



Sudan University Of Science And Technology
College Of Postgraduate Studies And Scientific Research



Study Of Female Pelvic Pain Using Ultrasonography

دراسة ألم الحوض عند النساء باستخدام التصوير بالموجات فوق
الصوتية

Athesis Submitted For Partial Fulfilment Of Master Degree In Medical
Ultrasound

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DeDication

To my parents BANNAGA&NAFISA, who encouraged me to enjoy the intellectual challenge of Radiology and the love of making a difference in patients' lives

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Abbreviations

CT : computerized tomography

CPP : chronic pelvic pain

PID : pelvic inflammatory disease

SPSS : statistical package of social studies.

ALL : anterior longitudinal ligament

PLL : posterior longitudinal ligament

IUCD : intrauterine contraceptive device

IBS : irritable bowel syndrome

STDS : sexually transmitted diseases

ملخص البحث

أجريت هذه الدراسة لمعرفة أهمية الموجات فوق الصوتية في تشخيص وتحديد الأسباب المفضية إلى الألم الحوضي عند النساء لا سيما تلك التي تؤثر في التشريح والوظيفة.

جمعت بيانات هذه الدراسة من المستشفى التركي قسم بإستخدام جهاز الموجات فوق الصوتية (ميندرى 1100) وإستمارة إستبيان جمع المعلومات.

قسمت هذه الدراسة إلى خمسة فصول:

يحتوي الفصل الأول على المقدمة والأهداف العامة للدراسة ومشكلة البحث.

الفصل الثاني يشمل البحوث والدراسات السابقة ، تشريح، وظائف الأعضاء، علم أمراض الحوض والظهور الطبيعي لأعضاء الحوض بإستخدام الموجات فوق الصوتية.

الفصل الثالث يحتوي على الطرق والأدوات التقنية لجمع البيانات بالإضافة إلى حزمة التحليل الإحصائي. الفصل الرابع يتضمن تحديد البيانات والنتائج أما الفصل الخامس فيشمل المناقشة والتوصيات والخاتمة.

خلصت هذه الدراسة إلى العلاقة بين الألم الحوضي عند النساء والعمر الانجاب والحالة الإجتماعية. توصي هذه الدراسة بأهمية الموجات فوق الصوتية في تشخيص الألم الحوضي عند النساء.

ABSTRACT

This research is conducted so as to know the importance of Ultrasonography in the control, follow-up & the diagnosis of the different types of female pelvic pain causes.

This study is about female pelvic pain that causes any change in anatomy and function. The data were collected from Turkish hospital, using an ultrasound machine and a data collection sheet. This includes masses, cysts, gases, and fluids.

The first chapter is an introduction about the key words of the title as well as the general and specific objectives of the study to enumerate the steps and the variables of the study. An overview of the study is added in this chapter also the story of the problem and the justification to conduct the research and why about the pelvic pain in the females.

The second chapter gives us the previous scientific literature and researches, also includes anatomy, physiology, pathology, normal sonographic appearance of the pelvis and the normal uterine and ovarian appearance. In the third chapter the technical methods and tools as well as the materials and procedures important to collect the data are mentioned, also the technique and the statistical methods used, SPSS version 16 by which the data has been tabulated, represented and analyzed using Chi² test. The fourth chapter is about the results and data analysis. The last chapter describes the discussion, recommendations and conclusion. In the discussion we found that there is a relationship between age, fertility and the social status from one side ; and from the other side the pelvic pain causes but it is not so strong ,this done by using Chi² test put in mind that the error is 0.05 or the level of significance (relations 1-2-3) ..

CHAPTER ONE

1-1: Introduction

Pelvic pain is a symptom that can affect both women and men. The pelvic pain that persists for a period of 6 months or more to be considered chronic while less than this duration is considered acute. The pain may indicate the existence of poorly understood conditions that likely represent abnormal psycho neuromuscular function. Differentiating between acute and chronic pain is important in understanding chronic pelvic pain syndromes. Acute pain is most common, often experienced by patients after surgery or other soft tissue traumas. It tends to be immediate, severe and short lived however, pain that extends beyond a normal recovery period and lasts longer than 3–6 months constitutes chronic pain¹(MarekJantos2007). Most women, at some time in their lives, experience pelvic pain. As girls enter puberty, pelvic or abdominal pain becomes a frequent complaint. Chronic pelvic pain (CPP) accounts for 10% of all visits to gynecologists. In addition, CPP is the reason for 20—30% of all laparoscopies in adults.

CAUSES OF FEMALE PELVIC PAIN:

Acute pelvic pain may be the manifestation of various gynecologic and non-gynecologic disorders from less alarming rupture of the follicular cyst to life threatening conditions such as rupture of ectopic pregnancy or perforation of inflamed appendix. In order to construct an algorithm for differential diagnosis we divide acute pelvic pain into gynecologic and non-gynecologic etiology, which is then subdivided into gastrointestinal and urinary causes. Appendicitis is the most common surgical emergency and should always be considered in differential diagnosis if appendix has not been removed. Apart of clinical examination and laboratory tests, an ultrasound examination is sensitive up to 90% and specific up to 95% if graded compression technique is used. Still it is user-dependend and requires considerable experience in order

to perform it reliably. Meckel's diverticulitis, acute terminal ileitis, mesenteric lymphadenitis and functional bowel disease are conditions that should be differentiated from other causes of low abdominal pain by clinical presentation, laboratory and imaging tests. Dilatation of renal pelvis and ureters are typical signs of obstructive uropathy and may be efficiently detected by ultrasound. Additional thinning of renal parenchyma suggests long-term obstructive uropathy. Ruptured ectopic pregnancy, salpingitis and hemorrhagic ovarian cysts are three most commonly diagnosed gynecologic conditions presenting as an acute abdomen. Degenerating leiomyomas and adnexial torsion occur less frequently. For better systematization, gynecologic causes of acute pelvic pain could be divided into conditions with negative pregnancy test and conditions with positive pregnancy test. Pelvic inflammatory disease may be ultrasonically presented with numerous signs such as thickening of the tubal wall, incomplete septa within the dilated tube, demonstration of hyperechoic mural nodules, free fluid in the "cul-de-sac" etc. Color Doppler ultrasound contributes to more accurate diagnosis of this entity since it enables differentiation between acute and chronic stages based on analysis of the vascular resistance. Hemorrhagic ovarian cysts may be presented by variety of ultrasound findings since intracystic echoes depend upon the quality and quantity of the blood clots. Color Doppler investigation demonstrates moderate to low vascular resistance typical of luteal flow. Leiomyomas undergoing degenerative changes are another cause of acute pelvic pain commonly present in patients of reproductive age. Color flow detects regularly separated vessels at the periphery of the leiomyoma, which exhibit moderate vascular resistance. Although the classic symptom of endometriosis is chronic pelvic pain, in some patients acute pelvic pain does occur. Most of these patients demonstrate an endometrioma or "chocolate" cyst containing diffuse carpet-like echoes. Sometimes, solid components may indicate even ovarian malignancy, but if color Doppler ultrasound is applied it is less likely to obtain false positive results. One should be aware that pericyclic and/or hilar type of

ovarian endometrioma vascularization facilitate correct recognition of this entity. Pelvic congestion syndrome is another condition that can cause an attack of acute pelvic pain. It is usually consequence of dilatation of venous plexuses, arteries or both systems. By switching color Doppler gynecologist can differentiate pelvic congestion syndrome from multilocular cysts, pelvic inflammatory disease or adenomyosis. Ovarian vein thrombosis is a potentially fatal disorder occurring most often in the early postpartal period. Hypercoagulability, infection and stasis are main etiologic factors, and transvaginal color Doppler ultrasound is an excellent diagnostic tool to diagnose it. Acute pelvic pain may occur even in normal intrauterine pregnancy. This may be explained by hormonal changes, rapid growth of the uterus and increased blood flow. Ultrasound is mandatory for distinguishing normal intrauterine pregnancy from threatened or spontaneous abortion, ectopic pregnancy and other complications that may occur in patients with positive pregnancy test. Incomplete abortion is visualized as thickened and irregular endometrial echo with certain amount of intracavitary fluid. If applied, color Doppler ultrasound reveals low vascular resistance signals in richly perfused intracavitary area. Transvaginalsonography has high sensitivity and specificity in visualization of uterine and adnexal signs of ectopic pregnancy. Color Doppler examination may aid in detection of the peritrophoblastic flow. Furthermore, it facilitates detection of ectopic living embryo, tubal ring or unspecific adnexal tumor. Corpus luteum cysts and leiomyomas are another cause of pelvic pain during pregnancy, which can be correctly diagnosed by ultrasound. Detection of uterine dehiscence and rupture in patients with history of prior surgical intervention on uterine wall relies exclusively on correct ultrasound diagnosis. In patients with placental abruption sonographer detects hypoechoic complex representing either retroplacental hematoma, subchorionic hematoma or subamniotic hemorrhage. In closing, ultrasound has already become important and easily available tool which can efficiently recognize patients with possibly

threatening conditions of different origins. Many different conditions can cause pelvic pain including:

- Exaggerated bladder, bowel, or uterine pain sensitivity (also known as visceral pain).
- Pelvic girdle pain (SPD or DSP).
- Gynecologic:

Dysmenorrhea—pain during the menstrual period.

Endometriosis—pain caused by uterine tissue that is outside the uterus.

Müllerian abnormalities.

Pelvic inflammatory disease—pain caused by damage from infections.

Ovarian cysts—the ovary produces a large, painful cyst, which may rupture.

Ovarian torsion—the ovary is twisted in a way that interferes with its blood supply.

Ectopic pregnancy—a pregnancy implanted outside the uterus.

- **Abdominal :**

Loin pain hematuria syndrome.

Proctitis—infection or inflammation of the anus or rectum.

Colitis—infection or inflammation of the colon.

Appendicitis—infection or inflammation of the bowel.

The aim of this study to assess the findings of ultrasound of the causes and diagnosis of pelvic pain.

There are many studies looking about pelvic pain but we notice that they not give the ultrasound modality its really role in detecting and diagnosing the pelvic pain.

1-2- STATEMENT OF THE PROBLEM

Pelvic pains are frequent complaints in the casualty of obstetrics and gynecology, many tools of investigations are used to find out the right diagnosis. This includes clinical examination, urine investigation, ultrasonography and different types of other radiological modalities. By conducting this research, we want to know the best way to reach the diagnosis and to help the health workers in the treatment of the pelvic pain in females.

1-3 RESEARCH OBJECTIVES:

1-3-1 General objectives:

TO diagnose the different pathological causes of female pelvic pain using ultrasound.

1-3-2 Specific objectives:

- To detect the size and nature of early pregnancy, abortion, and ectopic pregnancy in patients with pelvic pain.
- To characterize the masses (fibroids, ovarian or other pelvic mass).
- To identify the degree of complicated ovarian torsion.
- To enumerate the different inflammatory conditions (salpingitis, uteritis, cervicitis, cystitis).
- To measure the size of the lower ureteric & vesical stone.
- To diagnose the appendicitis in female patients complaining of pelvic pain.

1-4 –THESES OVERVIEW:

This study consists of five chapters:

Chapter one: contains introduction and objectives (general and specific).

Chapter two: literature review in two parts; part one anatomy, physiology and normal sonographic appearance of the female pelvis and part two pathology of female pelvic pain.

Chapter three: contains the materials and methods.

Chapter four: contains the results presentation.

Chapter five: contains the discussion, conclusion and recommendations.

CHAPTER TWO

2-1- LITRATURE REVIEW

Firstly we will review the anatomy, physiology, ultrasound technique for the female pelvis and sonographic features of female pelvis and secondly the pathological features in these organs in females with pelvic pain and previous studies

Pelvis anatomy:

Human pelvis:

"Pelvic girdle" redirects here. For the pelvic girdle in other animals, see [Pelvic girdles](#).

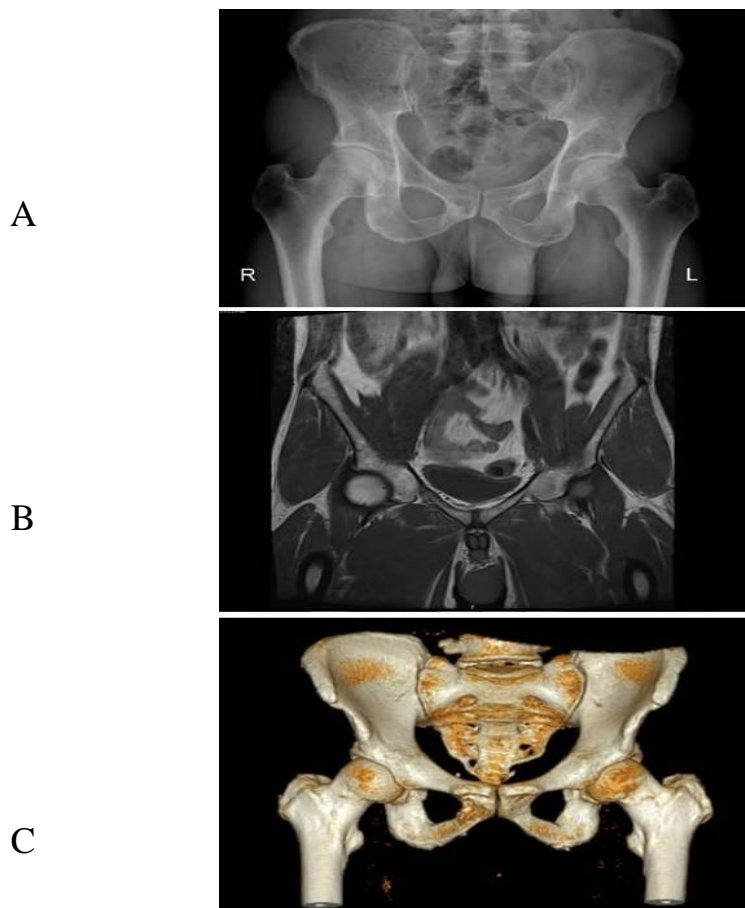


Fig 2-1: The same human pelvis, front imaged by (A) x-ray (top), (B) magnetic resonance imaging (middle), and (C) 3-dimensional computed tomography (bottom).

