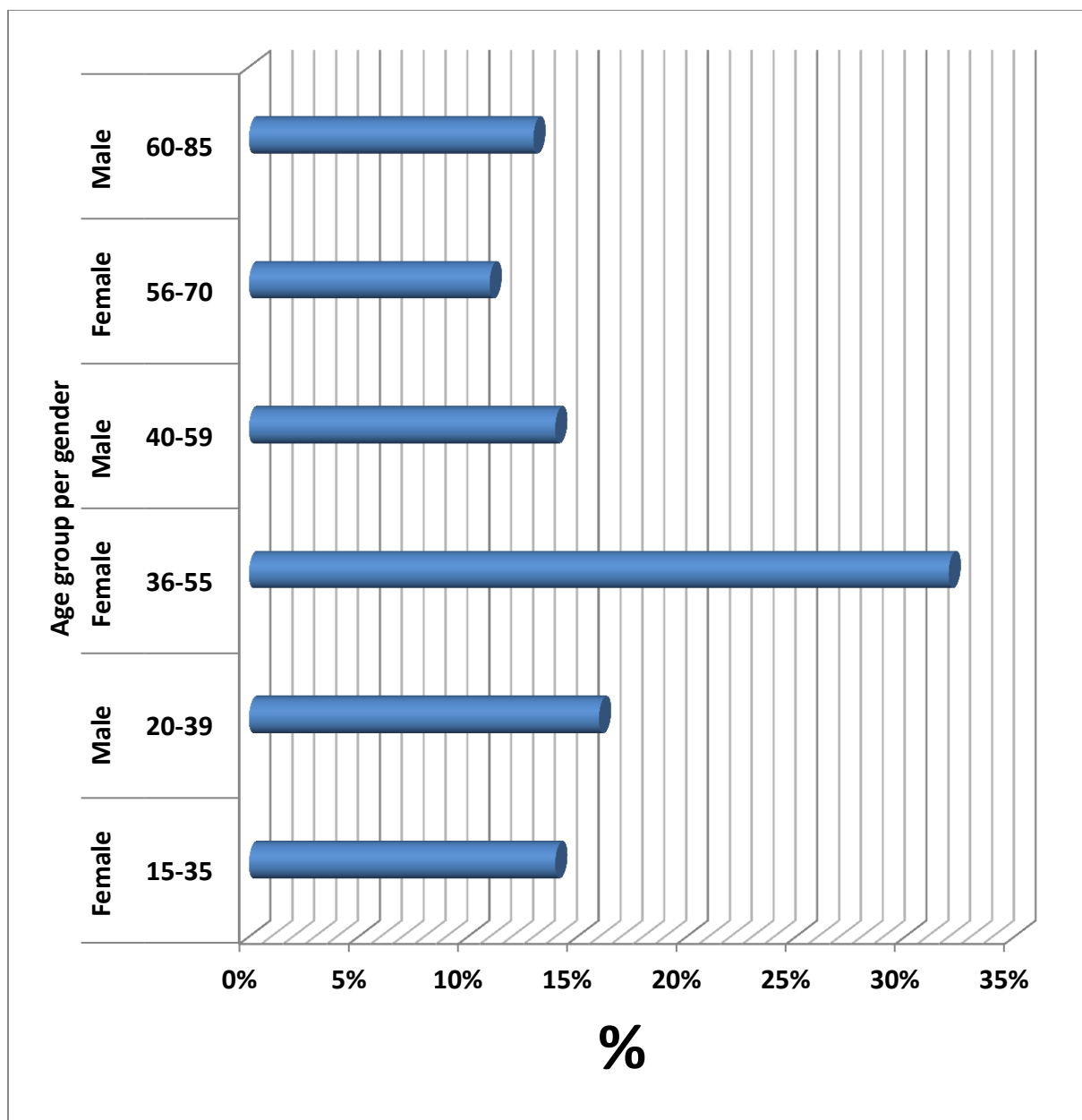


Figure (4-2): show age group per gender

Table(4-3): Site of tribes of 100 patients investigate with U/S for incidence pathologies in Sudan

Site of tribe	No of patient	Percentage
Central Sudan	35	35%
Northern Sudan	32	32%
Western Sudan	21	21%
Southern Sudan	8	8%
Eastern Sudan	4	4%

