PATTERN OF FEMALE PELVIC DISEASE AS

SHOWN BY

ULTROSONOGRAPHIC EXAMINATION

AT

KENYATTA NATIONAL HOSPITAL

A SIX MONTHS RETROSPECTIVE AND

PROSPECTIVE STUDY

A DISSERTATION SUBMITTED IN PART FULFILMENT

FOR THE DEGREE OF MASTER OF MEDICINE IN

DIAGNOSTIC RADIOLOGY

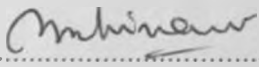## UNIVERSITY OF NAIROBI

BY DR. N.M. KIMANI

JULY 2000

DECLARATION

CANDIDATE

This dissertation is my original work and has not been presented in any other University

Signed ....Omhirianw..........

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This dissertation has been submitted for examination with my approval as the University

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Signed 16.08.2000

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DEDICATION

I wish to dedicate this work to my wife

Margaret

and our four children

Hope,

Mary,

Roy and

Phoebe.

They are the Green Lights of my life.

ACKNOWLEDGMENTS

I wish to express my sincere appreciation to Dr. G K IKUNDU, my Supervisor, for his constant advice suggestions and guidance throughout the preparation of this dissertation

I am also grateful to the rest of the staff of the Department of Diagnostic Radiology, University of Nairobi for their contribution towards this work.

Thanks are also extended to Mrs. Jacinta Gacau, a Radiographer in the X-ray Department of Kenyatta National Hospital for her co-operation and assistance in data collection.

I would also like to thank Mr. Erastus Muniu of the Kenya Medical Research Institute for his guidance and expertise in the statistical analysis of the data.

My deep appreciation is directed to my family whose patience, encouragement and prayers has been a source of motivation during the preparation of this dissertation. Lastly, but not least I thank Mrs Nancy Njoroge for her excellent secretarial work.

TABLE OF CONTENTS

TERMINOLOGY IN ULTRASONOGRAPHY

Sonographer: This will refer to the person performing the examination.

Sonologist: Will refer to the physician or radiologist interpreting the sonogram.

Anechoic or sonolucent: This refers to echo-free areas. A region can be anechoic because it relates to a fluid mass that transmits sound well or alternatively has a fine uniform structure which gives rise to backscatter of such low amplitude that it is not detected.

Transonic: This refer to fluid filled structures which produce enhancement distally.

Enhancement: A pulse of sound traversing a region of much reduced attenuation is more intense that it would otherwise have been. Distal structures appear to be echogenic when contrasted with similar structures at the same depth. Enhancement is an indication that the areas immediately proximal is transonic and probably cystic in nature.

Echogenic or Sonodense: Tissues produce strong echoes.

Shadowing: Objects which either attenuate or reflect the sound strongly remove acoustic energy from the beam to such an extent that the pulse progressing beyond these structures gives rise to echoes of low amplitude. Echoes from these distal structures are said to be in the region of "acoustic shadowing". Calcified structures e.g. bone, gall stones and gas bubbles cast strong shadows.

SUMMARY

A prospective and retrospective study to determine the pattern of female pelvic disease undergoing pelvic ultrasonography at Kenyatta National Hospital and the Department of Diagnostic Radiology of the University of Nairobi.

A total of 399 patients were reviewed over a period of 6 months from September 1999 to March 2000

Patients covered in the study were referred for pelvic ultrasonography from the wards, casualty, general and private clinics. They ranged from 6 years to 79 years.

The study found that 132 (33.1%) had normal pelvic ultrasound scans while 267 (66.1%) had pelvic disease.

The commonest clinical diagnosis was pelvic pain in 89 (22.3%) of patients. Clinical diagnosis was not given in 20 (5%) patients.

The commonest pelvic disease diagnosed on ultrasonography was adnexal disease in 131 (32.8%) patients.

97 (24.3%) patients had uterine disease while 18 (4.5%) patients had both adnexal and uterine disease.

AIM

To determine the pattern of female pelvic diseases shown by clinical diagnosis and ultrasonography at Kenyatta National Hospital (K.N.H)

SPECIFIC OBJECTIVES

1   To determine the pattern of female pelvic disease undergoing pelvic ultrasonography at   K.N.H

2   To study the age distribution of female pelvic disease seen at K.N.H

3   To study ultrasonographic findings of female pelvic disease at K.N.H.

4   To relate clinical diagnosis to ultrasonographic findings.

INTRODUCTION AND LITERATURE REVIEW

Ultrasound examination was introduced into medicine in the early 1950s but became of profound use in the late 1960s mainly in cardiology and obstetrics (1,2).

Currently a real time ultrasound has various uses in diagnosis, guidance of per cutaneous procedure for example biopsy and fine needle aspiration and follow-up of patients in evaluation of the management of a particular disease. (2,3).

Real time ultrasound scanning or rapid B-mode scanning technique provides continuos data acquisition at a rate sufficient to give an impression of instantaneous motion of moving structures.

Ultrasound (u/s) is frequently the first investigation performed in female patients presenting with pelvic symptoms at Kenyatta National Hospital.

The female pelvis can be evaluated by two ultrasound techniques: Transabdominal (TA) and Transvaginal (TV) technique (4). The transabdominal study is performed through a distended urinary bladder and transducers of up to 5 MHz are used. Transvaginal examination is performed with the patient's bladder empty and transducers of a higher frequency of upto 7.5 MHz are used. (3,4). Transabdominal (TA) technique is routinely used in Kenyatta National Hospital and the department of Diagnostic Radiology University of Nairobi.

TA study should be the first pelvic ultrasound study examination, with the TV examination reserved for a more critical evaluation (4).

The normal female pelvis contains the bladder, uterus with the fallopian tubes, ovaries broad ligament, muscles and the rectum. The bladder is a very important structure when performing a TA examination. When fully distended, it serves as an ultrasound window (5) through which the pelvis is visualized and also helps by displacing the gut, which would obscure the uterus and related structures

The uterus lies between the bladder anteriorly and the rectosigmoid colon posteriorly. The uterine position is variable and changes with varying degrees of bladder and rectal distension. The cervix is seen as a bulge into the vaginal lumen with its own internal echogenic channel of 2 -3 mm thickness. The fundus may lie obliquely on either side of the midline. The normal uterus varies throughout life. A nulliparus uterus measures about 7 cm in length, 5 cm in width and 3 cm in the anteroposterior diameter (1,2,3,4,10).

The vagina is seen as a double walled structure which flattens in the sagittal plane as it progresses cephalad. Fluid may be seen in the vagina at menstruation, with infections and after bathing (2).

The ovaries are usually found directly lateral to the body of the uterus in shallow depressions called the ovarian fossae. The ovary is classically ovoid and has a low-level uniform echogenicity and a thin hyperechoic rim (4,10). It measures about 3x2x2 cm in young nulliparous women and 5x3x2 cm in adult parous women. (4,10,12). Not all ovaries are sonographically visible. In many patients extraovarian disease or contralateral ovarian masses may limit visualization because the pelvic anatomy is distorted (6,10).

The fallopian tubes are not normally identified utrasonographically, but the effects of disease are usually seen (1,2,4). The pelvic sidewall is lined by the obturator internus muscle. The muscles are identified by their poorly echogenic appearance and lack of an inferior margin (2).

The urinary bladder appears as a transonic structure anterior to the uterus and is used as a window to visualize the other pelvic structures in TA examination.