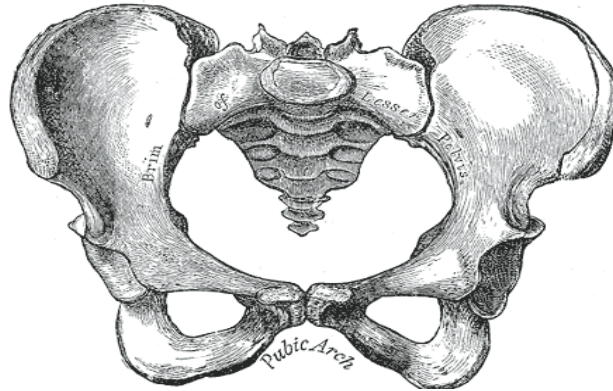


Fig 2-2: Female pelvis

In human anatomy, the **pelvis** (plural **pelvis** or **pelvises**) is either the lower part of the trunk,^[1] between the abdomen and the thighs (sometimes also called **pelvic region** of the trunk), or the skeleton embedded in it^[2] (sometimes also called **bony pelvis**, or **pelvic skeleton**).

The pelvic region of the trunk includes the bony pelvis, the pelvic cavity (the space enclosed by the bony pelvis), the pelvic floor, below the pelvic cavity, and the perineum, below the pelvic floor.^[1]

The pelvic skeleton is formed in the area of the back, by the sacrum and the coccyx and anteriorly and to the left and right sides, by a pair of hip bones. The two hip bones connect the spine with the lower limbs. They are attached to the sacrum posteriorly, connected to each other anteriorly, and joined with the two femurs at the hip joints.

The gap enclosed by the bony pelvis, called the pelvic cavity, is the section of the body underneath the abdomen and mainly consists of the reproductive organs (sex organs) and the rectum.

Pelvic region of the trunk

The pelvic region of the trunk is the lower part of the trunk, between the abdomen and the thighs.^[1] It includes several structures:^[1]

the **bony pelvis** (or pelvic skeleton), which is the part of the skeleton embedded in the pelvic region of the trunk, subdivided into:

the pelvic girdle (i.e., the two hip bones, which are part of the appendicular skeleton), which connects the spine to the lower limbs, and

the pelvic region of the spine (i.e., sacrum, and coccyx, which are part of the axial skeleton)

the pelvic cavity, typically defined as a small part of the space enclosed by the bony pelvis, delimited by the pelvic brim above and the pelvic floor below; alternatively, the pelvic cavity is sometimes also defined as the whole space enclosed by the pelvic skeleton, subdivided into:

the greater (or false) pelvis, above the pelvic brim

the lesser (or true) pelvis, below the pelvic brim

the pelvic floor (or pelvic diaphragm), below the pelvic cavity

the perineum, below the pelvic floor

Bony pelvis

Further information: Hip bone

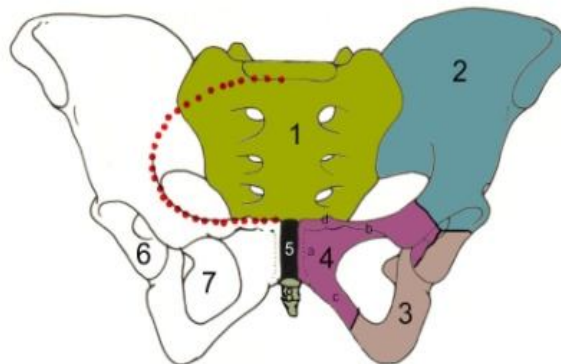


Fig 2-3 the hip bone (the bony pelvis)

The bony pelvis.

1. Sacrum
2. Ilium
3. Ischium
4. Pubic bone
5. Pubic symphysis
6. Acetabulum
7. Obturator foramen
8. Coccyx

Red line: Terminal line/pelvic brim

The pelvic skeleton is formed posteriorly (in the area of the back), by the sacrum and the coccyx and laterally and anteriorly (forward and to the sides), by a pair of hip bones. Each hip bone consists of 3 sections, ileum, Ischium, and pubis. During childhood, these sections are separate bones. During puberty, they fuse together to form a single bone.

Functions:

The skeleton of the pelvis is a basin-shaped ring of bones connecting the vertebral column to the femora. Its primary functions are to bear the weight of the upper body when sitting and standing; transfer that weight from the axial skeleton to the lower appendicular skeleton when standing and walking; and provide attachments for and withstand the forces of the powerful muscles of locomotion and posture. Compared to the shoulder girdle, the pelvic girdle is thus strong and rigid. (MarekJantos (2007). "Understanding Chronic Pelvic Pain". *Pelviperineology* **26** (2): 66–69).

Its secondary functions are to contain and protect the pelvic and abdominopelvic viscera (inferior parts of the urinary tracts, internal reproductive organs); provide attachment for external reproductive organs and associated muscles and membranes.

As a mechanical structure the pelvic girdle consists of the two hip bones. The hip bones are connected to each other anteriorly at the pubic symphysis, and posteriorly to the sacrum at the sacroiliac joints to form the pelvic ring. The ring is very stable and allows very little mobility, a prerequisite for transmitting loads from the trunk to the lower limbs.

As a mechanical structure the pelvis may be thought of as four roughly triangular and twisted rings. Each superior ring is formed by the iliac bone; the anterior side stretches from the acetabulum up to the anterior superior iliac spine; the posterior side reaches from the top of the acetabulum to the sacroiliac joint; and the third side is formed by the palpable iliac crest. The lower ring, formed by the rami of the pubic and ischial bones, supports the acetabulum and is twisted 80-90 degrees in relation to the superior ring.

An alternative approach is to consider the pelvis part of an integrated mechanical system based on the tensegrityicosahedrons as an infinite element. Such a system is able to withstand omnidirectional forces — ranging from weight-bearing to childbearing — and, as a low energy requiring system, is favored by natural selection.

The pelvic inclination angle is the single most important element of the human body posture and is adjusted at the hips. It is also one of the rare things that can be measured at the assessment of the posture. A simple method of measurement was described by the British orthopedist Philip Willes and is performed by using an inclinometer.

Junctions

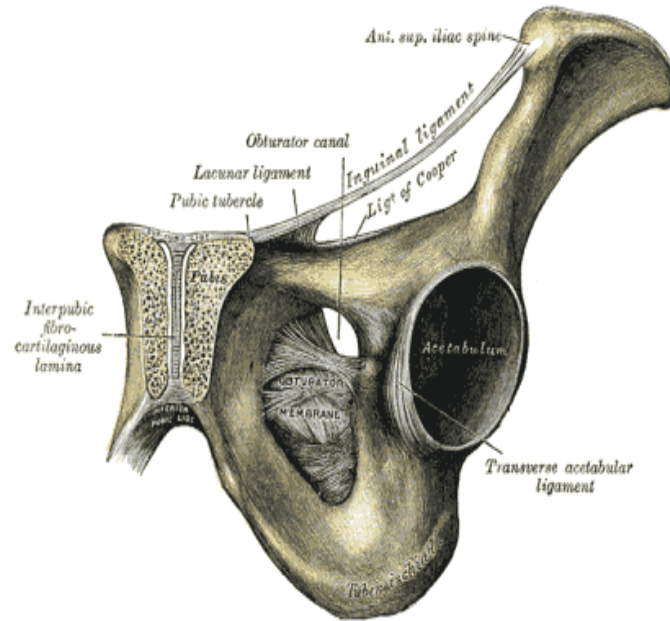


Fig 2-4 Coronal section through pubic symphysis

The two hip bones are joined anteriorly at the pubic symphysis by a fibrous cartilage covered by a hyaline cartilage, the interpubic disk, within which a non-synovial cavity might be present. Two ligaments, the superior and inferior pubic ligaments, reinforce the symphysis.

Both sacroiliac joints, formed between the auricular surfaces of the sacrum and the two hip bones. are amphiarthroses, almost immobile joints enclosed by very taut joint capsules. This capsule is strengthened by the ventral, interosseous, and dorsal sacroiliac ligaments. The most important accessory ligaments of the sacroiliac joint are the sacrospinous and sacrotuberous ligaments which stabilize the hip bone on the sacrum and prevent the promonotory from tilting forward. Additionally, these two ligaments transform the greater and lesser sciatic notches into the greater and lesser foramina, a pair of important pelvic openings. The iliolumbar ligament is a strong ligament which connects the tip of the transverse process of the fifth lumbar vertebra to the posterior part of the inner lip of the iliac crest. It can be thought of as the lower border of the thoracolumbar fascia and is occasionally accompanied by a smaller ligamentous band

passing between the fourth lumbar vertebra and the iliac crest. The lateral lumbosacral ligament is partly continuous with the iliolumbar ligament. It passes between the transverse process of the fifth vertebra to the ala of the sacrum where it intermingles with the anterior sacroiliac ligament.

The joint between the sacrum and the coccyx, the sacrococcygeal symphysis, is strengthened by a series of ligaments. The anterior sacrococcygeal ligament is an extension of the anterior longitudinal ligament (ALL) that runs down the anterior side of the vertebral bodies. Its irregular fibers blend with the periosteum. The posterior sacrococcygeal ligament has a deep and a superficial part, the former is a flat band corresponding to the posterior longitudinal ligament (PLL) and the latter corresponds to the ligamenta flava. Several other ligaments complete the foramen of the last sacral nerve.

Articulations

The lumbosacral joint, between the sacrum and the last lumbar vertebra, has, like all vertebral joints, an intervertebral disc, anterior and posterior ligaments, ligamenta flava, interspinous and supraspinous ligaments, and synovial joints between the articular processes of the two bones. In addition to these ligaments the joint is strengthened by the iliolumbar and lateral lumbosacral ligaments. The iliolumbar ligament passes between the tip of the transverse process of the fifth lumbar vertebra and the posterior part of the iliac crest. The lateral lumbosacral ligament, partly continuous with the iliolumbar ligament, passes down from the lower border of the transverse process of the fifth vertebra to the ala of the sacrum. The movements possible in the lumbosacral joint are flexion and extension, a small amount of lateral flexion (from 7 degrees in childhood to 1 degree in adults), but no axial rotation. Between ages 2–13 the joint is responsible for

as much as 75% (about 18 degrees) of flexion and extension in the lumbar spine. From age 35 the ligaments considerably limit the range of motions.

The three extracapsular ligaments of the hip joint — the iliofemoral, ischiofemoral, and pubofemoral ligaments — form a twisting mechanism encircling the neck of the femur. When sitting, with the hip joint flexed, these ligaments become lax permitting a high degree of mobility in the joint. When standing, with the hip joint extended, the ligaments get twisted around the femoral neck, pushing the head of the femur firmly into the acetabulum, thus stabilizing the joint. The zona orbicularis assists in maintaining the contact in the joint by acting like a buttonhole on the femoral head. The intracapsular ligament, the ligamentum teres, transmits blood vessels that nourish the femoral head.

Pelvic cavity

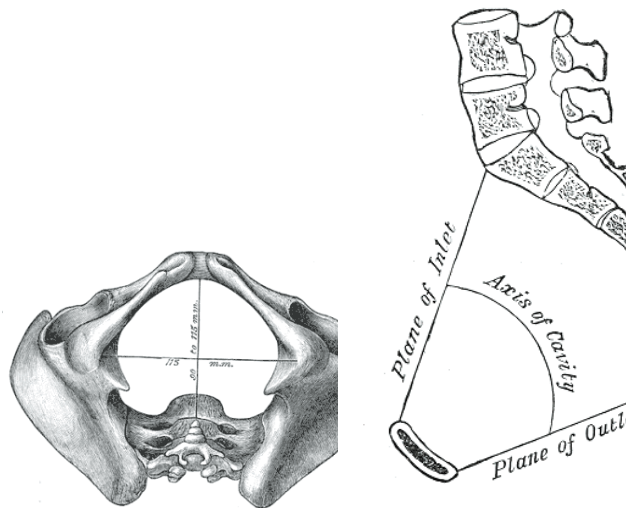


Fig 2-5 Main article: Pelvic cavity

The pelvic cavity is a body cavity that is bounded by the bones of the pelvis and which primarily contains reproductive organs and the rectum.