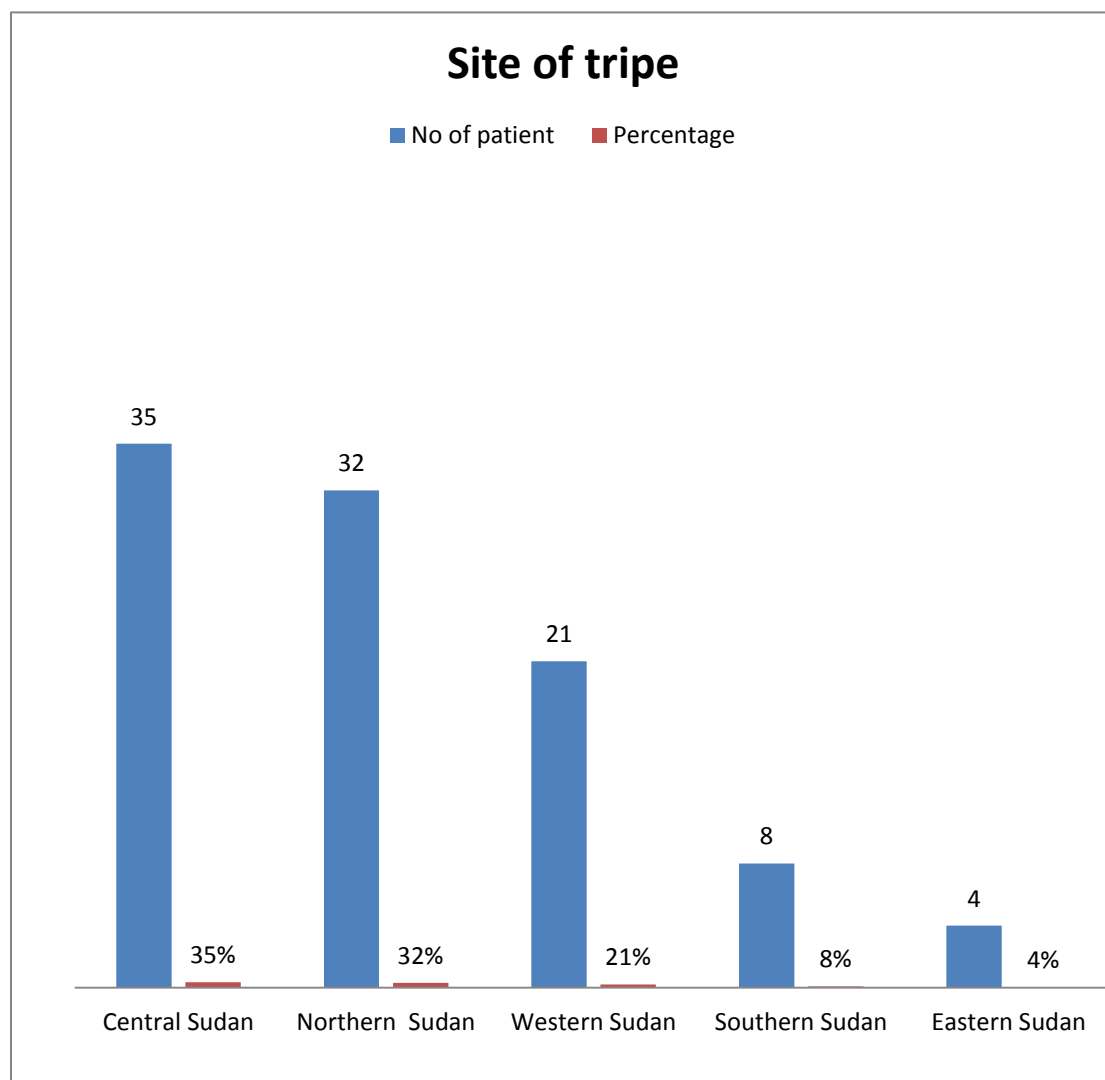


Figure (4-3) :Show site of tripe

Table(4-4):Occupations frequency of 100 patients investigate with U/S for incidence pathologies in Sudan .

Occupation	No. of patients	%
Housewives	40	40
Farmers	20	20
Teachers	9	9
Students	8	8
Workers	16	16
Others	7	7