PELVIC PATHOLOGY

In the field of gynaecology, ultrasonography has its greatest clinical application in the evaluation of pelvic masses. In a study carried out at Kenyatta National Hospital 1989 by D. Ndushabandi, to evaluate the sonographic pattern of pelvic masses, uterine fibroids were found to comprise 26.2% ovarian cyst 20.6%, ectopic pregnancy 14.3% tubo-ovarian mass 18.6% (26), other pathologies comprised of 20.3% (5). A similar study carried out in Abidjan, Cote d'Ivoire 1996 reviewed 343 female patients. In this study ovarian masses were the most frequent (56.66%) followed by uterine masses (31.45%). Most masses were benign. The sensitivity of ultrasonography was 100% and specificity was 97.69% (16). The most frequent clinical complaint was Pelvic pain (36.94%) followed by pelvic mass impression(28.65%).

Ultrasonography is capable of detecting and describing pelvic masses in well over 90% of cases (2). Two major factors limit the specificity of the technique - its inability to be precise about the organ of origin of the pelvic mass and the impossibility of distinguishing the benign from malignant tumour (2,4). When a pelvic mass is found by sonographic

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examination, it may be characterised by its size, location (uterine or extra uterine), external contour (well defined, ill-defined, irregular borders), consistency (cystic, complex or solid). Uterine masses are usually solid and ovarian masses are usually cystic (3).

UTERUS

Fibroids: (Leiomyomas)

Fibroids are the most common myometrial abnormality (2, 4, 16). They are benign soft tissue tumours that more frequently affect women of certain racial groups and women of advancing age. N'Gbess RD, working in Cote d'Ivoire found fibroids in African women to occur in younger age groups (31 - 40 years) as compared to the European patients (40 -50 years). Fibroids can be solitary or multiple, small or large and located anywhere from completely within the myometrium, to exophytic, to prolapsing into the endometrial canal.(4).

The ultrasound appearance of fibroids is extremely variable and in 5% of cases may mimic other normal and abnormal pelvic conditions, e.g. uterine variants, pregnancy related conditions, adnexal masses etc.

INTRAUTERINE DEVICES (IUD)

Ultrasonography is employed to check the position of an I.U.D or management of associated complications (1,2,3,4). Complications associated with the devices include:

• Unrecognised expulsion

• pregnancy either intrauterine or ectopic

• uterine perforation':myometrial embedment

• pelvic inflammatory disease

• pain and bleeding

A common clinical problem is a 'lost IUD'. If threads cannot be seen or palpated in the vagina the device is considered as 'lost'. (3,4) Ultrasonography will demonstrate whether the I.U.D is present within the uterus and normally in the midline position within the endometrial canal equidistant from the uterine margins.

The IUD will appear as a strongly echogenic structure casting an acoustic shadow. The shape is dependent on the type of device used but is always regular and artefactual (2). If a woman with an IUD has pelvic pain, the area around the uterus needs to b assessed to determine whether she has pelvic inflammatory disease (4).

ENDOMETRIAL ABNORMALITIES

Endometrial abnormalities are very uncommon in the premenstrual years. In the fertile years almost all abnormalities are related to pregnancy, either intrauterine or ectopic and almost all are detected in the first trimester. (4) In an ectopic pregnancy a pseudogestational sac may be present.

William M Marks and colleagues analysed 39 cases of ectopic pregnancy and found 20% of the cases exhibited an intrauterine fluid collection with a sorrounding rim of high amptitude echoes which could be easily misconstrued as a normal gestational sac (8,13,15) After miscarriages (spontaneous abortions) retained products of conception assume varied appearances. It is important to detect them because persistent products of conception (pocs) can lead to infection. Sonographic appearance of pocs include a gestational sac with or without a non-living embryo, a round to avoid fluid collection and a thickened hyperechoic endometrial stripe of more than 5 mm.

The post partum uterus is not routinely studied but ultrasonography may be needed in suspected postpartum sepsis.

In the postmenopausal years, a thickened endometrium or fluid collection in the endometrial canal is a well established sign of endometrial malignancy.

Differential diagnosis for a hyperechoic thickened endometrium (postmenopausal) of 8 mm or more includes hyperplasia and endometrial polyps.

Postmenopausal endometrial collections range in echogenicity from hypoechoic to hyperechoic and may be due to cervical stenois or an obstructing malignant tumour. They may be serous, mucin, blood or pus (pyometra).

THE ADNEXA

The adnexa contain many structures. Each has an ovary, mesosalpinx, a fallopian tube, a broad ligament and uterine and ovarian blood vessels. (1,2,3,4). Sonographically only the ovaries are detected consistently. The normal non-dilated fallopian tubes are not identified.

The mesosalpinges and broad ligaments are not seen even when abnormal. Most of the adnexal pathology seen on u/s is therefore related to the ovaries and the fallopian tubes. Andrew Wu and Siegel evaluated the pelvis in children and found ovarian and tubal masses occurred in 77% of the patients. All lession in this group were easily separated from the uterus. The most common cause of a well rounded uniformly homogenously cystic adnexal mass was a classic simple ovarian cyst. The cysts were characterised by a

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thin walled mass with absent internal echoes and distal acoustic enhancement (9).

Complex extrauterine masses in this study included haemorrhagic ovarian cysts, cystic

teratomas and tubo-ovarian abscesses (9, 14).

Deborah Levine found 17% of asymptomatic postmenopausal women to have simple

ovarian cysts. Some of these cysts were observed to regress over a period of 22 months

(14) indicating the usefulness of ultrasonography in evaluating and follow-up of patients

with pelvic disease.

ECTOPIC PREGNANCY

An ectopic pregnancy is defined as the implantation of a fertilized ovum outside the

endometrial lining of the uterus. Ectopic pregnancies are most common in the fallopian

tubes (95 - 97%) (4).

25% of patients with an ectopic pregnancy present as an acute abdomen, but abdominal

pain is a near universal feature. 75% will have a recent menstrual disturbance (2).

Ultrasonographic features of an ectopic pregnancy include (1) absence of an intrauterine

gestation sac. (2) Presence of an adnexal mass. This appears as a hetorogeneous but

strongly echogenic mass representing disorganized trophoblast and blood clot. (3)

Presence of fluid in the pelvis. This is a common feature of extrauterine pregnancy but

non-specific. (4) Endometrial hyperplasia, Occasionally forming a pseudogestational sac

(5) A positive pregnancy test. Sonograhy has a reported sensitivity in demonstrating a

characteristic adnexal mass of 90%. (2).

Ultrasound has proven useful in the diagnosis of ectopic pregnancy as shown by several authors (8, 13, 15). The typical appearance includes a slightly enlarged or normal sized uterus without a gestational sac, a complex or solid adnexal mass, and fluid in the cul-de-sac.

A gestational sac like structure (adnexal ring) associated with an empty uterus is an infrequent but highly specific finding for ectopic pregnancy. The presence of a tubal ring has been used to infer absence of tubal rupture (15).

PELVIC INFLAMMATORY DISEASE

Pelvic inflammatory disease may be acute or chronic. In the acute phase of pelvic inflammatory disease (PID), salphingitis and less commonly endometritis are obvious clinically, ultrasound is rarely necessary. (4). Ultrasonography shows thickening of the uterus and adexae with traces of fluid in the peritoneal recesses. (2).

When the process is more chronic, particularly in patients who have responded inappropriately to antibiotics, tubo-ovarian or pelvic abscess will be formed with debris and echogenic walls forming as the abscess becomes chronic. PID always involves the fallopian tubes.

Patten RM et al. (27) correlated laparascopic and ultrasonographic findings in 16 patients with operatively confirmed acute pelvic inflammatory disease and found a sensitivity of 93% for inflamed tubes and 90% in periovarian inflammation. Overall accuracy for prediction of peri-ovarian inflammation or tubal disease was 91% and 93% respectively.