A distinction is made between the lesser or true pelvis inferior to the terminal line, and the greater or false pelvis above it. The pelvic inlet or superior pelvic aperture, which

leads into the lesser pelvis, is bordered by the promontory, the arcuate line of ilium, the iliopubic eminence, the pecten of the pubis, and the upper part of the pubic symphysis. The pelvic outlet or inferior pelvic aperture is the region between the subpubic angle or pubic arch, the ischialtuberosties and the coccyx. Ligaments: obturator membrane, inguinal ligament (lacunar ligament, iliopectineal arch)

Development:

Each side of the pelvis is formed as cartilage, which ossifies as three main bones which stay separate through childhood: ilium, ischium, pubis. At birth the whole of the hip joint (the acetabulum area and the top of the femur) is still made of cartilage (but there may be a small piece of bone in the great trochanter of the femur); this makes it difficult to detect congenital hip dislocation by X-raying.

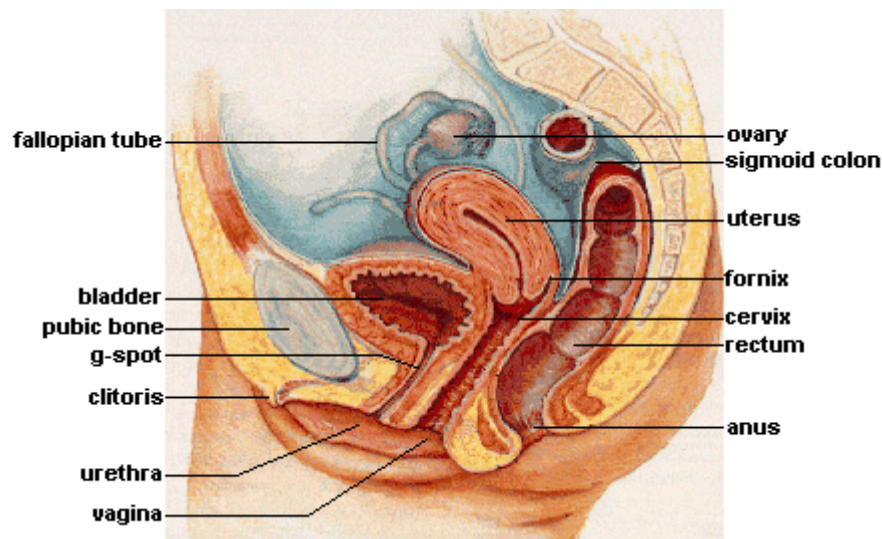


Fig 2-6 Cross-sectional diagram of the female reproductive organs.

Physiology:

All living things reproduce. This is something that sets the living apart from non-living. Even though the reproductive system is essential to keeping a species alive, it is not essential to keeping an individual alive. This chapter describes the different parts of the female reproductive system: the organs involved in the process of reproduction, hormones that regulate a woman's body, the menstrual cycle, ovulation and pregnancy, the female's role in genetic division, birth control, sexually transmitted diseases and other diseases and disorders.

Reproduction:

Reproduction can be defined as the process by which an organism continues its species. In the human reproductive process, two kinds of sex cells (gametes), are involved: the male gamete (sperm), and the female gamete (egg or ovum). These two gametes meet within the female's uterine tubes located one on each side of the upper pelvic cavity, and begin to create a new individual. The female needs a male to fertilize her egg; she then carries offspring through pregnancy and childbirth

At about 5 months gestation, the ovaries contain approximately six to seven million oogonia, which initiate meiosis. The oogonia produce primary oocytes that are arrested in prophase I of meiosis from the time of birth until puberty. After puberty, during each menstrual cycle, one or several oocytes resume meiosis and undergo their first meiotic division during ovulation. This results in the production of a secondary oocyte and one polar body. The meiotic division is arrested in metaphase II. Fertilization triggers completion of the second meiotic division and the result is one ovum and an additional polar body. The ovaries of a newborn baby girl contain about one million oocytes. This number declines to 400,000 to 500,000 by the time puberty is reached. On average, 500-1000 oocytes are ovulated during a woman's reproductive lifetime.

When a young woman reaches puberty around age 10 to 13, a primary oocyte is discharged from one of the ovaries every 28 days. This continues until the woman reaches menopause, usually around the age of 50 years. Oocytes are present at birth, and age as a woman ages.

Female Reproductive System:

Produces eggs (ova). Secretes sex hormones. Receives the male spermatozoa during. Protects and nourishes the fertilized egg until it is fully developed. Delivers fetus through birth canal.

Provides nourishment to the baby through milk secreted by mammary glands in the breast

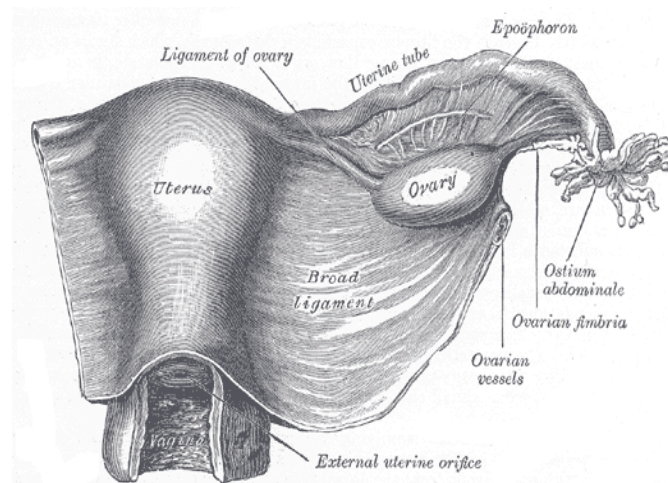


Fig 2-7 Drawing show the ligaments of both uterus and the ovary

Table 2-1 show the site & the functions of the different female reproductive system organs

STRUCTURE	LOCATION & DESCRIPTION	FUNCTION
Breasts	Upper chest one on each side containing alveolar cells (milk production), myoepithelial cells (contract to expel milk), and duct walls (help with extraction of milk).	Lactation milk/nutrition for newborn.
Cervix	The lower narrower portion of the uterus.	During childbirth, contractions of the uterus will dilate the cervix up to 10 cm in diameter to allow the child to pass through. During orgasm, the cervix convulses and the external os dilates
Clitoris	Small erectile organ directly in front of the vestibule.	Sexual excitation, engorged with blood.
Fallopian tubes	Extending upper part of the uterus on either side.	Egg transportation from ovary to uterus (fertilization usually takes place here).
Hymen	Thin membrane that partially covers the vagina in young females.	
Labia majora	Outer skin folds that surround the entrance to the vagina.	Lubrication during mating.
Labia minora	Inner skin folds that surround the entrance to the vagina.	Lubrication during mating.
Mons	Mound of skin and underlying fatty tissue, central in lower pelvic region	
Ovaries (female gonads)	Pelvic region on either side of the uterus.	Provides an environment for maturation of oocyte. Synthesizes and secretes sex hormones (estrogen

		and progesterone).
Perineum	Short stretch of skin starting at the bottom of the vulva and extending to the anus.	
Urethra	Pelvic cavity above bladder, tilted.	Passage of urine.
Uterus	Center of pelvic cavity.	To house and nourish developing human.
Vagina	Canal about 10-8 cm long going from the cervix to the outside of the body.	Receives penis during mating. Pathway through a womans body for the baby to take during childbirth. Provides the route for the menstrual blood (menses) from the uterus, to leave the body. May hold forms of birth control, such as an IUD, diaphragm, neva ring, or female condom
Vulva	Surround entrance to the reproductive tract.(encompasses all external genitalia)	
Endometrium	The innermost layer of uterine wall.	Contains glands that secrete fluids that bathe the utrine lining.
Myometrium	Smooth muscle in uterine wall.	Contracts to help expel the baby.

The Female Reproductive Cycle

Towards the end of puberty, girls begin to release eggs as part of a monthly period called the female reproductive cycle, or **menstrual cycle** (menstrual referring to "monthly"). Approximately every 28 days, during ovulation, an ovary sends a tiny egg into one of the fallopian tubes. Unless the egg is fertilized by a sperm while in the fallopian in the two to three days following ovulation, the egg dries up and leaves the body about two weeks later through the vagina. This process is called menstruation. Blood and tissues from the inner lining of the uterus (the endometrium) combine to form the menstrual flow, which generally lasts from four to seven days. The first period is called **menarche**. During menstruation arteries that supply the lining of the uterus constrict and capillaries weaken. Blood spilling from the damaged vessels detaches layers of the lining, not all at once but in random patches. Endometrial mucus and blood descending from the uterus, through the liquid creates the menstruation flow.

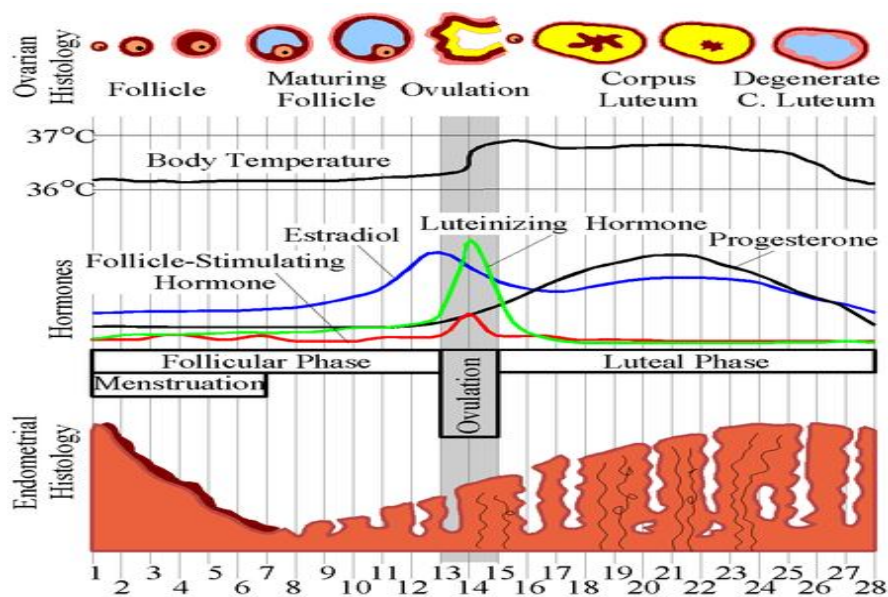


Fig 2-8 Drawing show the Female Reproductive Cycle

2-2--Normal sonographic appearance of female pelvis, ULTRASOUND OF THE UTERUS

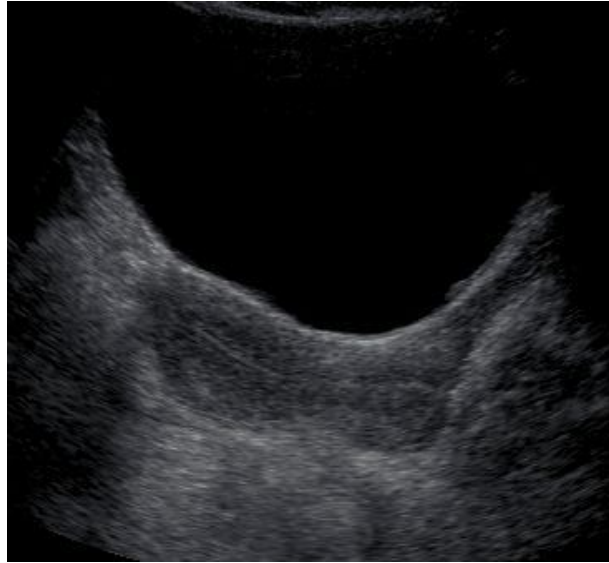


Fig 2-2 Uterus (sagittal) US image.

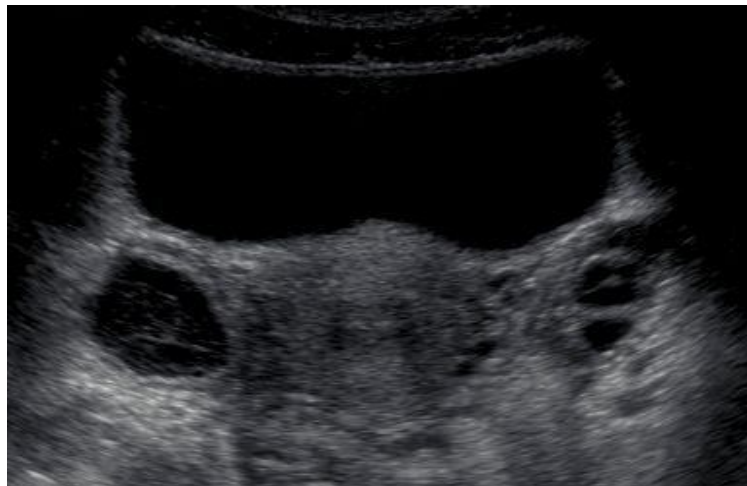


Fig 2-3 Uterus (tranverse) US image.