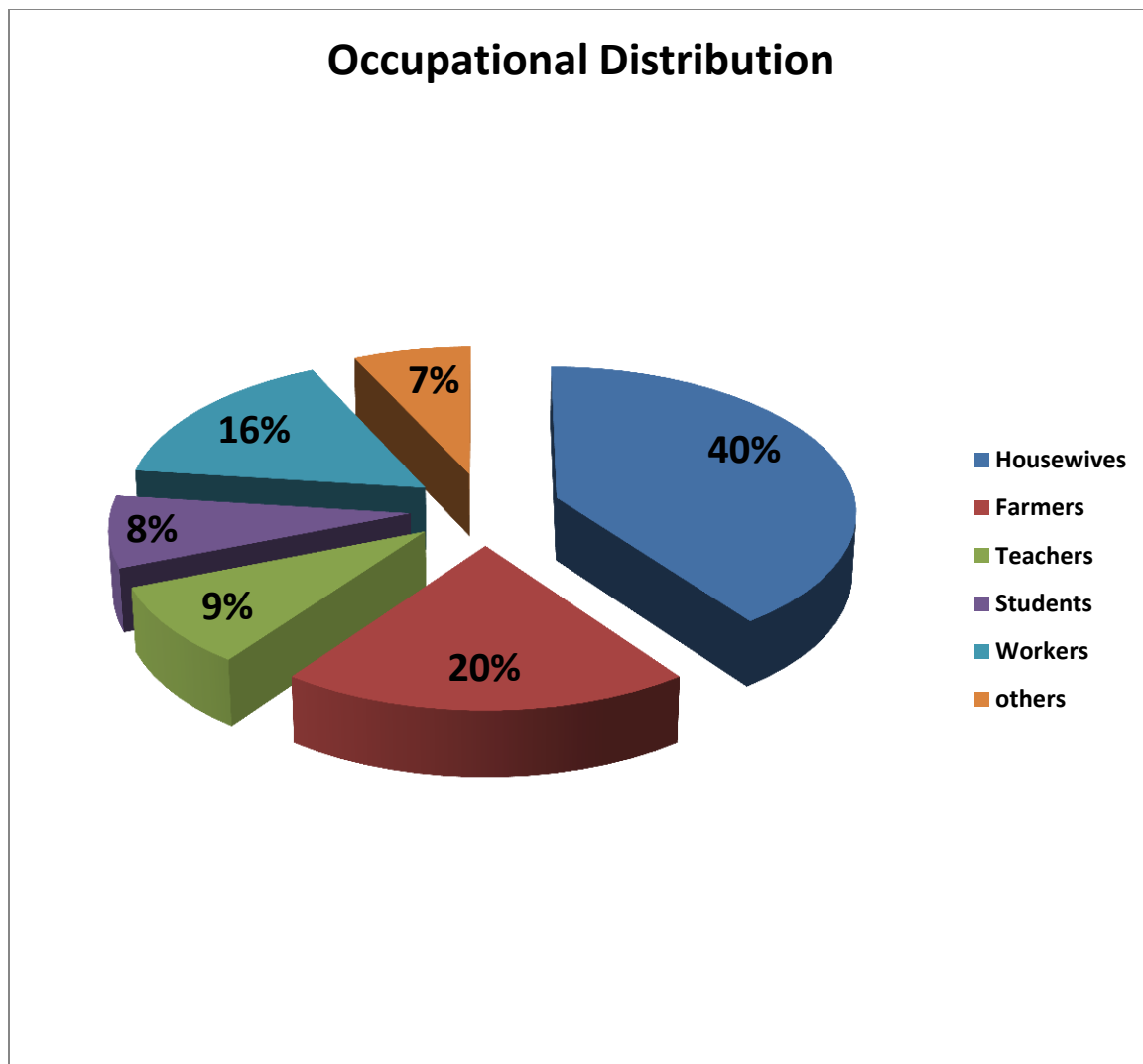


Figure (4-4) : show Occupation frequency of 100 patients investigate with U/S for incidence pathologies in Sudan .

Table (4-5): Symptoms and/or Sign of 100 patients investigate with U/S for incidence pathologies in Sudan.

Symptoms and/or Sign	No. of Patients with gallbladder diseases	No. of Patients without gallbladder diseases	Total In Percentage
RUQ pain	33	5	35%
Jaundice	4	2	6%
Positive Murphy's Sign	5	0	5%
Liver Inflammatory diseases	6	2	8%
Recurrent Symptoms of Peptic ulcer	4	3	7%
Normal	0	66	66%