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Sonography failed to demonstrate small quantities of purulent fluid (less than 20cc) in the pelvic cul-de-sac in six of nine cases.

PELVIC PAIN

Pelvic pain is a common clinical presentation of pelvic disease at K.N.H. Causes of pelvic pain ranges from inflammatory, torsion, pelvic masses to psychiatric causes. Patients with chronic pelvic pain are challenging, from both diagnostic and therapeutic viewpoints. (24) Huengsberg M et al (25) reviewed 279 pelvic ultrasound examinations performed due to pelvic pain. An abnormal ultrasound was rarely found in women with pain but no pelvic mass (16%). He found ultrasound useful in refuting a diagnosis of ectopic pregnancy by demonstrating an intrauterine gestational sac.

Ultrasound examination is useful in patients with pelvic pain and normal pelvic examinations (28) as small pelvic masses may not be detected clinically.

CONGENITAL ABNORMALITIES

Varying degrees of failure of fusion of the mullerian ducts leads to a corresponding series of congenital abnormalities of the uterus and upper vagina, resulting in the Mayer-Rokitansky-Kuster-Hauser syndrome (1,2,11) This syndrome is composed of vaginal atresia with other mullerian duct abnormalities such as bicornuate or septated uterus. The fallopian tubes, ovaries, broad ligament and round ligaments are normal (11). Unilateral renal and skeletal abnormalities are associated in 50% and 2% respectively. The mayer-Rokitansky syndrome is the second most common cause of primary amenorrhoea. Ultrasonography is an excellent imaging modality in these patients (11, 22).

Haller et al (22) has shown that sonography is a useful imaging modality in ambiguous genitalia. The Uterus and ovaries are identified in female pseudohermaphrodites. Absence of internal genital structures supports the diagnosis of male pseudohermaphrodite. Imperforate hymen appears as a large pear shaped, fluid filled mass pushing the uterus upwards. (1).

MATERIALS AND METHODS

(a)   **Study Design:**

This was a descriptive study which was carried out both retrospectively (Review of records last 3 months) and prospectively (for 3 months).

(b)   **Samples Size and Determination**

All those diagnosed clinically as having pelvic disease and who underwent ultrasonography during the study period were included in the study. On average 100 female patients with pelvic disease undergo ultrasonography per month in the x-ray department of K.N.H and the Department of Diagnostic Radiology (DDR) of the University of Nairobi. Therefore during the study period approximately 600 patients were expected to be included in the study.

(C)   **Inclusion/exclusion Criteria**

All female patients referred for pelvic ultrasonography at K.N.H. and DDR were included in the study. Those found to have an intrauterine pregnancy on scanning were excluded from the study.

(D)   **Instruments**

Patients were scanned on a Phillips U/S machine (model SD 800) at K.N.H., Medison SONOET (model sonace 5000) and HP Image Point Hx, ultrasound machines in the Department of Diagnostic Radiology of the University of Nairobi. A 3.5 MHz sector probe was used for Transabdominal (TA) scanning and 6.5 MHz probe were used where Transvaginal (TV) evaluation was found necessary. Ultrasound gel was used as a coupling medium. Sony thermo-printing paper was used for recording some of the images by a paper printer.

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(E)   Data Collection

Sonographic findings, diagnosis and patient personal data were recorded as per guidelines
in appendices **A** and **B**. The final sonographic interpretation was done with the assistance
of a consultant radiologist.

(F)   Booking and Patient Preparation

All patients scanned at K.N.H went through formal booking procedures except in
emergency cases. Patients personal data and sonographic findings were recorded as in
Appendices
A and B.

Patients scanned at DDR were attended as they came. All patients were required to have a
full urinary bladder before scanning. Those without a full bladder were given water to
drink and had to wait for sometime before scanning was done.

(g)   Data Management and Analysis

Data was entered into a micro-computer using statistical package for social sciences
(SPSS) data entry module. Validation was done before analysis. SPSS programme was
used for analysis which involves descriptive statistics such as means, proportions,
sensitivity and specificity.

(h)   Ethical Considerations

The patient's confidentiality was not compromised as the actual name of the patient was
not used in the data collection sheet.

The examination was to be part of the work-up in patient management and the clinician's request was not influenced by the study.

Sonography has not been reported to have any harmful effects to those on whom it has been done. It is safe, quick, non-invasive and acceptable to most patients. However, consent before the examination was sought.

The total number of patients covered was 399. These patients were aged from 6 years to 79 years (where age was provided). 89 (22.3%) patients did not have their ages specified. The distribution of patients by age group is shown in Table 1 below.

TABLE 1

DISTRIBUTION OF PATIENTS BY AGE IN YEARS

AGE (YEARS)	FREQUENCY	PERCENT
< 20	22	5.5
21 - 30	135	33.8
31 - 40	86	21.6
41 - 50	42	10.5
> 50	25	6.3
Unspecified	89	22.3
Total	399	100.

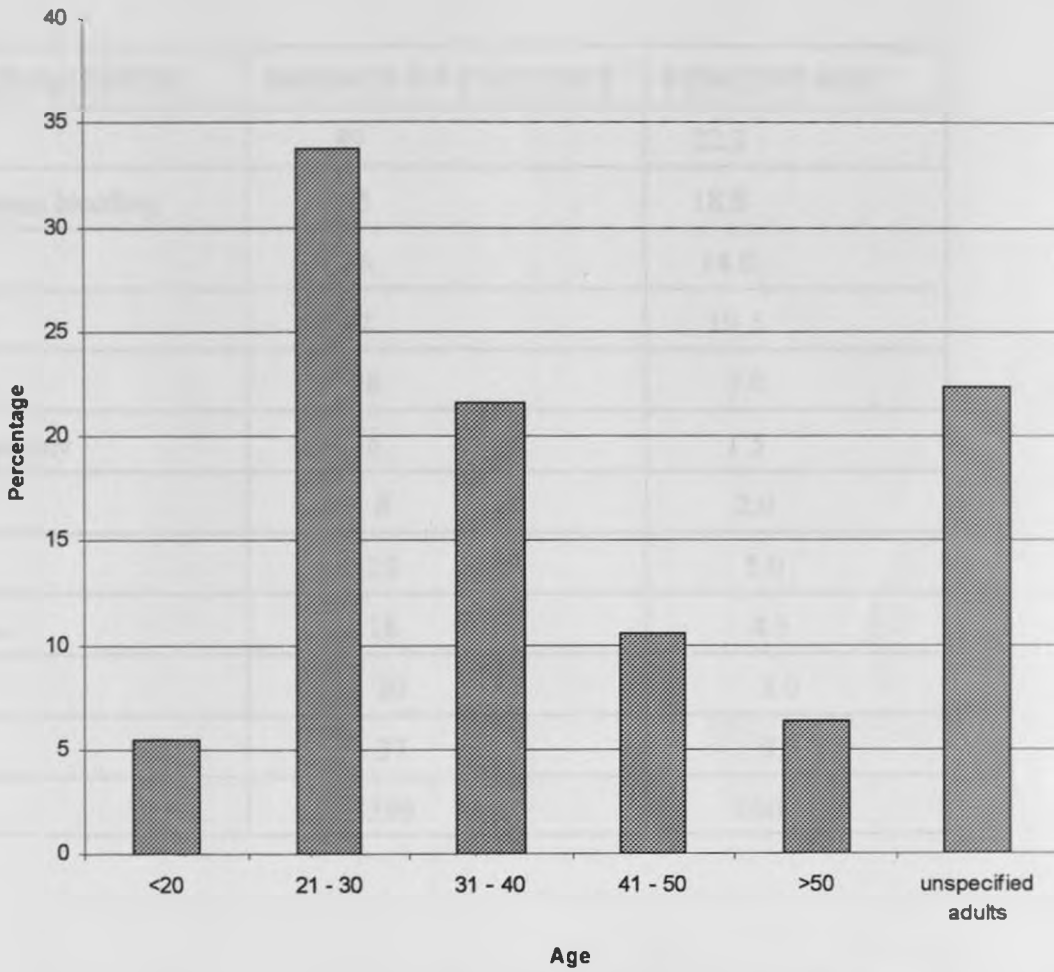Fig I   Distribution of patients by Age in Years

Figure I above shows the age distribution of patients covered in this study:
21 - 30 years age group formed the majority of the patients.