Both ovaries seen

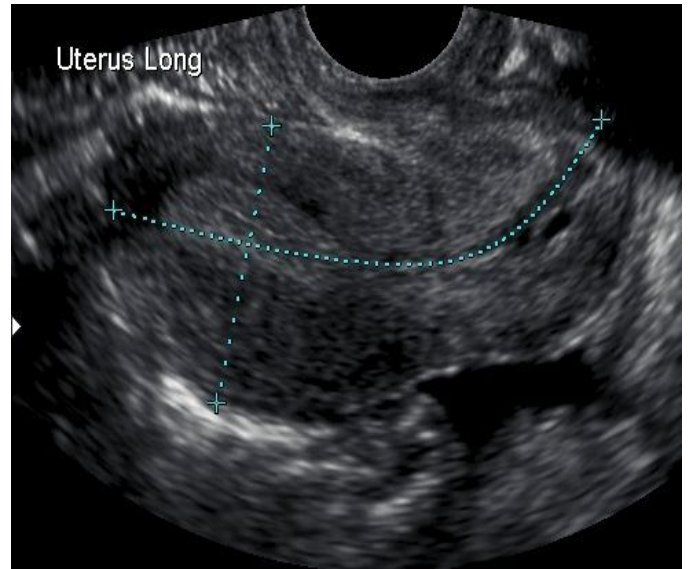
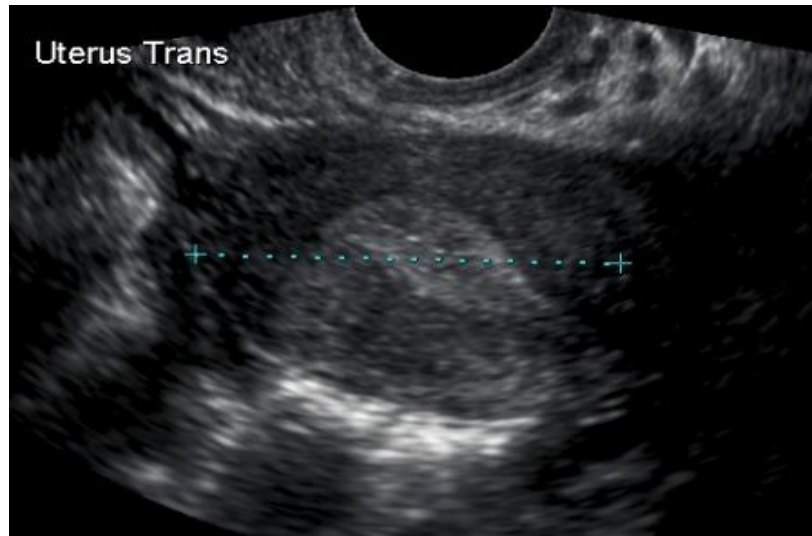


Fig 2-3 Normal TV image anteverted sagittal. Fig 2-4 Retroverted uterus transvaginal scan.

EVALUATION OF THE UTERUS

Evaluation of contour changes, variations in echogenicity, masses and cysts. Any pathology must be measured in 2 planes. Fibroids should be labelled if they are submucosal, intramural, subserosal or pedunculated and their position within the uterus (Rt, Lt, Midline, Fundal, Body or cervical)



The probe is turned slowly anticlockwise to visualise the uterus at 90degrees to the sagittal view. The Maximum Width is measured in this transverse (coronal) plane.

Pelvic pathology:

What Is Pelvic Pain?

Pelvic pain refers to pain in the abdomen below the belly button. This pain can accompany a wide range of conditions. It may be a harmless sign of fertility, a digestive disorder like IBS, or a red flag for a life-threatening emergency. There are 18 causes of pelvic pain. But be sure to see your doctor for proper diagnosis and treatment.

Causes Pelvic Pain:

Possible causes of pelvic pain in both men and women may include Appendicitis - Bladder disorders - Sexually transmitted diseases - Kidney infection or kidney stones - Intestinal disorders - Nerve conditions - Hernia - Pelvis disorder - Broken pelvis - Psychogenic pain .

Possible causes of pelvic pain in women only may include:

Ectopic pregnancy - Miscarriage - Pelvic inflammatory disease - Ovulation

Menstrual cramps - Ovarian cysts or other ovarian disorders- Fibroids - Endometriosis
Uterine cancer - Cervical cancer.

Appendicitis:

This is an inflammation of the appendix, a tube of tissue connected to the large intestine. The symptoms include sharp pain in the lower right abdomen, vomiting, and fever. If you have these symptoms, go to the ER. An infected appendix must be surgically removed or it will eventually burst, spreading the infection within the abdomen. This can result in life-threatening complications.

Although pelvic pain often refers to pain in the region of women's internal reproductive organs, pelvic pain can be present in men, too, and can stem from multiple causes. Pelvic pain may be a symptom of infection or may arise from pain in the pelvic bone or in non-reproductive internal organs, such as the bladder or colon. In women, however, pelvic pain can very well be an indication that there may be a problem with one of the reproductive organs in the pelvic area (uterus, ovaries, fallopian tubes, cervix, or vagina).

Mittelschmerz (Painful Ovulation):

If you have painful twinges halfway between your periods, you may be feeling your body ovulate. During ovulation, the ovary releases an egg along with some fluid and blood, which may irritate the lining of the abdomen. This is called *mittelschmerz* from the German words for "middle" and "pain," because it occurs mid-cycle. The pain may switch sides from month to month. It isn't harmful and usually goes away within a few hours.

PMS (Premenstrual Syndrome):

PMS is known for triggering mood swings and food cravings. It can also cause abdominal cramps, low back pain, headaches, tender breasts, and acne. Hormonal

changes may be to blame. Stress, lack of exercise, and some vitamin deficiencies may make the symptoms worse. If PMS is interfering with your daily activities, talk to your doctor. Lifestyle changes and medication can often help.

Menstrual Cramps:

Every month, the uterus builds up a lining of tissue called the endometrium, where an embryo can implant and grow. If you don't get pregnant, the lining breaks down and leaves the body as your menstrual period. Menstrual cramps can occur when the uterus contracts to help push out this blood. The cramps are usually felt in the lower belly or back and last one to three days. A heating pad and over-the-counter pain relievers may help.

Ectopic Pregnancy:

This is a life-threatening emergency that requires immediate treatment. It happens when an embryo implants and begins growing somewhere outside of the uterus, usually the fallopian tube. The symptoms include sharp pelvic pain or cramps (particularly on one side), vaginal bleeding, nausea, and dizziness. Urgent medical attention is needed.

Pelvic Inflammatory Disease:

One of the most serious complications of STDs is pelvic inflammatory disease or PID. This infection can cause permanent damage to the uterus, ovaries, and fallopian tubes (seen here, swollen and red). In fact, it's the leading preventable cause of infertility in women. Symptoms include belly pain, fever, abnormal vaginal discharge, and pain during sex or urination. PID is treated with antibiotics, and in severe cases, surgery.

Ovarian Cysts:

A follicle houses the maturing egg during the menstrual cycle and releases the egg when you ovulate. Occasionally, a follicle doesn't open to release the egg or recloses after

releasing the egg and swells with fluid, forming an ovarian cyst. This is usually harmless and goes away on its own. But large cysts may cause pelvic pain, weight gain, and frequent urination. Ovarian cysts can be identified with a pelvic exam or ultrasound.

Uterine Fibroids:

Fibroids grow in the wall of the uterus and are sometimes called fibroid tumors, but they are not cancerous. Fibroids are common in women in their 30s and 40s and usually cause no problems. However, some women may experience pressure in the belly, low back pain, heavy periods, painful sex, or trouble getting pregnant. Talk with your doctor about treatments to shrink or remove problematic fibroids.

Endometriosis:

In some women, endometrial tissue grows outside the uterus. Growths may form on the ovaries, fallopian tubes, bladder, intestines, and other parts of the body. When it's time for your period, these clumps break down, but the tissue has no way to leave the body. While this is rarely dangerous, it can cause pain and produce scar tissue that may make it tough to get pregnant. There are treatments for endometriosis, but there is no cure.

Urinary Tract Infection:

A urinary tract infection (UTI) begins when germs get into the urinary tract. A UTI can cause problems anywhere from the urethra to the bladder and up through the ureters all the way to the kidneys. Symptoms include pressure in the lower pelvis, painful urination, and a frequent urge to urinate. The infection usually isn't serious if it is treated promptly. But when it spreads to the kidneys, it can cause permanent damage. Signs of a kidney infection include fever, nausea, vomiting, and pain in one side of the lower back.

Kidney Stones:

Kidney stones are globs of salt and minerals that deposit in the urine. They can be as tiny as a grain of sand or as large as a golf ball. As the stones move from your kidney to your bladder, they can trigger sudden, excruciating pain in the belly or pelvic area. Your urine may turn pink or red from blood. Check with your doctor if you think you have kidney stones. Most will pass out of your system on their own, but some require treatment.

Interstitial Cystitis (IC):

Interstitial cystitis (IC) is a chronic pain condition related to inflammation of the bladder. The cause is unknown. People with severe IC may need to urinate multiple times an hour. Other symptoms include pressure above the pubic area, painful urination, and pain during sex. The condition is most common in women in their 30s and 40s. Although there is no cure, there are ways to ease the symptoms.

Sexually Transmitted Diseases:

Pelvic pain is a warning sign for some sexually transmitted diseases (STDs.) Two of the most common are Chlamydia and gonorrhea (shown here through a microscope); they often occur together. They don't always cause symptoms, but when they do, they may trigger pelvic pain, painful urination, bleeding between periods, and abnormal vaginal discharge. It's important to seek treatment to prevent serious complications and avoid infecting your partner.

Pelvic Organ Prolapse: Many women will have some type of pelvic organ Prolapse as they age. This occurs when an organ, such as the bladder or uterus, drops into a lower position. It usually isn't a serious health problem, but it can be uncomfortable. The most common symptoms are pressure against the vaginal wall, feeling full in the lower belly, discomfort in the groin or lower back, and painful sex. Treatment options range from special exercises to surgery.

Pelvic Congestion Syndrome:

Varicose veins commonly occur in the legs (seen here in the upper thigh), and they can sometimes develop in the pelvis. Blood backs up in the pelvic veins, causing them to become swollen and painful. This is known as pelvic congestion syndrome. The pain tends to be worse when you sit or stand. Lying down may provide relief. There are minimally invasive procedures to treat pelvic congestion syndrome.

Scar Tissue:

If you've had surgery in the pelvic or lower abdominal region, such as an appendectomy or a C-section, or infection in the area, you could have ongoing pain from scar tissue. Adhesions are a type of internal scar tissue that forms between organs or structures that are not meant to be connected. Abdominal adhesions can cause pain and other problems, depending on their location. In some cases, adhesions must be surgically removed.

Vulvodynia:

Vulvodynia is chronic vulvar pain that has no known cause. The pain affects the area around the opening of the vagina. It can be constant or recurring and is often described as a burning, stinging or throbbing sensation. Riding a bike or having sex may make the pain worse. It is not caused by an infection. And a diagnosis of Vulvodynia is made only after ruling out other causes of vulvar pain. Treatment options range from medication to physical therapy.

Pain During Sex:

Pain during sex (dyspareunia) can be caused by many of the conditions we've discussed, most of which are treatable. Other reasons for painful sex are vaginal infections or

insufficient lubrication. Sometimes there is no medical explanation for pain during sex. In those cases, sexual therapy may be beneficial. This type of therapy can help resolve inner conflicts about sex or past abuse.

Other causes include IBS.

Irritable Bowel Syndrome:

Irritable bowel syndrome (IBS), also known as "spastic colon," is a common disorder. While most people experience digestive troubles once in a while, what sets IBS apart is belly pain and diarrhea or constipation that comes back again and again. IBS affects 10% to 15% of people in North America.

Chronic Pelvic Pain:

Chronic pelvic pain occurs below your belly button and lasts at least 6 months. It may be severe enough to interfere with your sleep, career, or relationships. The first step toward getting your life back is seeing your doctor for a diagnosis. Most of the conditions we've discussed respond well to treatment. Sometimes, even after a lot of testing, the cause of pelvic pain remains a mystery. But your doctor can still help you find ways to feel.

Symptoms Suggest a Problem:

Menstrual cramps -- Menstrual pain -- Vaginal bleeding, spotting or discharge -- Painful or difficult urination -- Constipation or diarrhea -- Bloating or gas -- Blood seen with a bowel movement -- Pain during intercourse -- Fever or chills -- Pain in the hip area -- Pain in the groin area.

Determination of Causes of Pelvic Pain:

To determine what is causing pelvic pain, your doctor will first ask you several questions about your symptoms and past medical problems. He or she will also perform a physical

exam and may offer you tests to determine what is causing your pain. Other tests that may be given include:

Blood and urine tests, Pregnancy tests in females of reproductive age, Vaginal or penile cultures to check for sexually transmitted diseases such as gonorrhea and/or Chlamydia, Abdominal and pelvic X-rays, Bone density screening (special type of X-ray to determine the strength of bone), Diagnostic laparoscopy (procedure allowing a direct look at the structures in the pelvis and abdomen), Hysteroscopy (procedure to examine the uterus), Stool test (checking a stool sample for microscopic blood), Lower endoscopy (insertion of a lighted tube to examine the inside of the rectum and part or all of the colon), Ultrasound (test that uses sound waves to provide images of internal organs), CT scan of the abdomen and pelvis (scan that uses X-rays and computers to produce an image of a cross-section of the body).

2-3- Previous studies:

Study 1:

Clinical presentation and epidemiology of female genital tuberculosis in eastern Sudan, by Ali AA¹, Abdallah TM. **OBJECTIVE:** To describe the epidemiology and clinical presentation of female genital tuberculosis (FGTB) among women in eastern Sudan. **METHODS:** A cross-sectional survey was conducted at Kassala Maternity Hospital, Sudan, from January 1 to December 31, 2010. **RESULTS:** Of the 2778 women presenting with various gynecologic symptoms, 44 suspected cases of FGTB were identified. Granulomatous tissue reactions were observed in 25 of the suspected FGTB cases, yielding an incidence of 0.9%. The majority (20/25; 80%) of these patients presented with chronic pelvic and lower abdominal pain; however, 68.0% (17/25) presented with pelvic mass, cyst and/or abscess; 48.0% (12/25) had dyspareunia; 40.0% (10/25) were infertile; 28% (7/25) had menstrual dysfunction; 20.0% (5/25) had dysmenorrhea; and 4.0% (1/25) experienced postmenopausal bleeding. Body mass index, residence, and educational level were significantly different between women diagnosed with FGTB and those where FGTB was excluded (P values=0.02, 0.03, and 0.01, respectively). However, no significant differences were found in age and Bacillus Calmette-Guérin vaccination status. **CONCLUSION:** Clinical suspicion may facilitate and improve the detection of FGTB, with chronic pelvic pain identified as the predominant clinical presentation among women in eastern Sudan.