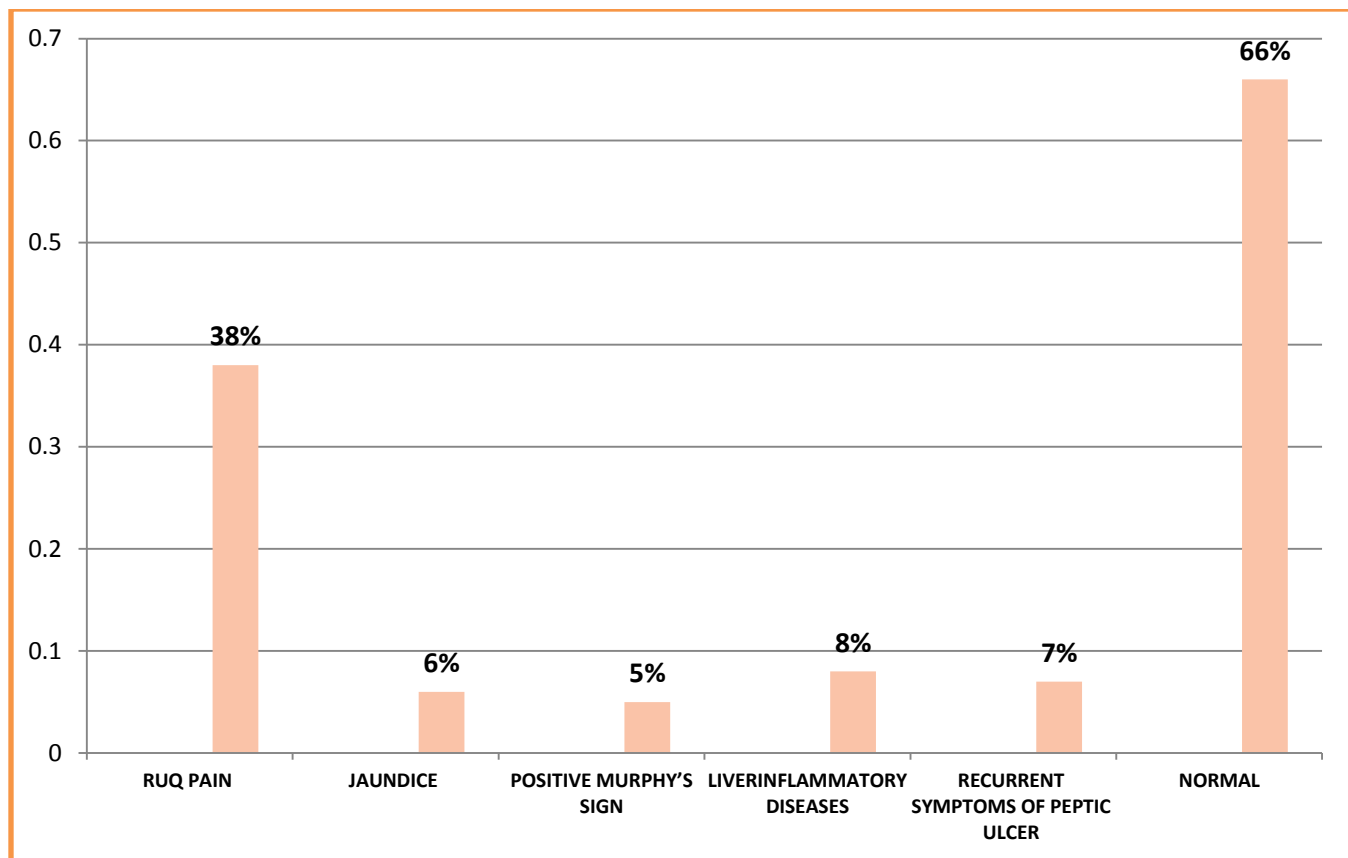


Figure (4-5) : Clinical signs and symptoms

Table (4-6): The Ultrasound findings to show the gallbladder lesions in 100 patients

Ultrasound findings	No. of Patient	Percentage
Cholelithiasis	16	16%
Calculous Cholecystitis	12	12%
ACalculous Cholecystitis	6	6%
Thickened wall GB	7	7%
Sludge	3	3%
Polyp	1	1%
Gallbladder Carcinoma	1	1%