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TABLE 2

DISTRIBUTION OF PATIENTS ACCORDING TO CLINICAL DIAGNOSIS

CLINICAL DIAGNOSIS	NUMBER OF PATIENTS	PERCENTAGE
Pelvic pain	89	22.3
Abnormal uterus bleeding	75	18.8
Fibroids	56	14.0
Pelvic mass	42	10.5
PID/abscess	28	7.0
Ectopic pregnancy	6	1.5
Ca cervix	8	2.0
Infertility	20	5.0
Ovarian mass	18	4.5
Not given	20	5.0
Others	37	9.3
Total	399	100

Table 2 shows the distribution of patients by clinical diagnosis. Pelvic pain 89 (22.3%) was the most common clinical diagnosis. 20 (5.0%) patients did not have the clinical diagnosis specified.
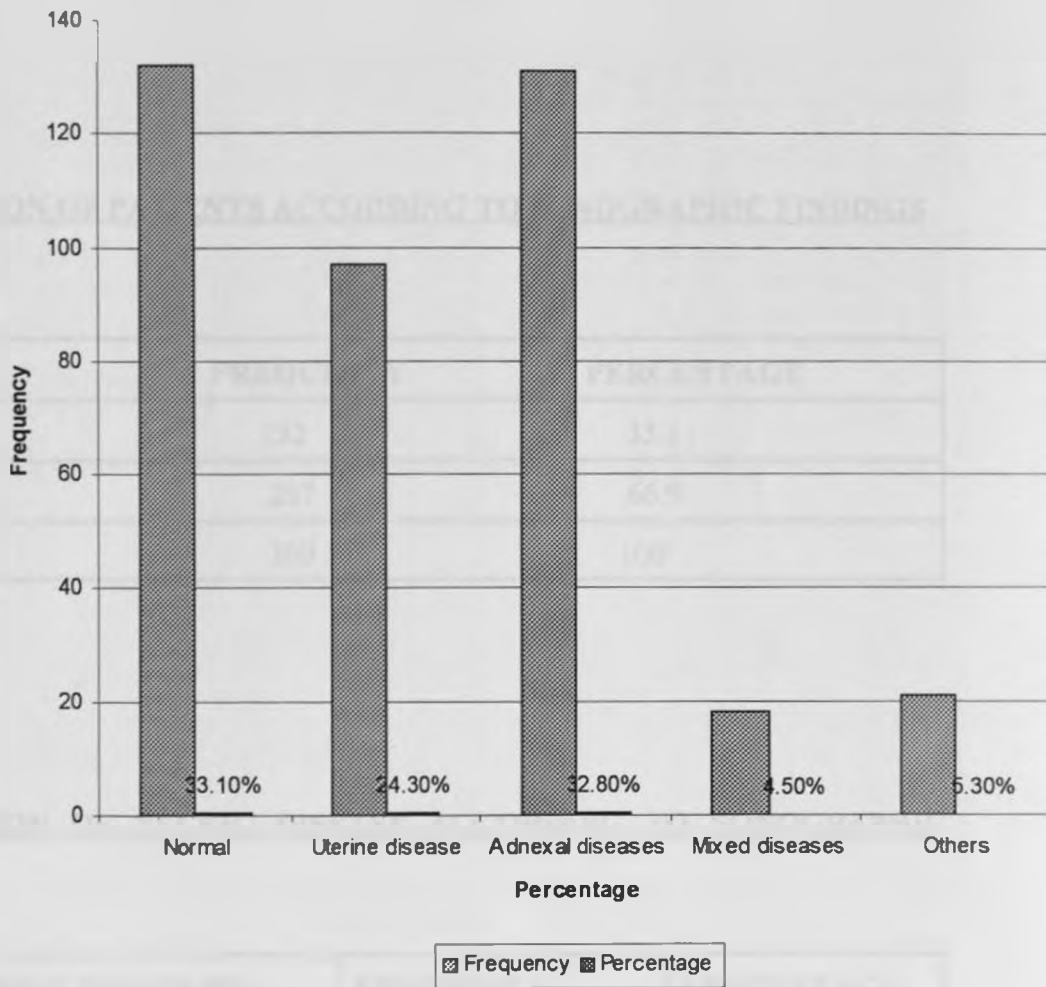
Fig II above shows the distribution according to sonographic findings. Adnexal disease was the most common sonographic diagnosis comprising of 32.8% of patients. Uterine disease was found in 24.3% and 4.5% had mixed disease .

After sonographic examination was carried out, patients were then divided into those with normal findings and those with abnormal findings. Their distribution is shown in table 3 below.

TABLE 3

DISTRIBUTION OF PATIENTS ACCORDING TO SONOGRAPHIC FINDINGS

	FREQUENCY	PERCENTAGE
Normal	132	33.1
Abnormal	267	66.9
Total	399	100

TABLE 4

DISTRIBUTION OF PELVIC DISEASE ACCORDING TO SONOGRAPHIC FINDINGS

SONOGRAPHIC DIAGNOSIS	FREQUENCY	PERCENTAGE
Normal	132	33.1
Uterine disease	97	24.3
Adnexal disease	131	32.8
Mixed disease	18	4.5
Others	21	5.3
Total	399	100

TABLE 5

DISTRIBUTION OF ADNEXAL DISEASE

DISEASE	FREQUENCY	PERCENTAGE
Tom (Tubo-ovarian mass)	47	35.9
Ovarian cyst	30	22.9
Pelvic inflamation	26	19.8
Ectopic pregnancy	11	8.4
Endomebrosis Endometriosis	4	3.1
Pelvic abscess	3	2.3
Others (mixed)	10	7.6
Total	131	100

TABLE 6

DISTRIBUTION OF UTERINE DISEASE

DISEASE	FREQUENCY	PERCENTAGE
Fibroids	78	80.4
Cervical mass	4	4.1
Adenomyosis	3	3.1
Endometrial mass/hyperplasia	3	3.1
Bulky uterus	2	2.1
Mixed disease	7	7.2
Total	97	100

TABLE 7

DISTRIBUTION OF PELVIC DISEASE BY AGE IN YEARS

Age GP (yrs)	Normal	Uterus	Adnexal	Both	Others	
≤ 20	12 (11.4)	1 (1.5)	9 (8.6)			22
21 - 30	53 (50.3)	18 (26.5)	60 (57.1)	2 (11.8)	2 (13.3)	135
31 - 40	24 (22.9)	21 (30.9)	25 (23.8)	10 (58.8)	6 (40.0)	86
41 - 50	8 (7.6)	20 (29.4)	7 (6.7)	3 (17.6)	4 (26.7)	42
> 50	8 (7.6)	8 (11.8)	4 (3.8)	2 (11.8)	3 (20.0)	25
Total	105 (33.9)	68 (21.9)	105 (33.9)	17 (5.5)	15 (4.8)	310