Study 2:

Female Circumcision in Sudan: Future Prospects and Strategies for Eradication, By M. Mazharul Islam and M. Mosleh Uddin **Context:** Female circumcision—also known as female genital mutilation—is widely practiced in some parts of Sudan.

Information about attitudes toward the practice, the reasons why women support it and the social and demographic predictors associated with support for it are needed for development of eradication strategies. **Methods:** In a survey on reproductive health, approximately 1,000 ever-married women were randomly selected in each of three areas—Haj-Yousif and Shendi in the north, where female circumcision is widely practiced, and Juba in the south, where it is relatively rare. Interviewers collected data on the prevalence of the three types of circumcision, their social and demographic correlates, women's attitudes toward the practice and their perception of their husbands' attitudes. **Results:** Some 87% of respondents in Haj-Yousif, almost 100% of those in Shendi and 7% of those in Juba have been circumcised. Pharaonic circumcision—the most severe type—was reported by 96% of circumcised women in Shendi and 69% of those in Haj-Yousif, but only 31% of those in Juba. However, a small but significant shift from Pharaonic to Sunna circumcision appears to have occurred in Shendi and Haj-Yousif in recent years. Overall, 67% of respondents in Haj-Yousif, 56% of those in Shendi and 4% of those in Juba support continuation of the practice; more highly educated and economically better off women are less likely to be supportive in the two high-prevalence areas. Social custom is the most commonly cited reason for favoring continuation of female circumcision in Haj-Yousif and Shendi (69-75%), while better marriage prospects are the most frequently given reason in Juba. Based on the women's perceptions, men are more likely than women to favor discontinuation. **Conclusions:** Female circumcision seems to be declining slightly in some areas of Sudan. A culturally accepted policy and political commitment to eradicate the practice are needed. Education and economic empowerment of women would help lower support for the practice. A mass media campaign publicizing the risks of female circumcision and the fact that female circumcision is not obligatory for Islamic women would also be helpful.

Study 3:

Female chronic pelvic pain is common and complex done by KatriHamunenPain Clinic, Department of Anaesthesiology and Intensive Care Medicine, Helsinki University Central Hospital, P.O. Box 140, FIN-00029 HUS Helsinki, Finland .Published Online: March 05, 2014. Reported prevalence rates for chronic pelvic pain have varied. In one large epidemiological study with 5263 women participating 15% reported chronic pelvic pain within last three months. In primary care the prevalence of chronic pelvic pain seems to be comparable to migraine, back pain, and asthma .In this issue of the *Scandinavian Journal of Pain* Loving and co-workers report a cross-sectional study on prevalence of female chronic pelvic pain. The study was a postal survey with 1176 participants and responder rate of 48%. The authors found that the prevalence of chronic pelvic pain in this Danish sample was 11%. Prevalence was somewhat higher, 13.6%, in women of reproductive age. Self-reported incidence of irritable bowel, bladder pain, or interstitial cystitis, vulvodynia, endometriosis, and pelvic surgery within 6 months were more common compared with pain-free responders. Conclusions and implications.The problem of female chronic pelvic pain is far from solved. Pathophysiological mechanisms, diagnostic criteria, and effective treatments need to be investigated. Appropriate multidisciplinary treatment programmes should be built. Making the problem visible is the first step towards better understanding and treatment of any illness. Like the authors of this study write, valid data on prevalence is needed in order to acquire funding for research and treatment. Loving and her co-workers should be complimented for doing this important prevalence study.

Study 4:

Pelvic pain during pregnancy: a descriptive study of signs and symptoms of 870 patients in primary care. Done by Röst CC¹, Jacqueline J, Kaiser A, Verhagen AP, Koes BW.

STUDY DESIGN: The authors conducted a cross-sectional analysis. **OBJECTIVE:** The objective of this study was to describe the signs and symptoms of pregnant women with pain and dysfunction in the pelvic area. **SUMMARY OF BACKGROUND DATA:** Pelvic pain during pregnancy is common with incidence rates of 48% to 56%. The exact cause of pelvic pain during pregnancy is still unclear. Also unclear is the association between physical examination and the occurrence of pelvic pain during pregnancy. **METHODS:** Pregnant women with pelvic pain were sent for treatment to 2 physical therapy practices between January 1997 and January 2002. A standardized clinical examination protocol and an extensive questionnaire were used to obtain relevant clinical and demographic characteristics. **RESULTS:** In total, 870 women were included. The average score of the overall severity of the complaints was 7.8 (scale 0-15). Main complaints were located around the sacroiliac joints (76.6%) and the pubic symphysis (57.2%). The area of pain was not related to positive signs in passive hip movements and sacroiliac tests. The highest positive test results were found for Patrick sign (71.7%), active straight leg raise (ASLR) test (66.4%), resisted adduction (54.4%), and passive hip abduction (36.9%). Overall severity of complaints was related to age, number of weeks pregnant, passive hip flexion and internal rotation, and swimming. The total explained variance of these factors was 15.9%. No relationship was found between overall complaints and sacroiliac tests, pelvic pain during a previous pregnancy, extremely painful or type of previous deliveries. **CONCLUSIONS:** Pregnant patients with pelvic pain show a considerable level of complaints. The overall severity of complaints is not related to previous peripartum pelvic pain or type of deliveries or to commonly used tests. Further study on the role of clinical examination, including passive flexion and internal rotation of the hip joints, is recommended.

CHAPTER THREE

MATERIALS AND METHODS

3-1- Materials & tools:

An ultrasound machine (Mindary 1100 with one probe – convex 3.5 MHz , Ultrasound imaging system) with a B mode capabilities is used. The transducer is a phased - array 3.5 MHZ, and ultrasound gel is applied to the transducer to prevent any attenuation or artifact. And thermal Paper Printer was used. A data collection sheet is used to collect the data and to number the patients.

3-2- Methods:

The study was conducted in Turkish hospital, Khartoum city, from the first of December to the thirty first of May 2016. From the study population, in a random way a total of fifty one patients (n=51) were selected to be the sample unit in this study.

3-3-The inclusion criterion:

Any patient attending the hospital in that period mentioned complaining of pelvic pain.

3-4-The exclusion criteria:

Noexclusion criterion, any patient comes with suprapubic pain.

A written permission is issued and taken from the hospital director; also anyone in the study signed an agreement to be one of the study objects after had been told about what should be done for her.

To collect the suitable data for the study; personal information from any patient is written in the data collection sheet as well as the results .This includes the following:

General information, Clinical information and Ultrasound findings. See the appendix

3-5- Ultrasound technique of the female pelvis:

The examination begins with the patient in the supine position. Scans are performed in the sagittal and transverse planes from the anterior approach using the bladder as acoustic window (transabdom. The highest frequency transducer permitting adequate penetration is used. This is usually in the 3.5MHz. A convex probe is used and an acoustic gel is applied.

3-6- statistics:

Finally these data was tabulated, described, represented and analyzed using SPSS version 16 ,putting in mind that the p value is 0.05 using the chi square test to know the significance & correlation coefficient between tow suitable variables . The results of this analysis put in a scientific frames and facts from which the medical decision and recommendations is created in the discussion chapter.

Chapter four

Results and analysis

Table 4-1 shows the distribution of the marital status.

Marital Status

	Frequency	Percent	Valid Percent	Cumulative Percent
Married	44	86.3	86.3	86.3
Single	7	13.7	13.7	100.0
Total	51	100.0	100.0	

Table 4-2 represent the distribution of the fertility in the surveyed patients.

Fertility

	Frequency	Percent	Valid Percent	Cumulative Percent
Single	7	13.7	13.7	13.7
Fertile	38	74.5	74.5	88.2
Infertile	6	11.8	11.8	100.0
Total	51	100.0	100.0	

Table 4-3 shows the distribution of the pelvic pain.

Pelvic Pain

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	50	98.0	98.0	98.0
No	1	2.0	2.0	100.0
Total	51	100.0	100.0	

Table 4-4 represent the distribution of the vaginal bleeding in the surveyed patients.

Vaginal bleeding

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	4	7.8	7.8	7.8
No	47	92.2	92.2	100.0
Total	51	100.0	100.0	

Table 4-5 shows the distribution of the back pain

Back Pain

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	32	62.7	62.7	62.7
No	19	37.3	37.3	100.0
Total	51	100.0	100.0	

Table 4-6 represent the distribution of the vaginal discharge in the surveyed patients.

Vaginal Discharge

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	11	21.6	21.6	21.6
No	40	78.4	78.4	100.0
Total	51	100.0	100.0	

Table 4-7 shows the distribution of the pelvic swelling

Pelvic Swelling

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	12	23.5	23.5	23.5
No	39	76.5	76.5	100.0
Total	51	100.0	100.0	

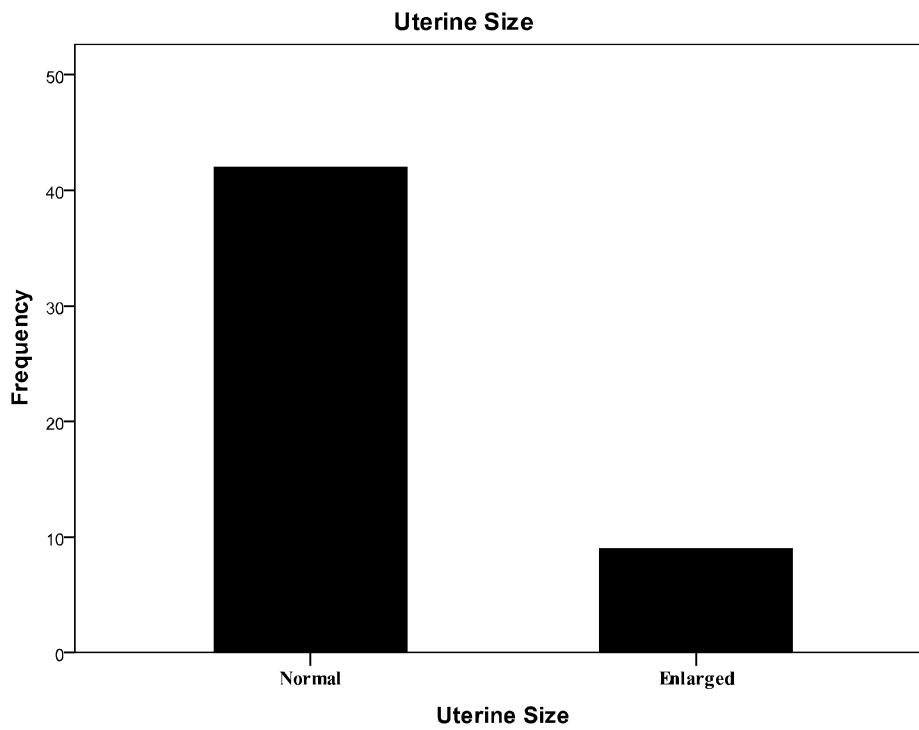
Table 4-8 shows the distribution of menstrual period.

Menstrual Period

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Regular	38	74.5	74.5	74.5
Irregular	13	25.5	25.5	100.0
Total	51	100.0	100.0	

Table 4-9 shows the distribution of the uterine size

		Uterine Size			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Normal	42	82.4	82.4	82.4
	Enlarged	9	17.6	17.6	100.0
	Total	51	100.0	100.0	



Figure(4-1) shows the distribution of the uterine size.

Table 4- 10 shows the distribution of the uterine mass

Uterine Mass

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid YES	10	19.6	19.6	19.6
No	41	80.4	80.4	100.0
Total	51	100.0	100.0	

Table 4-11 shows the distribution of the Ovaries

Ovaries

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Normal	35	68.6	68.6	68.6
Abnormal	16	31.4	31.4	100.0
Total	51	100.0	100.0	

Table 4-12 represents the distribution of the fluid collection of pouch of douglass

Pouch of Douglass

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Fluid Collection	6	11.8	11.8	11.8
No Fluid	45	88.2	88.2	100.0
Total	51	100.0	100.0	

Table 4-13 shows the distribution gases collection in the pelvic.