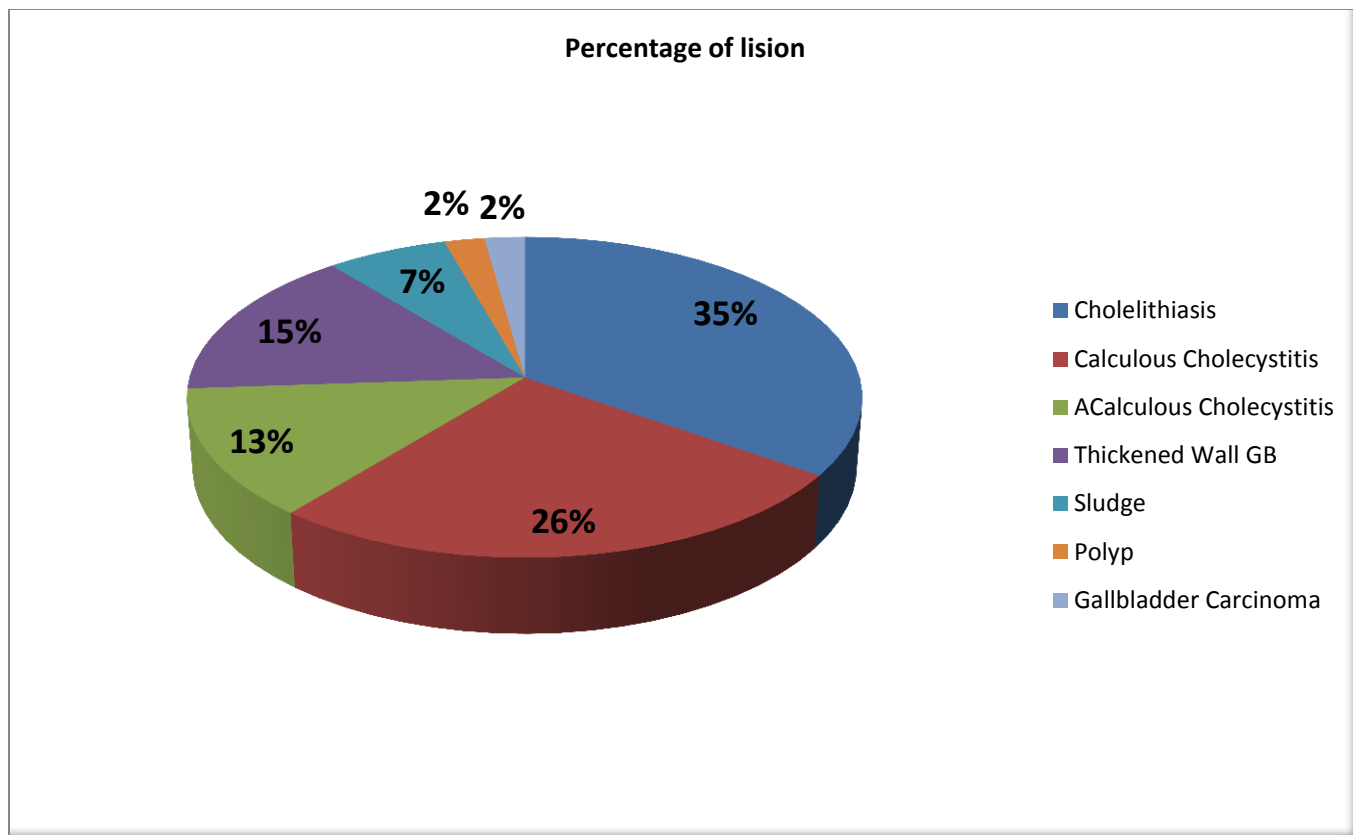


Figure (4-6) Show Percentage of lesions in in 100 patients.

Table (4-7): The gallstone frequency among males & females

Patients with gallstones	No. of patient	Percentage
Female	12	12%
Male	4	4%

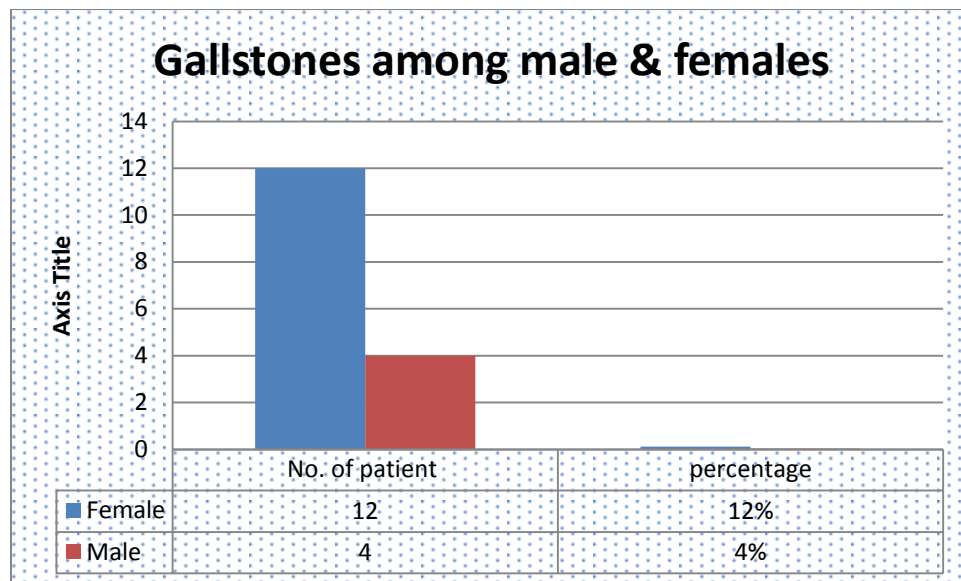
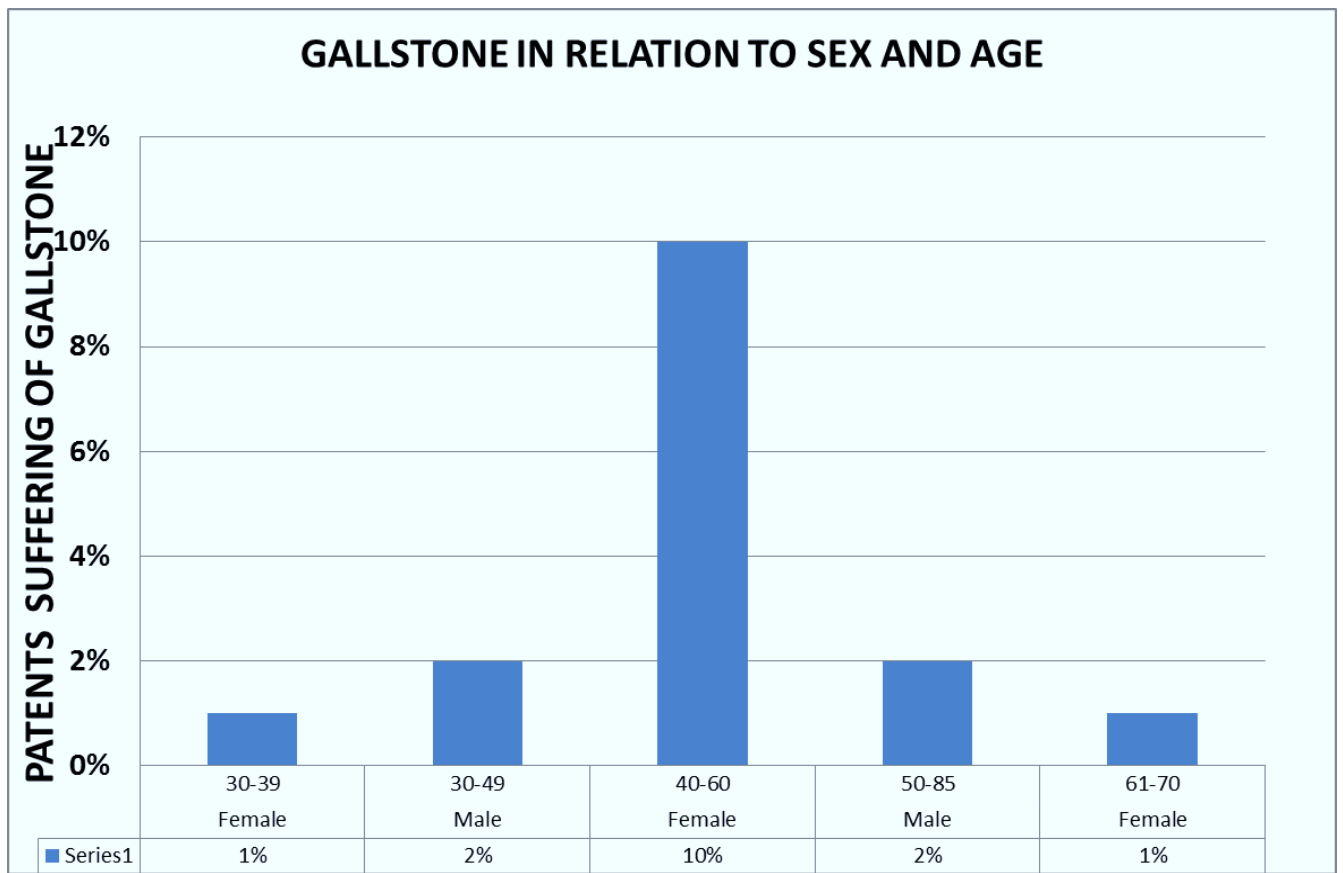