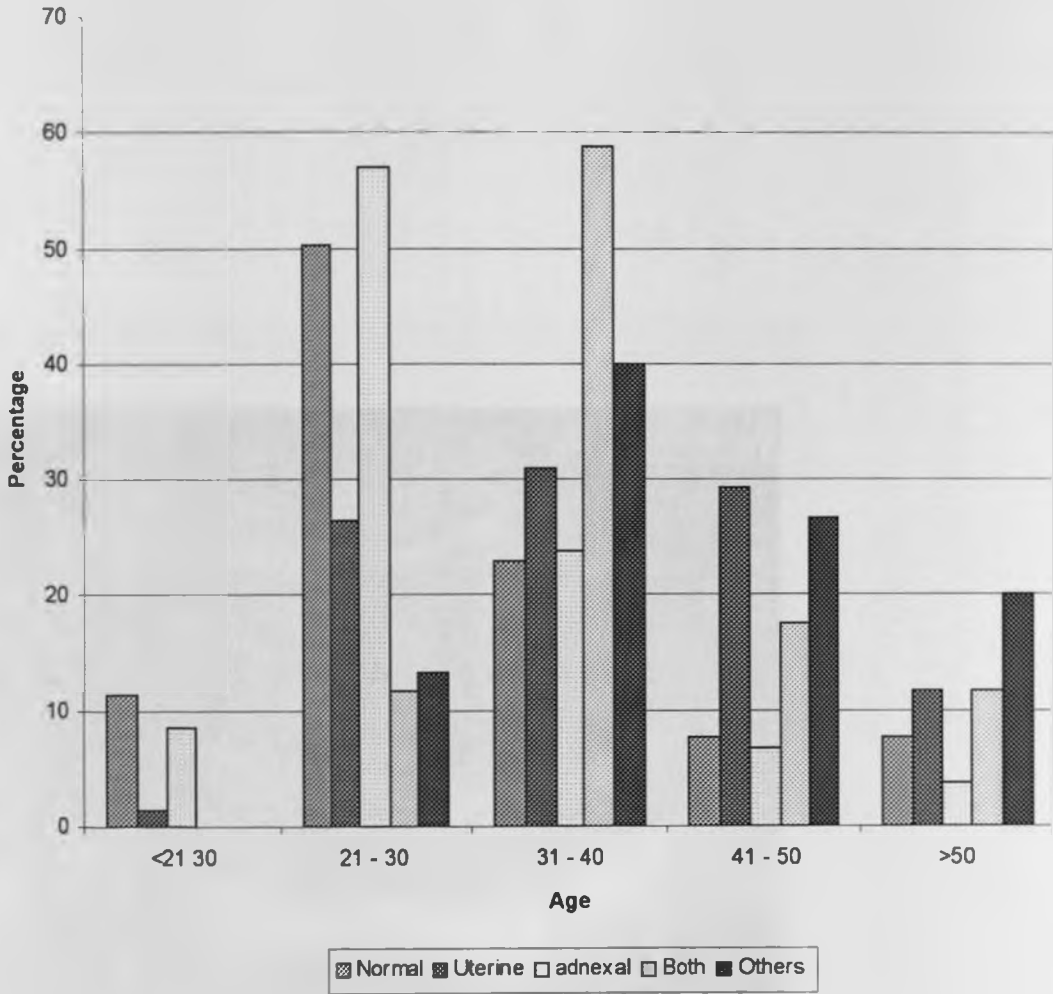**Fig III   Distribution of Pelvic Diseases by Age in Years**

Fig III above shows the distribution of people disease by age group: Pelvic disease was more common in the 21- 40 years age group
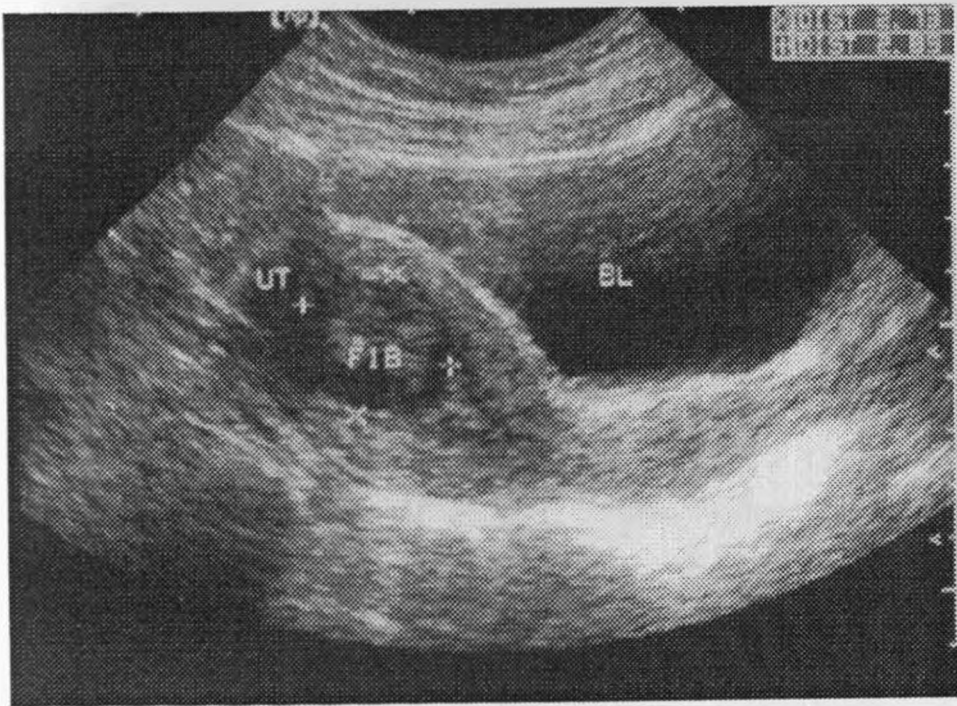
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Plate 1

Longitudinal pelvic sonogram showing a uterine fibroid:
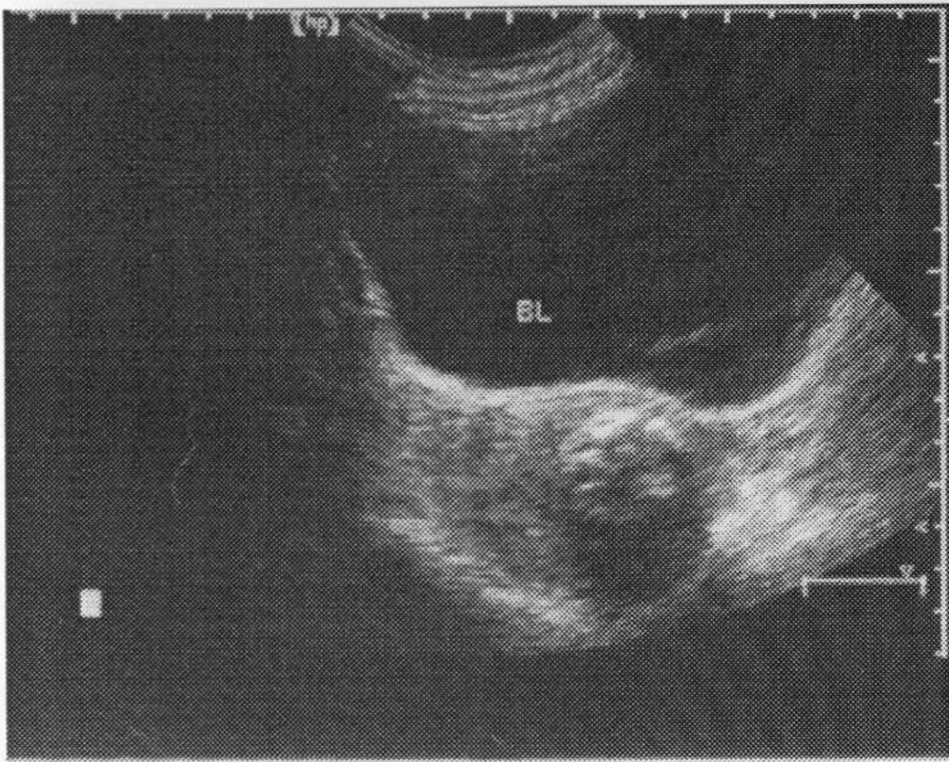
UT - Uterus BL - BladderFIB - Fibroid