Gases

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	13	25.5	25.5	25.5
No	38	74.5	74.5	100.0
Total	51	100.0	100.0	

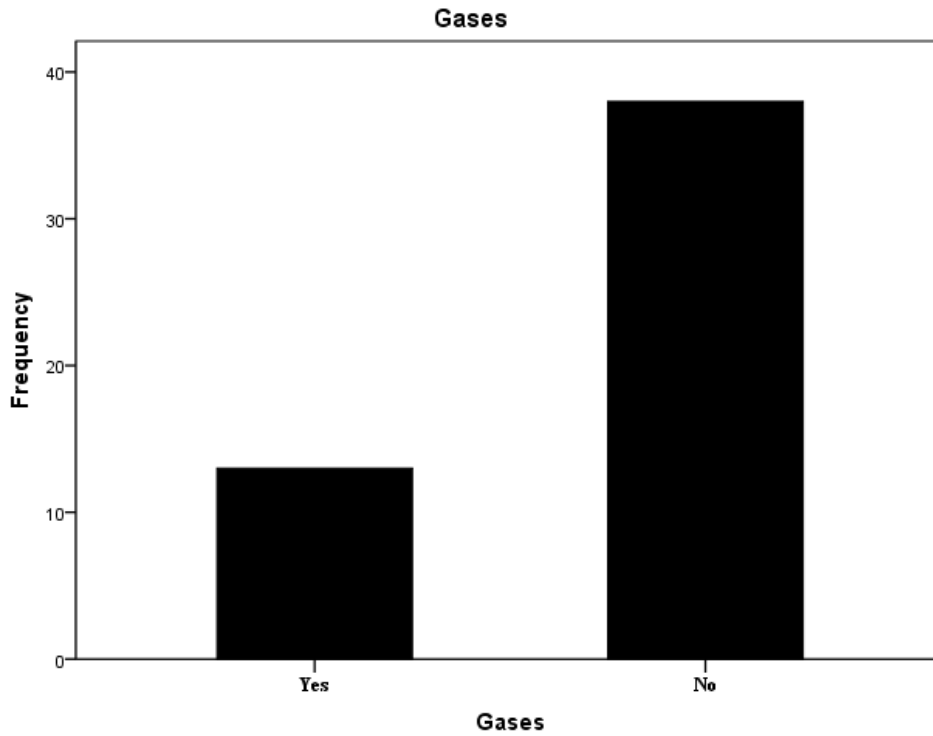


Figure (4-2) shows the distribution of gases.

Table 4-14 represents the distribution of the urinary bladder thick wall.

Urinary Bladder Wall

	Frequency	Percent	Valid Percent	Cumulative Percent
Thick	2	3.9	3.9	3.9
Not Thick	49	96.1	96.1	100.0
Total	51	100.0	100.0	

Table 4-15 shows the distribution of the Endometrial thick ness

Endometrial

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Thickened	4	7.8	7.8	7.8
Normal	47	92.2	92.2	100.0
Total	51	100.0	100.0	

Table 4-16 shows the distribution offluid collection in the endometrial cavity

Fluid Collection

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	3	5.9	5.9	5.9
No	48	94.1	94.1	100.0
Total	51	100.0	100.0	

Table 4-17 shows the distribution of the ultrasound findings of causes of the pelvic pain

		Findings			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Fibroid	10	19.6	19.6	19.6
	Ovarian Cyst	16	31.4	31.4	51.0
	PID	6	11.8	11.8	62.7
	Cystitis	2	3.9	3.9	66.7
	IBS	11	21.6	21.6	88.2
	Thickened Endometrium	3	5.9	5.9	94.1
	Endometritis	3	5.9	5.9	100.0
	Total	51	100.0	100.0	

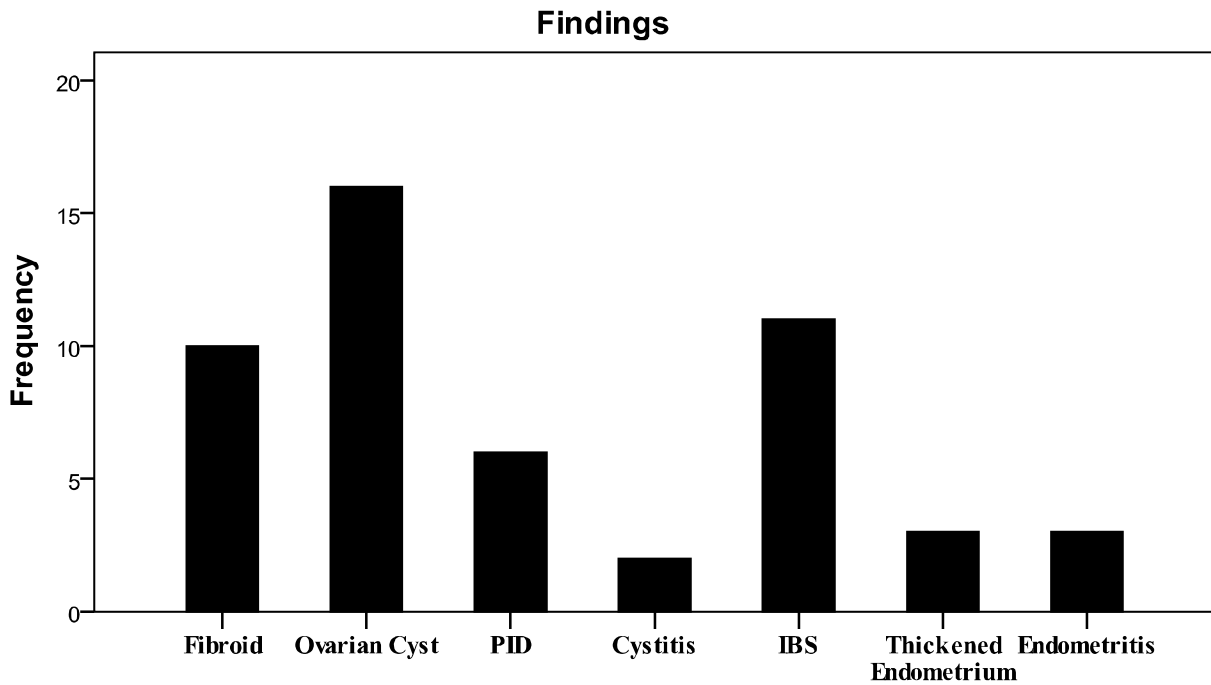


Figure (4-3) shows the distribution of the ultrasound findings of causes of the pelv

Chapter Five

5-1- Discussion:

This study has been done in Turkish hospital, KHartoum city, from the first of December to the thirty first of May 2016. From the study population, in a random way a total of fifty one patients (n=51) were selected to be the sample unit in this study, was defined in five age groups . the majority of the patients in this study aged between 31-40 years , and reveals that it is (34.6%) of them , (25%) in the age group 21-30 years, (21.2%) in the age group 14-20, and those who are in the age groups over 50 years and 41-50 years their percentages are (11.5%) and (7.7%), respectively.

Table (4-1) shows the social (Marital Status) of the surveyed patients in the study, and it reveals that (86.3%) of them are married, while only (19.3%) are not married. The table number (4-2) shows the distribution of fertility among the studied patients, and it indicates that (74.5%) of the patients are fertile, while only (11.8%) are not fertile.

All the patients selected should have pelvic pain, but unfortunately table (4-3) shows the distribution of pelvic pain among the surveyed patients in the study, and it indicates that the majority of them suffer from areal pelvic pain with a percentage of (98%), while only (2%) of them do not suffer from pelvic pain. In the study (8%) out of the patients have vaginal bleeding, and (92%) do not have vaginal bleeding . table (4-4) show this distribution. Table (4-9) represents the distribution of the size of uterus among the surveyed patients, and it shows that (17.6%) of the patients their uterus is enlarged, while (82.4%) have normal uterus size .

In table (4-10) the existence of Uterine Mass in surveyed patients, it indicates that most of the patients do not have uterine mass with a percentage (80.4%), while those with uterine mass are little; their percentage is (19.6%).

Table number (4-11) shows the data of the normality of ovaries in the surveyed patients, and it reveals that (68.6%) of them have a normal ovary, while (31.4%) of them have an abnormal ovary has a cyst.

6 out of 51 have got fluid collection in cul de sac, shown in table (4-12) the distribution of fluid collection in Douglas Pouch , and it reveals that (88.2%) of the surveyed patients do not have fluid collection and (11.8%) have fluid collection.

In table (4-13)the existence of Gases collection in the pelvic in surveyed patients, it indicates that most of the patients do not have gases collection with a percentage (74.5%), while those with gases collection are little; their percentage is (25.5%).

In brief in the total of the studied patients (n = 51), the cause of pelvic pain is as follows: endometrial wall thickening was 3 out of 52 which is 5.9%, fluid collection in the endometrial cavity (endometritis) was 3= 5.9%, UB wall thickening (cystitis) was 2 = 3.9%, gases collection (IBS) was 11 = 21.6%, fluid collection in the cul de sac (PID) was 6 = 11.8%, uterine mass (fibrosis) was 10 = 19.6%, ovarian cyst was 16 =31.4%.

From the statistical study and analysis that done , it was found that there is a relationship between age, fertility and the social status from one side ; and from the other side the pelvic pain causes but it is not so strong ,this done by using Chi² test put in mind that the error is 0.05 or the level of significance .

5-2- Conclusion

This study has been done in Turkish hospital, Khartoum city, from the first of December to the thirty first of May 2016. From the study population, in a random way a total of fifty one patients (n=51) were selected to be the sample unit in this study, the age from 16 years and more. Noexclusion criterion, any patient comes with suprapubic pain. The goal of the study is to evaluate the pelvic pain in women using ultrasonography.

The results conclude that there is a long list of pelvic pain causes of which the most important are uterine masses (fibroid), ovarian cysts and irritable bowel syndrome (IBS)

Ultrasound scanning is very important modality to detect any pelvic changes in female patients and to diagnose it early and differentiate between gynecological and non gynecological diseases.

Also ultrasound has avery important role to no diagnose only but treated sociological treatment for majority of patients that coming to the departmentand carried in their mind that they have malignant diseases and really they treated sociologically by ultrasound when they found that they only have an irritable bowel syndrome(IBS).

5-3- Recommendations

After reading the results, analysis and the fruitful discussion we can send messages to all people in the medical field as follows:

- Ultrasonography could be used as routine checkup, follow up to help diagnosis, treatment and control of pelvic pain in females.
- The easy and safe way to diagnose fibroids, masses, irritable bowel syndrome as well as cysts is ultrasound.
- We can use ultrasound to confirm the diagnosis of ureteric stones and pelvic masses that causes pain that diagnosed by urinalysis and clinical examination.
- Transvaginal sonography has high sensitivity and specificity in visualization of ectopic and early intrauterine pregnancy.
- Color Doppler contributes to more accurate diagnosis in pelvic masses.

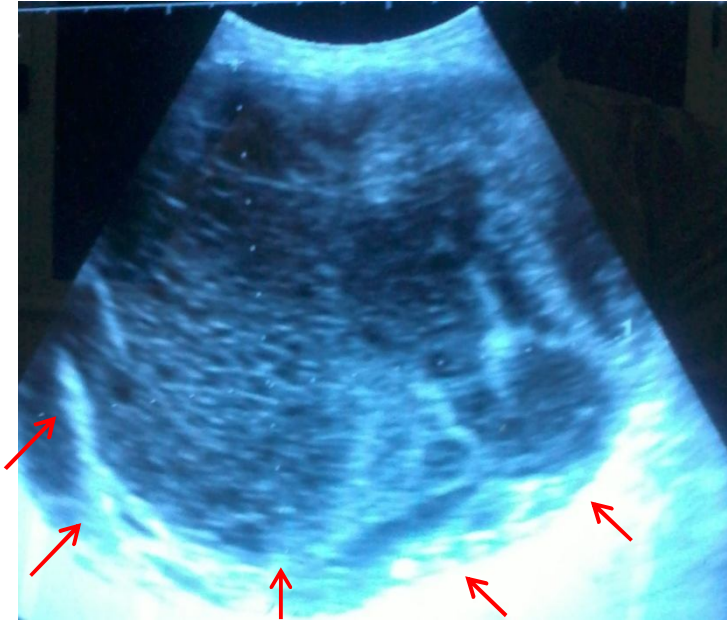
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APPENDIXS

APPENDIX 1

Figures



fig(1-1): 37years female patient ,large R.I.F.hetrogenous solid mass((9×7cm)
RT ovarian mass.

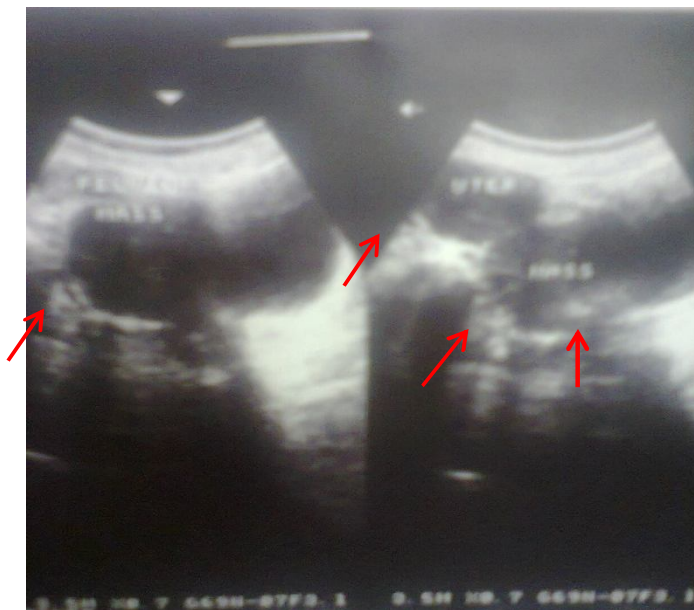


fig (1-2): 40years female patient bulky lobulated uterus with multiple small well defined masses representing uterine fibroids.