Fig (4-7): Gallstone among male and female

Table (4-8): The Gallstone in relation to sex and age .

Gallstones	Range of age	No. of patients in percentage.
Female	(30 - 39)	1%
Male	(30 - 49)	2%
Female	(40 - 60)	10%
Male	(50 - 85)	2%
Female	(61 - 70)	1%



Fig(4-8): The Gallstone in relation to sex and age .

Table(4-9): The Gallstone in relation to sex and occupation .

Gallstones	Housewives	Farmers	Employee
Female	8%	1%	3%
Male	0%	3%	1%

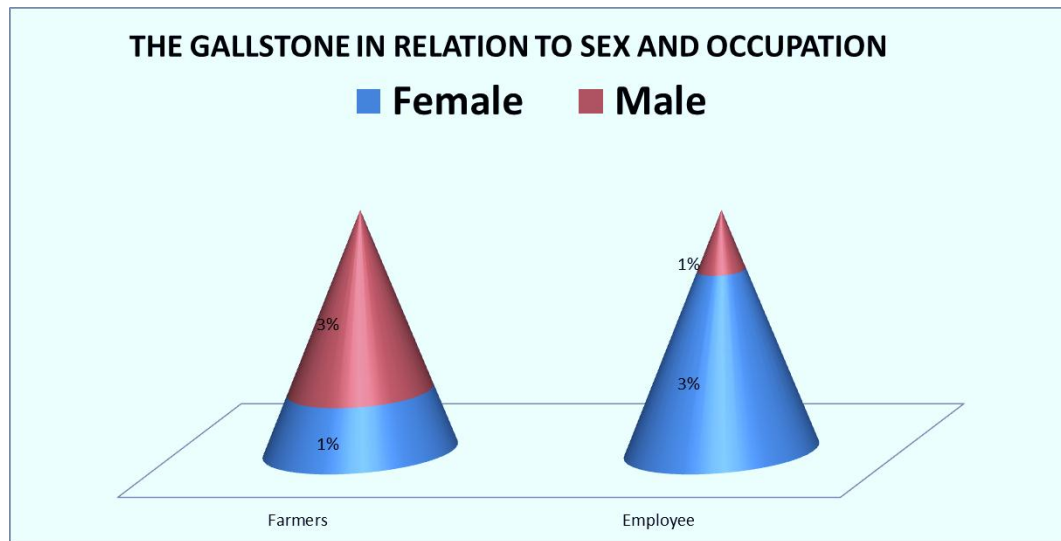


Fig (4-9): The Gallstone in relation to sex and occupation .

Table (4-10): The Gallstone in relation to sex and residence .