Plate 2

Transverse pelvic sonogram showing a calcified fibroid with acoustic shadowing
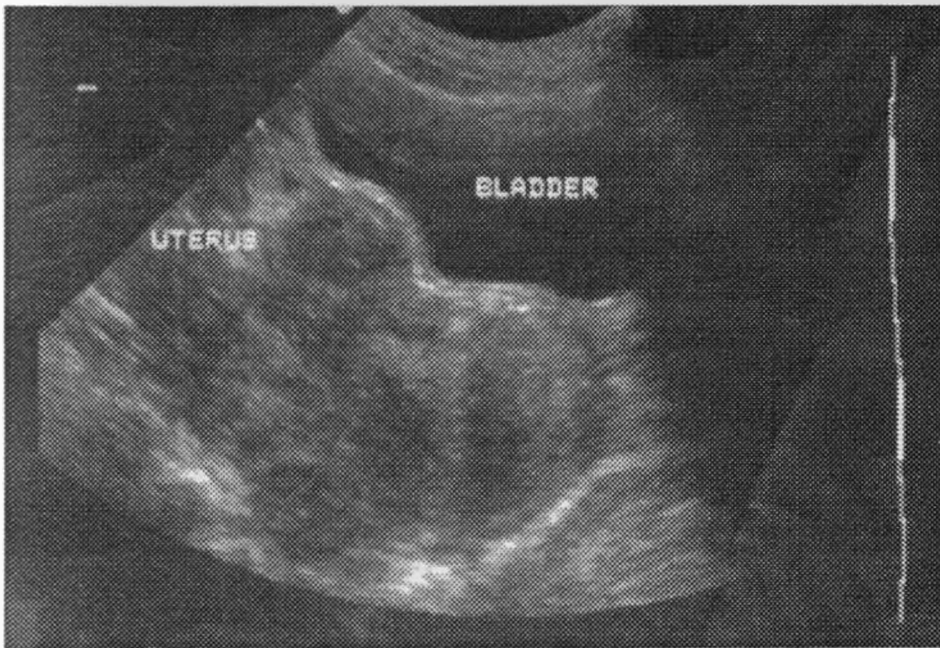
Plate 3:

Longitudinal pelvic sonogram showing an irregular uterine outline due to multiple uterine fibroids. The endometrium is not defined
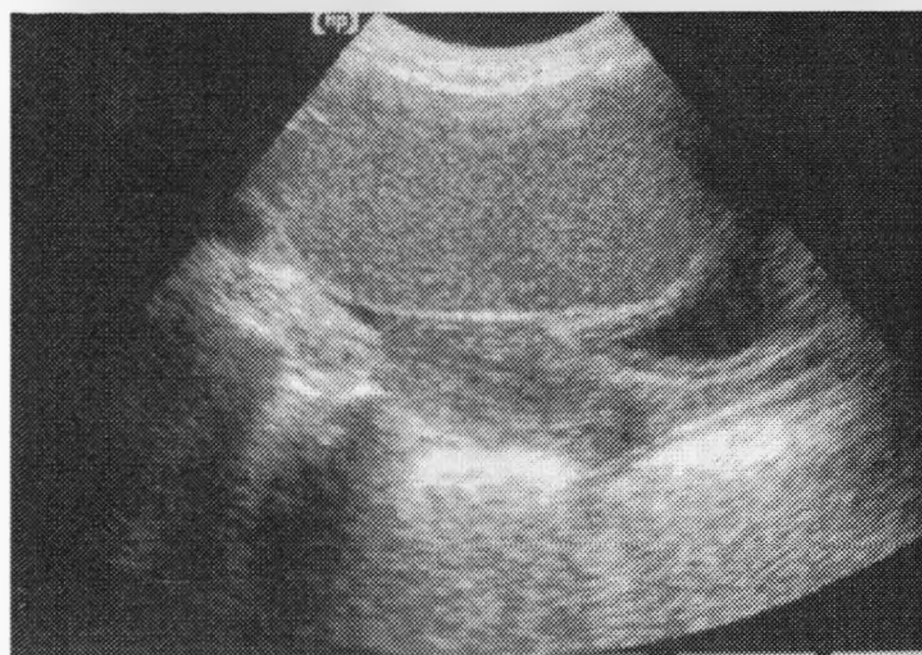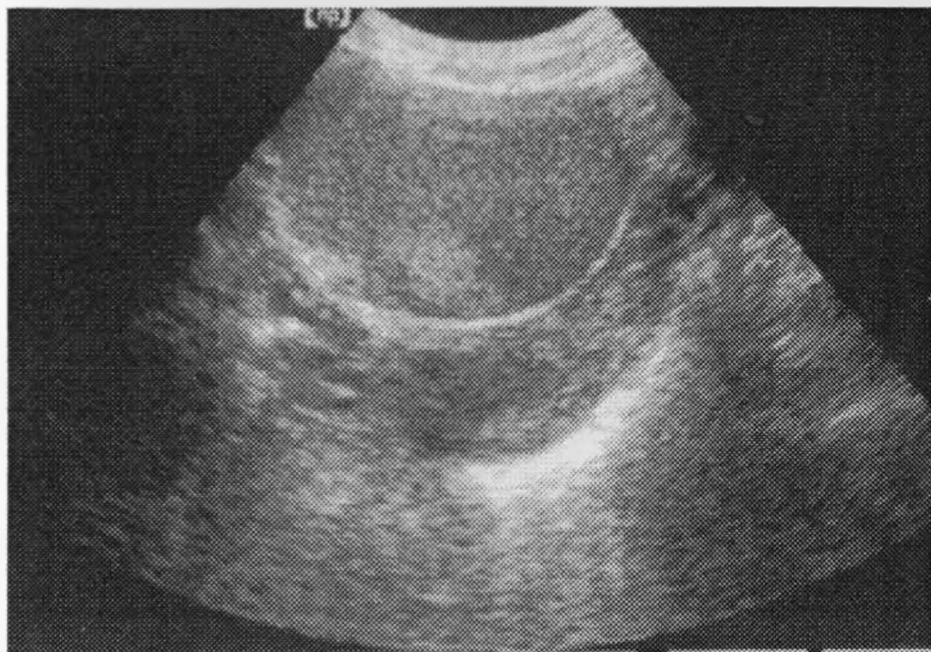
Plate 4 & 5:

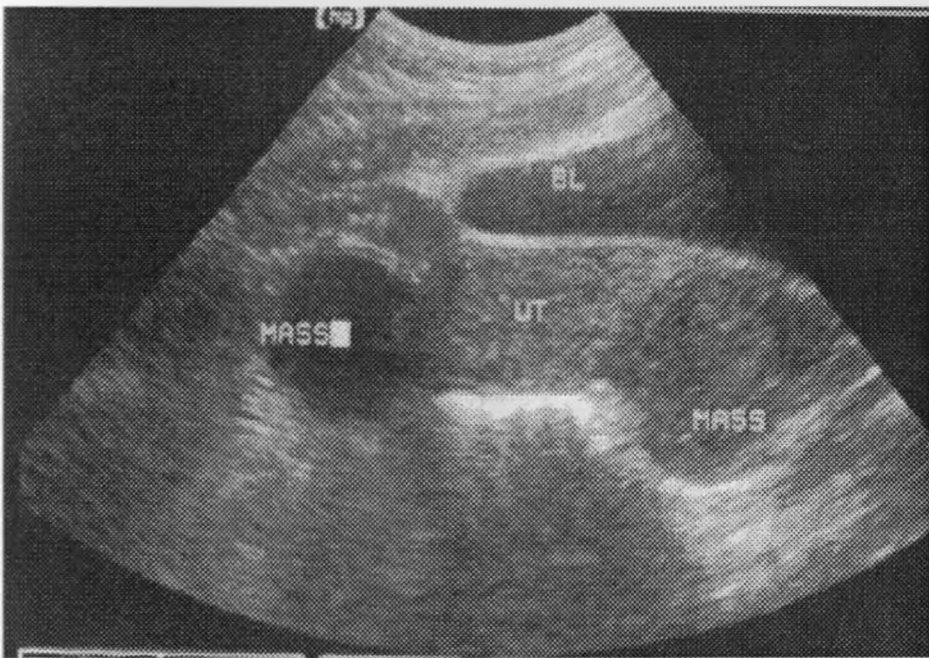Transverse and longitudinal pelvic scans to show a solid ovarian mass

Plate 6:

Transverse sonogram showing a simple ovarian cyst on the right. The mixed echo mass on the left was sonographically suspected to be an ectopic pregnancy (UT - UterusBL - Bladder)
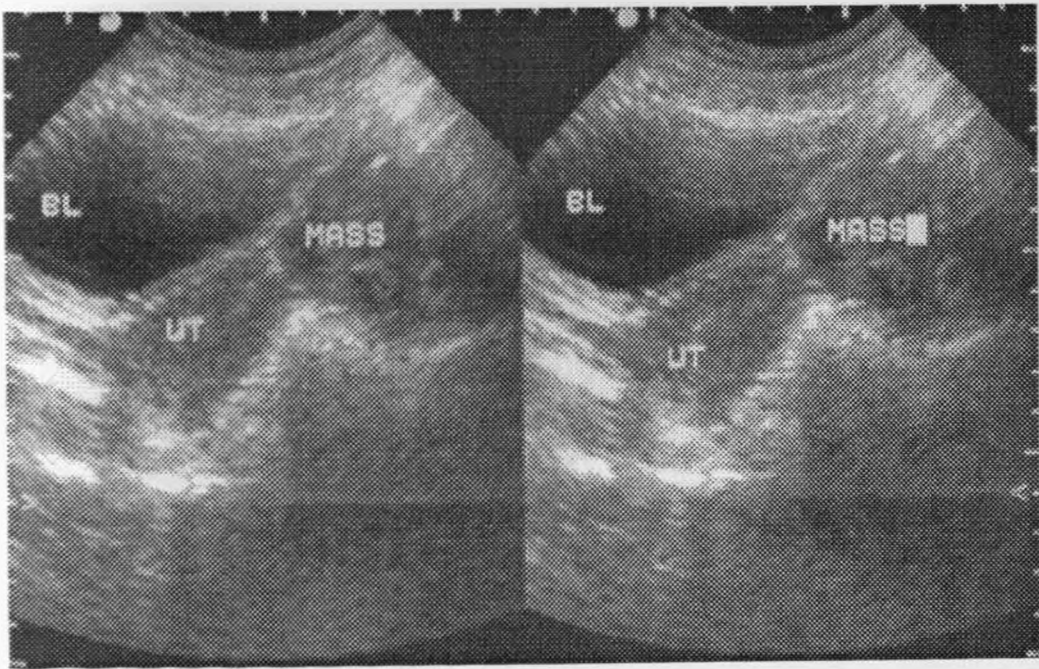
Plate 7:

This is a transverse pelvic scan showing a left complex mass diagnosed as an ectopic pregnancy
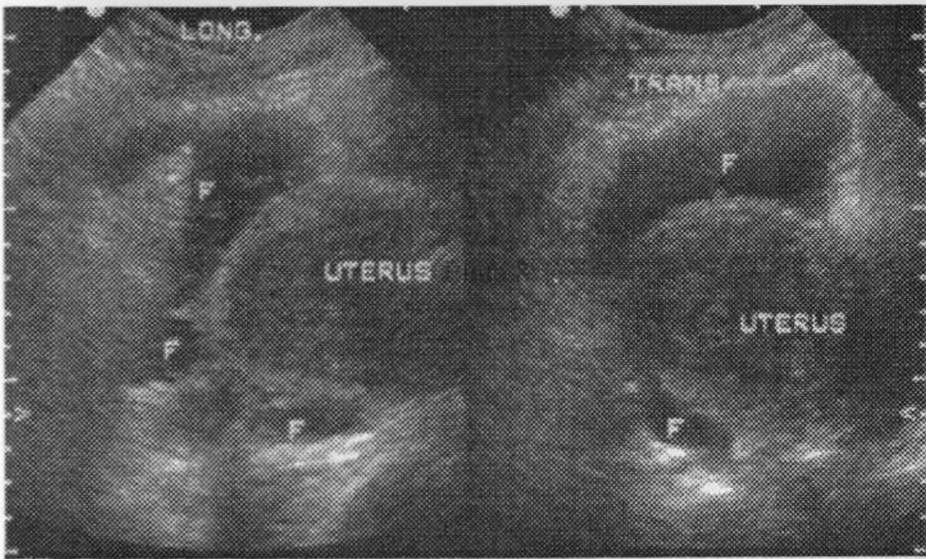
Plate 8:

Longitudinal sonogram in a patient presenting with severe low abdominal pains and p.v. discharge. Fluid (F) with thick septae is seen around the fundus of the uterus. This is a classical appearance of a pelvic abscess.
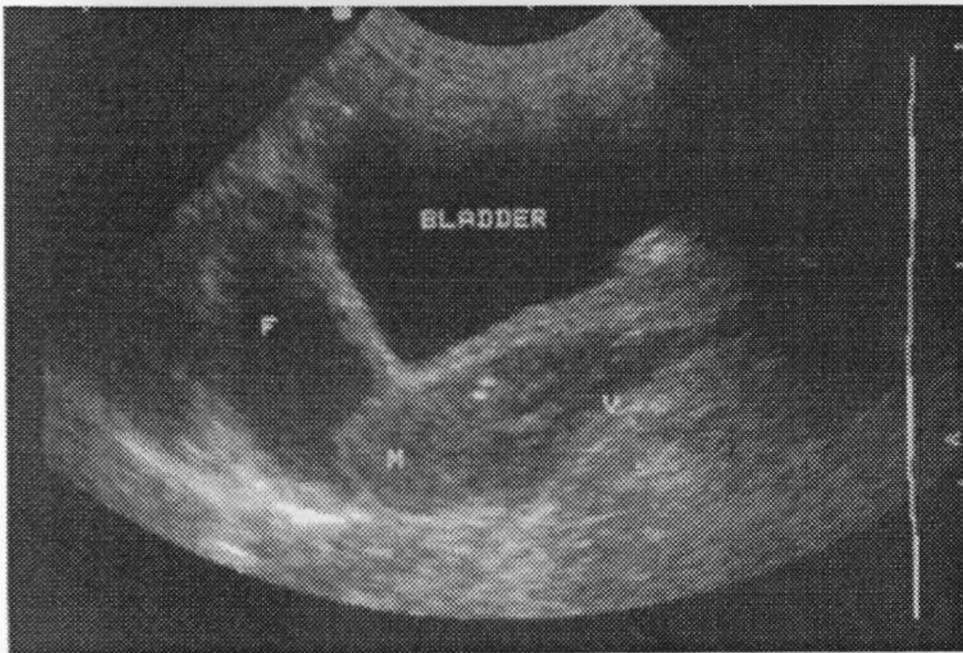
Plate 9:

Longitudinal pelvic ultrasound scan of a patient with proven diagnosis of carcinoma of the cervix. A cervical mass (M) with fluid (F) collection in the endometrial cavity due to obstruction of cervical canal is demonstrated. V - Vagina.