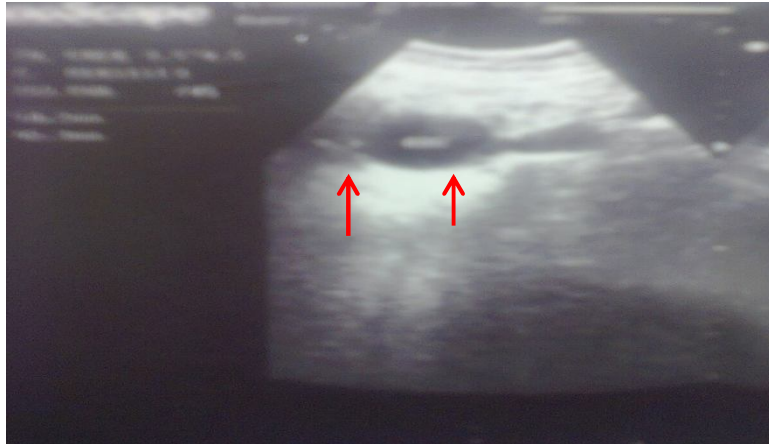


fig (1-3): small simple RT ovarian cyst.

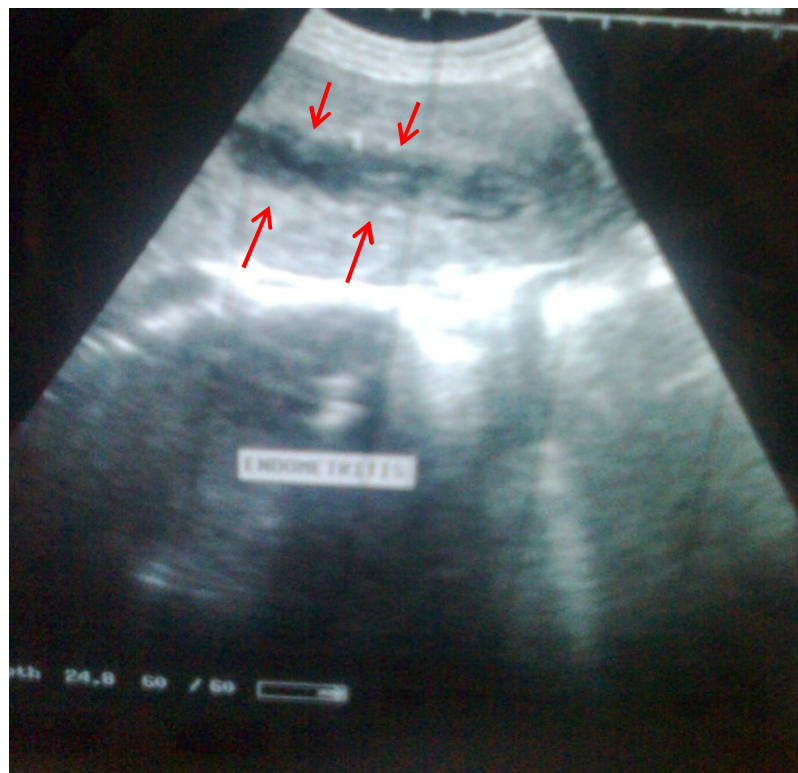
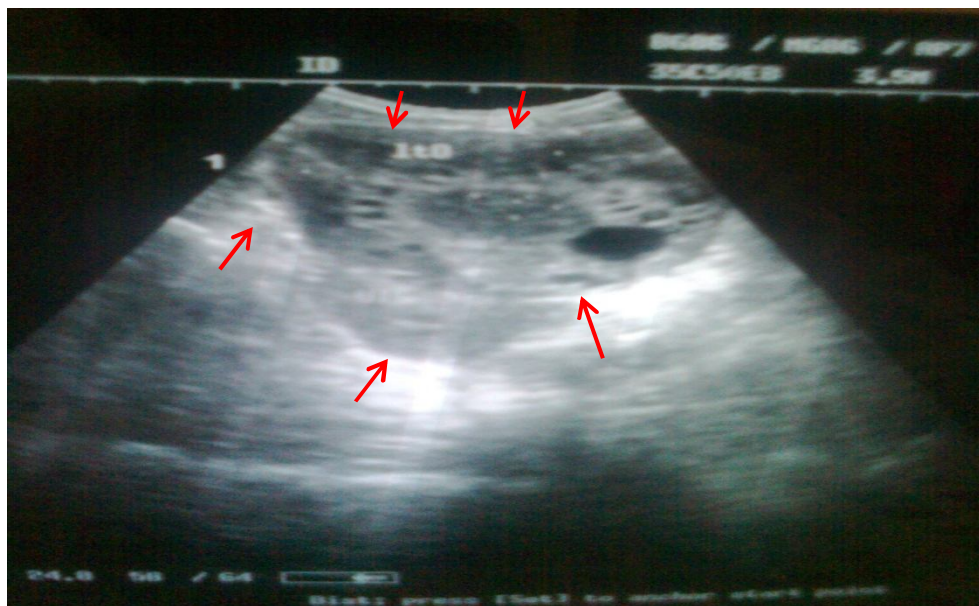


fig (1-4): female patient 2 month post normal vaginal delivery ultrasound shows large uterus with hypoechoic thick endometrium = endometritis.



fig (1-5): 45years female patient US shows small empty uterus with large vesical stone 15mm.



fig(1-6): 23years single female patient large Lt ovary with large irregular hypoechoic mass.

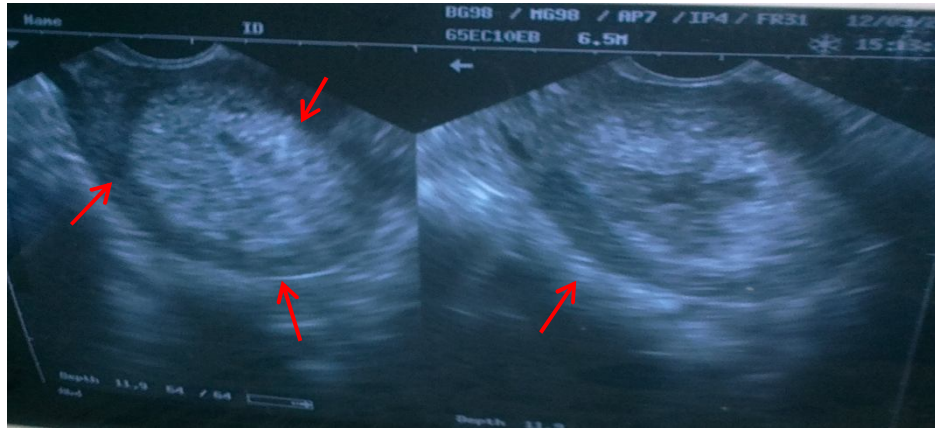
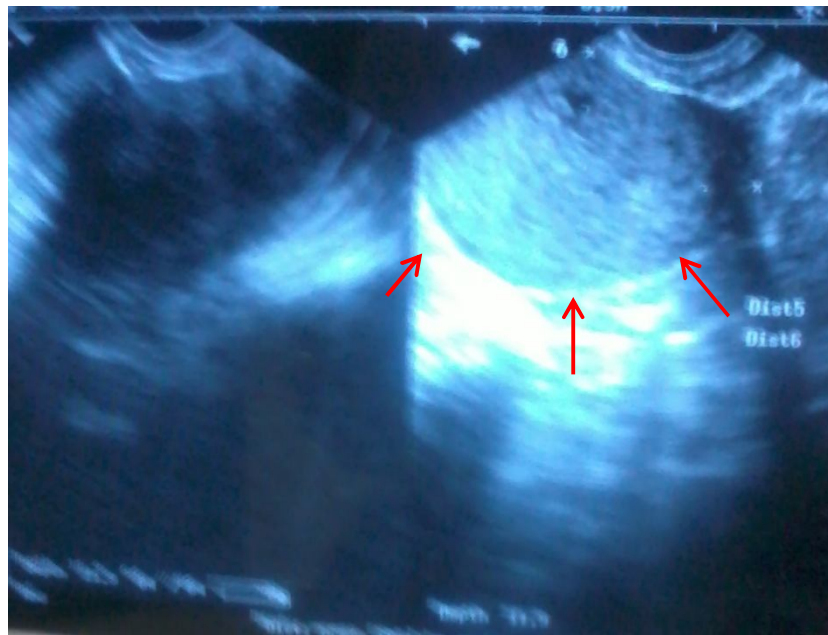


fig (1-7): 53years female patient UIS shows large echogenic endometrium 35mm
Endo -hyperplasia.



fig(1-8): 36years female patient Us show swell defined wall echoegenic sold mass 8*6cm

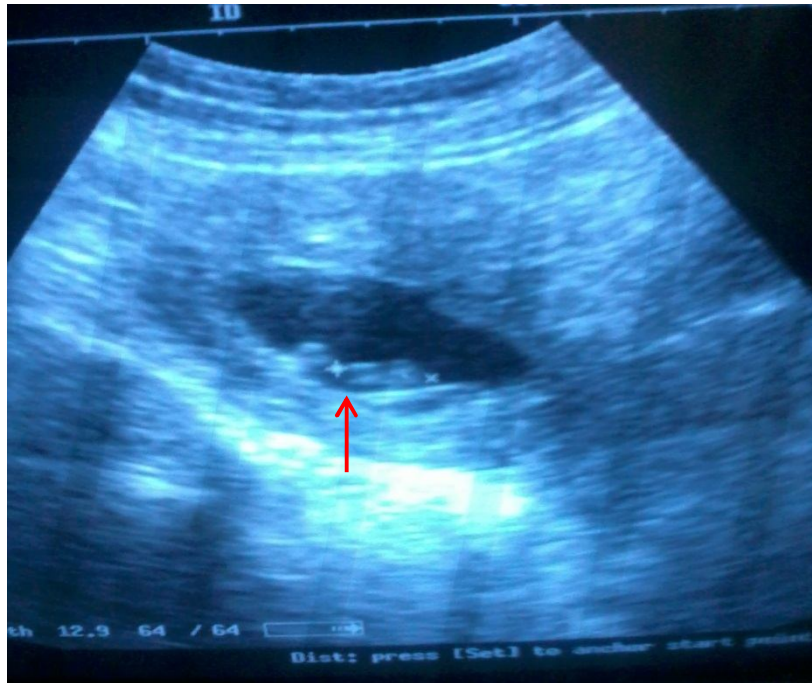


Fig (1-9):36years female patient UIS show large GS with single non viable fetus GA= 8weeks-- missed abortion.s

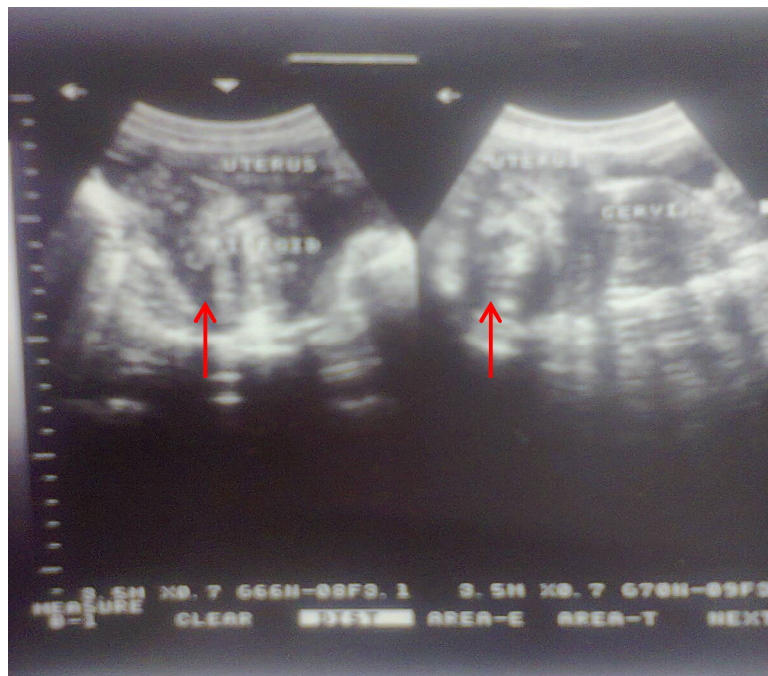


fig (1-10):55years female patient UIS shows bulky uterus with large fundal solid echogenic mass measuring (7x5 cm)= uterine fibroid.



Fig (1-11): 58years female patient Us shows small uterus with thick endometrium 14mm.



Fig (1-12): 28years female patient UIS shows large hypoechoic mass with centric echogenic areas located in the right iliac fossa representing acute appendicitis

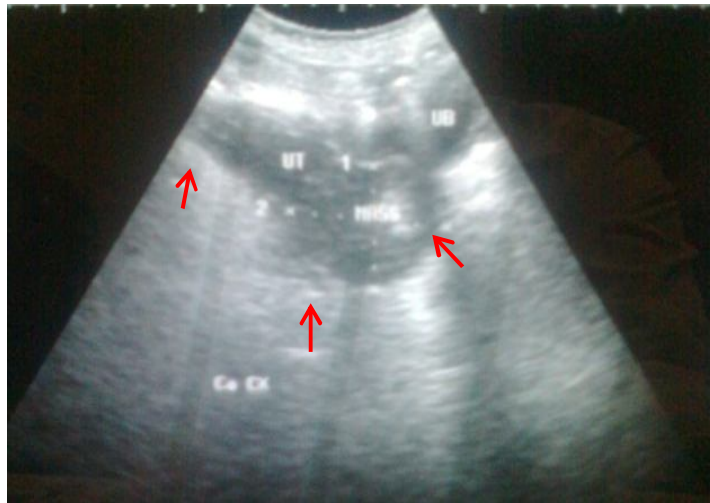


Fig (1-13):69years female patient UIS shows well defined wall hypoechoic cervical solid mass containing small calcified area=(5*4cm) = suggestion of Ca CX.