Gallstones	Central Sudan	Khartoum
Female	6 %	6%
Male	2%	2%

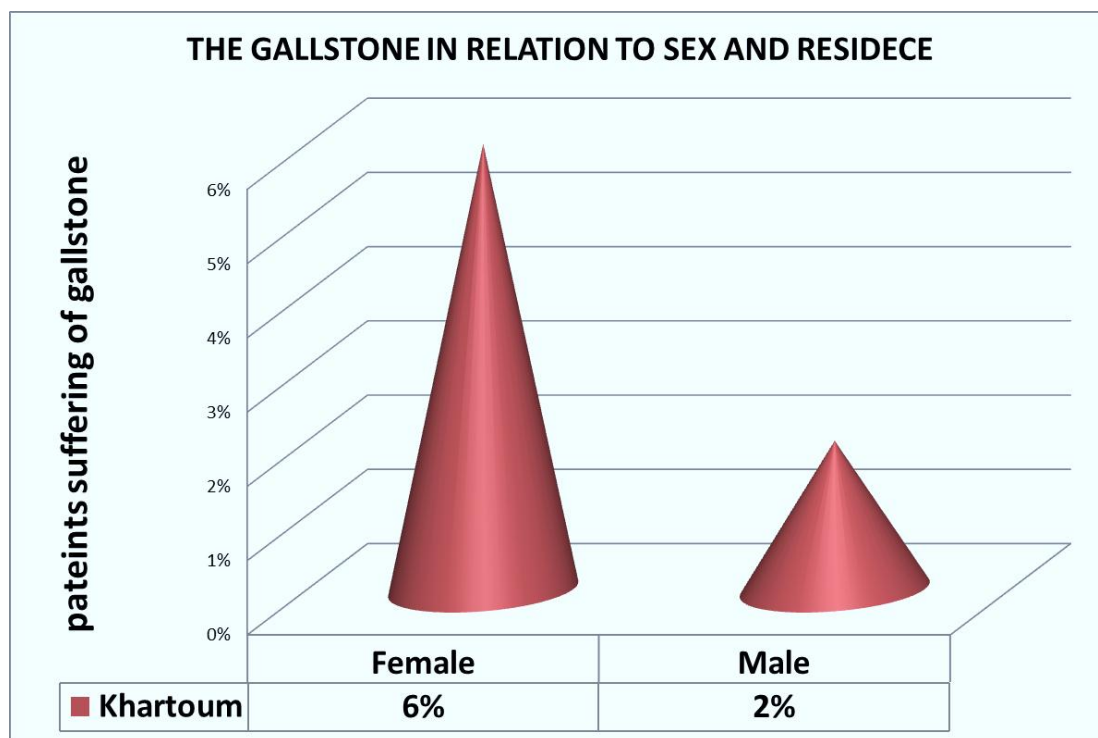


Fig (4-10): The Gallstone in relation to sex and residence .

Table(4-11): The Gallstone in relation to sex and Sudanese Tribes.

Gallstones	Central Tribes	Northern Tribes	Western Tribes	Eastern Tribes
Female	3	4	3	2
Male	1	2	1	-
Total in Percentage	4%	6%	4%	2%

Chapter five

Discussion , Conclusion and Recommendations

5-1 Discussion

Diseases of the gallbladder are rare unless they complicate gallstone (1) Out of 100 patient there were 66% with normal gallbladder. While 34% showed different gallbladder pathologies. The dominant one found to be the cholelithiasis which represented 16% of all gallbladder diseases related to the patients in this study.

(2) Reported that 18% is incidence of gallbladder stone, 12 patients (75%) out of the 16 patients with gallstones developed calculous cholecystitis 6% of the patient had acalculous cholecystitis. Comparing with other report “90 to 95% of acute cholecystitis patients have cholelithiasis, the remaining 5 to 10% have acalculous cholecystitis” the current study found that less percentage with the calculous and it is significant with the acalculous cholecystitis.

The gallbladder wall thickening due to other causes rather than presence of gallstones (fibrosis\ascites) appear in 7% sludged gallbladder without gallstones 3% patient with polyp 1%, and finally 1% old male patient found with gallbladder carcinoma confirmed with CT imaging.

The 100 patient were represented by 57% females and 43% male, the study found that the incidence of gallstone is more in females than male as so “gallstones are twice as common in women as in men and this particularly so before the age of 50”.

(4) In this study the ratio found to be 4 males’ 12 females (1:3) also show the increased incidence of gallstone among housewives (20%) 8 housewives out of 40 developed gallstones. Also we can notice the increase of gallstones among the

male farmers the increased incidence of gallstones among the male's farmers, farmers 3patient out of 4 according to the study and number of patient the patients with gallstone were equally distributed throughout the areas of study (8%) related to Khartoum state only, and 8%related to other state. The previous study carried out in Khartoum state only.

Symptoms and signs of the patients in study represented in the right upper quadrant RUQ pain 38%of patients, 33had gallbladder diseases and 5patient showed normal gallbladder. The other symptoms and signs accompanied with the RUQ pain like the jaundice which found in 6 patients 4 of them showed gallbladder diseases.

Liver inflammatory diseases involved 8 patients most of them were farmer 6 of them had gallbladder diseases patient with positive murphy" sign in this study, always develop gallbladder diseases .7patient with recurrent symptoms of peptic ulcer 4 had associated gallbladder diseases.

5-2Conclusion

- *The gall stone represent the high incidence disease compared with other gallbladder pathology.
- * Other gallbladder diseases developed due to presence of gallstones like the calculus cholyesistitis and the gallbladder wall thickening.
- *Incidences of gallbladder pathologies such as sludge polyp. Acalculous cholecystitis and carcinoma of gallbladder are relatively low.
- *The characteristic relation between, female's housewives and gallstones
- *The proportional relation between age and cholecystitis.
- *In Sudan and according to this study the complication of cholelithiasis and cholecystitis like emphysematous gangrenous and perforated gallbladder are not found.

5-3 Recommendations

*Patient for abdominal ultra sound especially for gallbladder scan should be examined during fasting state so as to have satisfied result.

*Patient who has symptoms and sign of gallbladder diseases (RUQ) pain, vomiting, nausea.....) who showed normal ultra sound images should be investigated carefully again using different type of probes with different frequencies.

*Ultra sound machine in many hospital and center should be facilitated with new modality.

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APPENDICES

(A) Images of patients:



Figure No. (1) : normal GB seen in male 39 years old

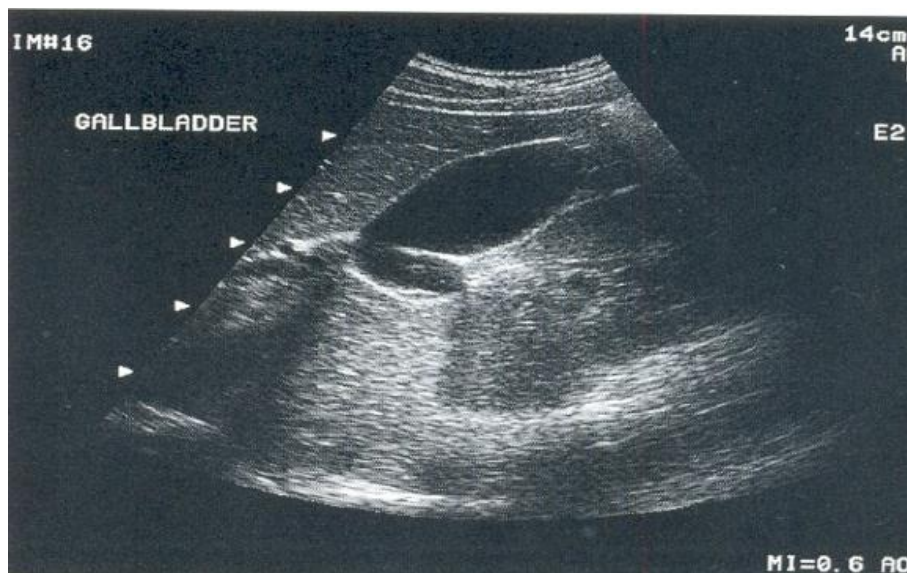


Figure No. (2) : normal GB seen in 28 years old

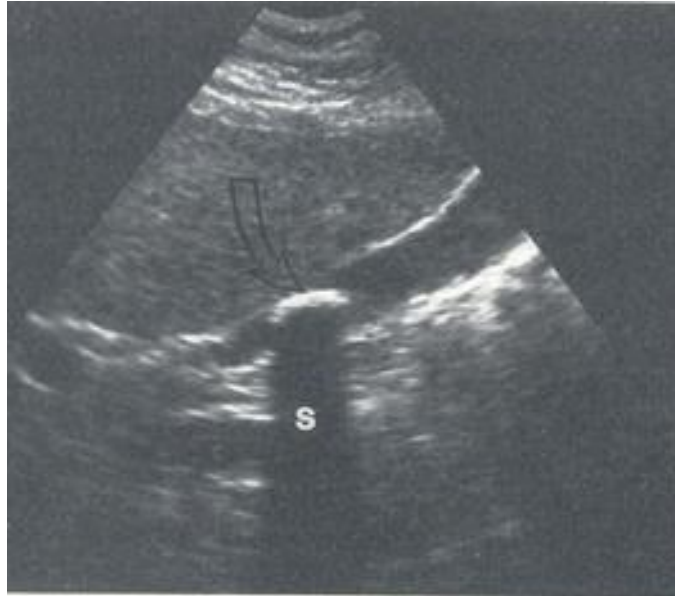


Figure No. (3) : gull stone with normal GB wall female 48 years old house wife .



Figure No. (4) male GB sludge seen in 38 years old



Figure No. (5)GB carcinoma (male 70 years old)



Figure No. (6): Normal GB male 40 years old.

(B)Data collection

After the scan and report were made the data collected after the permission of the patient and stored in a questionnaire paper for each patient. (look for the sample).

-Name..... - Age.....

-sex..... - Residence.....

-tribe..... - Occupation.....

-clinical symptoms&/or sing

-asymptomatic (yes).....(no).....

-RUQ pain (yes).....(no).....

-jaundice (yes).....(no).....

-liver inflammatory disease(yes).....(no).....

-positive murphy's sign(yes).....(no).....

-Recurrent symptoms of peptic ulcer (yes).....(no).....

-Others (yes).....(no).....

-Ultrasound finding

-Normal (yes)..... (no)

-chloleitiasis (yes)..... (no)

-thickened wall (yes)..... (no)

-sludge (yes)..... (no)

-Acalculous cholecystitis (yes)..... (No)

-polyp (yes)..... (No)

-Hydrops (yes)..... (No)

-Gallbladder carcinoma (yes)..... (No)

-other (yes)..... (No)

Number of patient ()

Using these questionnaire papers . analyses verified Using the table and computerized system to build up the results.