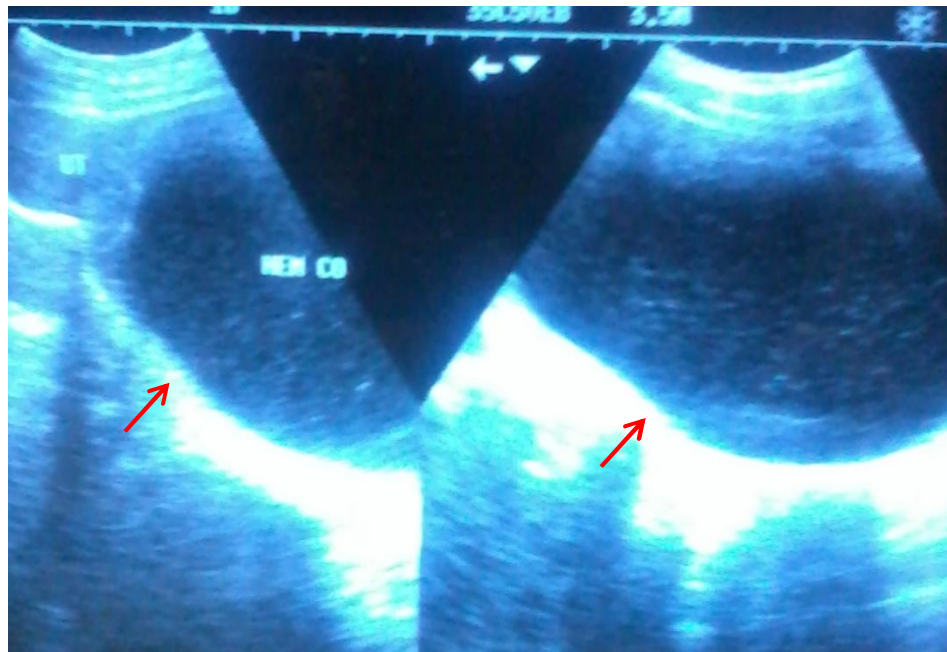


Fig (1-14): 12years female patient UIS shows large uterus with vaginal& cervical severe collections = hemto-colpos.

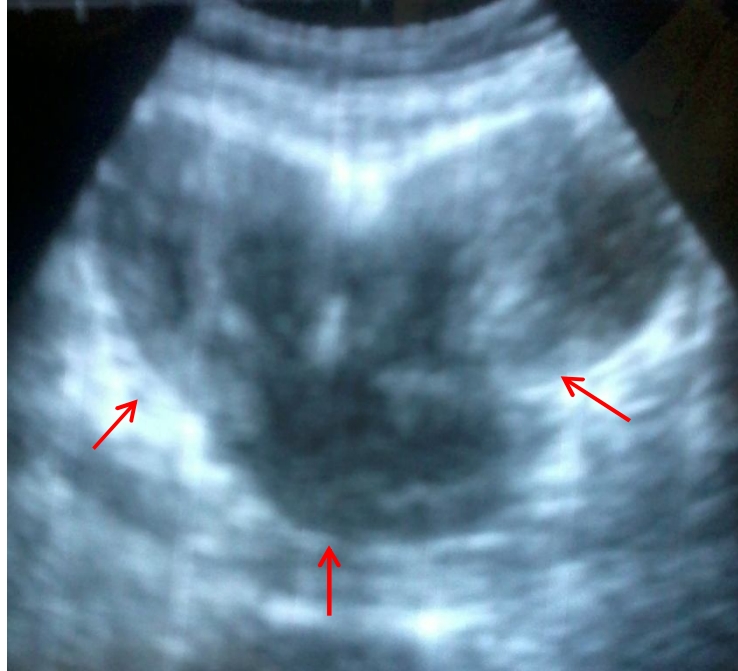


Fig (1-15): 12years female patient UIS shows didelphic uterus with small intrauterine echogenic shadows =retained products other cavity is empty.

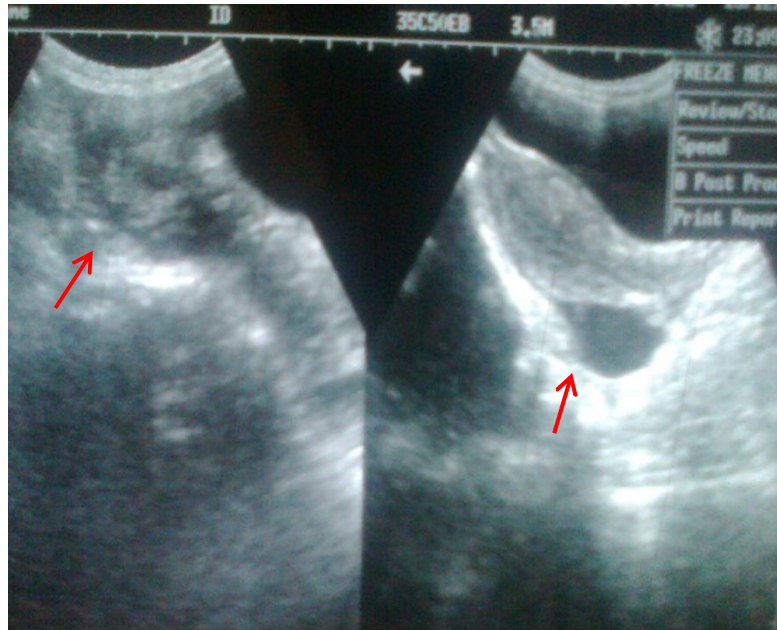


Fig (1-16): 12years female patient UIS shows small empty uterus with moderate pouch of Douglas collections + small thick wall cystic mass located in the RT adnexa suggestion of ectopic pregnancy.

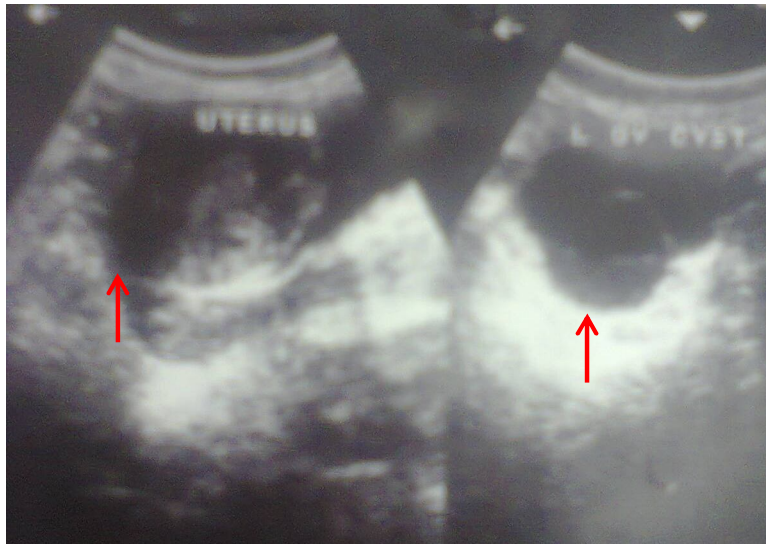


Fig (1-17): 12years female patient UIS shows normal uterus + small LIF cystic mass thin septation = (4.5*4cm)= Lt ovarian cyst.



Fig (1-18): 12 years female patient **US** shows bulky uterus with low lying echogenic mass (retained products)=incomplete abortion.



Fig (1-19): 13years female patient UIS shows large uterus with vaginal& cervical severe collections = hemo-colpos.

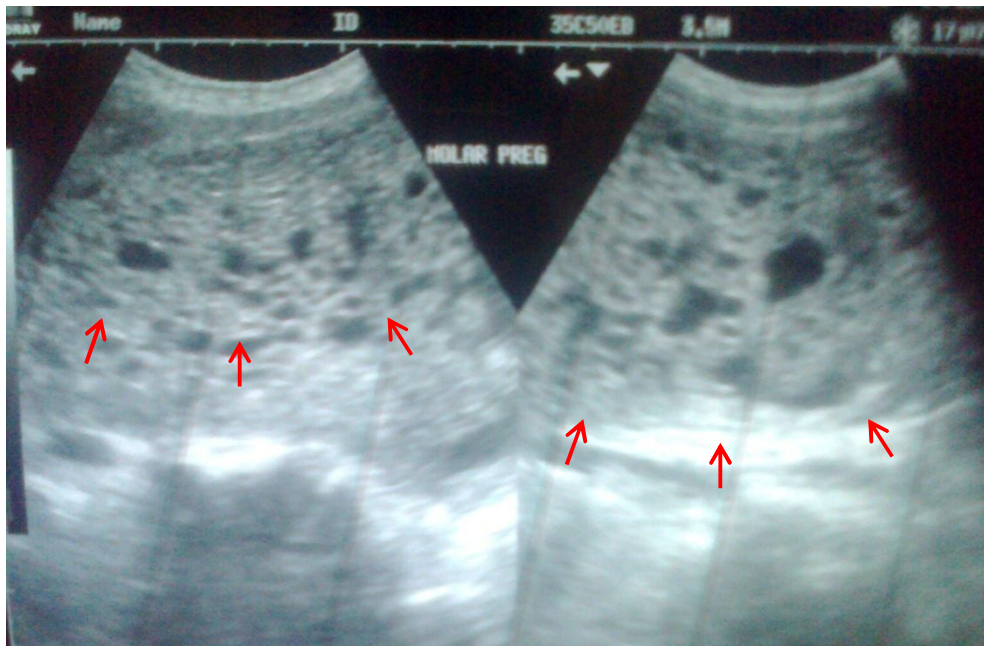


Fig (1-20): 45years female patient UIS shows bulky uterus with large solid echogenic mass containing multiple small cysts =molar pregnancy.

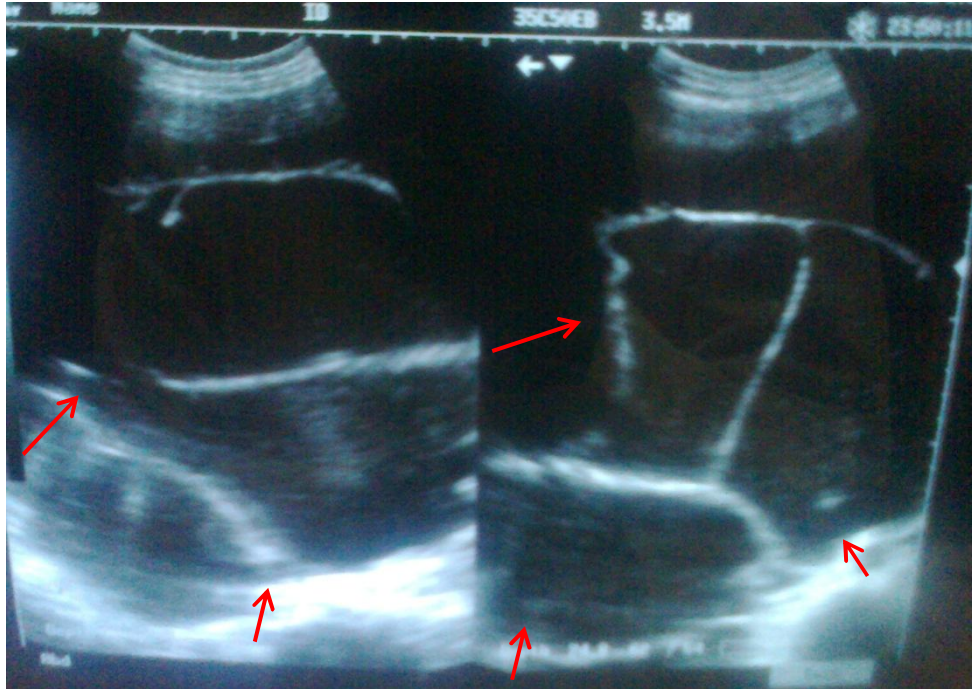


Fig (1-21): 34years female patient,large RIF multiloculatedcystic mass((12×10cm) Itovaian cyst

APPENDIX 2

Sudan University of sciences and technology

College of graduate study

Study of female pelvic pain using ultra sonography

Data collection sheet.

General information:

- Patient age year.
- Social status: Married Single
- Fertility: Fertile infertile

Clinical informations:

- pelvic pain: Yes No
Supra pubic R.I.F L.I.F
- Vaginal bleeding: Yes No
- Back pain: Yes No
- Vaginal discharge: Yes No
- Pelvic swelling: Yes No
- Menstrual period: Regular Irregular

Ultrasound findings:

- Uterine size.....
Small normal enlarged
- Uterine mass: Yes No
Size..... Echo Texture.....
- Ovaries: Normal Abnormal
Mass: size..... Cyst: size
- Pouch of Douglas collection: Yes No
- R.I.F and L.I.F gases: Yes No
Rt Lt
Size..... Echo Texture.....
- No
- Endometrium cavity wall thickening: Yes No
- Uterine walls Adhesions: Yes No