Plate 10:

Congenital anomalies of the uterus are rarely demonstrated at ultrasonography. This transverse scans shows a bicornuate uterus.

DISCUSSION

Most women are examined sonographically during their fertile years, which are typically between 14 and 50 years. (4). Ultrasonography is frequently the first investigation performed in female patients presenting with pelvic symptoms at Kenyatta National Hospital. (5).
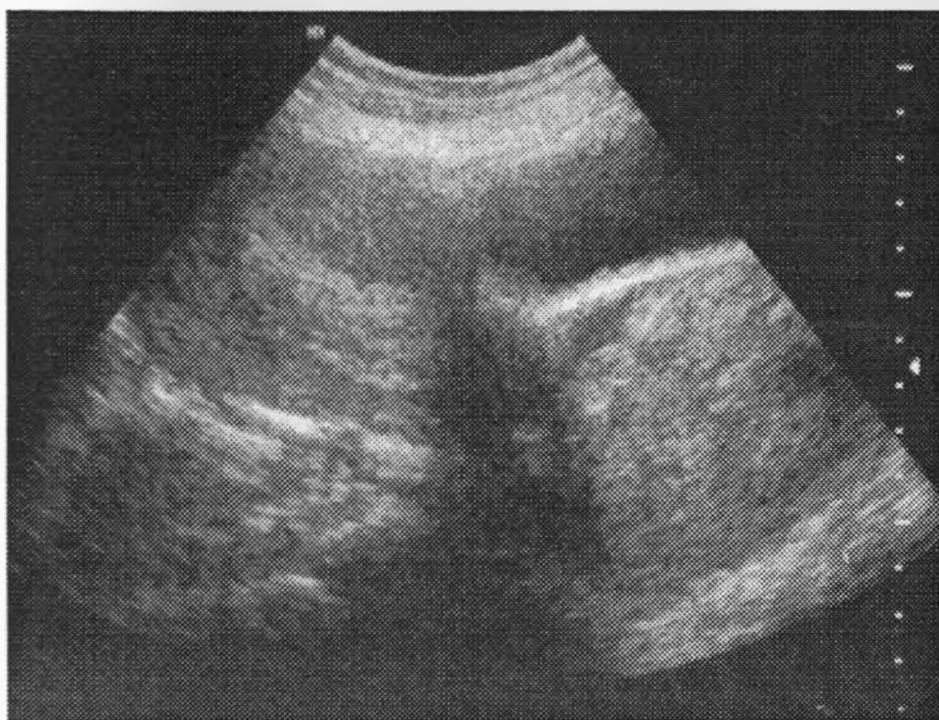
In this study a total of 399 patients were reviewed. They ranged from 6 years to 79 years where ages were given. The mean age was 33 years. The age distribution of these patients is shown in Table 1 and Figure I.

The study shows that majority (135 or 33.8%) are in the 21 - 30 years age group. This is followed by 31 - 40 years age group (86 or 21.6%). These two groups constitute 55.4% of the patients studied. As noted above these patients are in their fertile years when pelvic symptoms are more likely to occur. In the study carried out in Cote d'voire by N'Gbesso et al (16) it was shown that fibroid masses among African women were commonest in the 31 - 40 years age group.

In this study only 22 (5.5%) patients were 20 years and below. 89 (22.3%) patients did not have their ages specified. 25 (6.3%) of the patients were over 50 years of age.

Table 2 shows the distribution of patients by clinical diagnosis. Pelvic pain was the most common clinical diagnosis in 89 (22.3%). This compares favourably with studies done elsewhere. In the Cote'd'voire study by N'Gbesso R.D. pain was the most frequent clinical complaint comprising of 36.94% followed by pelvic mass impression (28.65%). In this study pelvic mass impression (fibroids, pelvic mass, ovarian mass)was found in 116 (29.1%) of patients.

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Abnormal uterine bleeding was the second most frequent clinical diagnosis in 75 (18.8%) patients in this series. Other clinical diagnosis encountered in this study are infertility (5.0%), ectopic pregnancy (1.5%), pelvic inflammatory disease (7.0%) carcinoma of the cervix (2%) 132 (33.1%) patients were found to have normal sonographic finding while 167 (66.9%) were found to have abnormal sonographic findings. The distribution of these patients is shown in the table 3.

Of the patients with abnormal sonographic findings 97 (24.3%) had uterine disease, 131 (32.3%) had adnexal disease, and 18 (4.5%) had both uterine and adnexal disease. Other conditions included bladder outlet obstruction, cystitis, I.U.C.D., hysterectomy, peritonitis, vaginal cyst. These were found in 21 (5.3%) patients. (Table 4)

The study shows that adnexal disease is more common 32.8% in patients undergoing ultrasonography at Kenyatta National Hospital. Studies have shown that among pelvic masses, benign adnexal masses are the commonest accounting for 34% of all pelvic masses (30). In the field of gynaecology sonography is of greatest clinical application in the evaluation of pelvic masses. (5). In the absence of a pelvic mass, the presence of disease may be demonstrated by abnormal fluid accumulation or poor defination of the pelvic structure. This agrees with this study as shown in Table 5. Adnexal masses were found in 77 of 131 patients with adnexal disease. This constituted 58.8% of the patients found to have adnexal diseases at ultrasonography.

This is one major factor that limits specificity of ultrasonography. Despite this, a scording system to predict ovarian malignancy has been developed by Sassone et. al. (31). In this scoring system the following parameters are used.

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- Wall thickness

- Inner wall structure

- Echogenicity

Wall thickness is charaterised as thin (≤ 3 mm) thick (> 3mm), or solid inner wall structure is grounded into smooth, irregular, with papillary projections or mostly solid. The presence or absence of septae is evaluated. Echogenicity ranges from anaechoic through mixed echogenicity to hyperchoid.

Benign masses are mostly anechoic, with a thin smooth wall not septated. The more abnormal and numerous the ultrasound findings, the greater the likelihood of malignancy. Other findings that suggest malignancy are the presence of lymphnodes and ascites. Ultrasonography is an invaluable technique as it provides reliable evidence to back up clinical suspicion (2).

Tubo-ovarian mass was the commonest adnexal lesion in this study. It was found in 47 (35.9%) of the patients diagnosed to have adnexal disease. The term tubo-ovarian mass includes space occupying lesions that are located in the region of the fallopian tubes and the ovaries. The majority of these are infective rather than neoplastic (5). The infective process may end up in formation of an abscess in which case the mass is referred to as tubo ovarian abscess. When an abscess becomes organized, the features of an abscess are lost and all one picks on sonography is the presence of a mass which is poorly defined.

As noted above benign adnexal cysts are the commonest adnexal finding at sonography. In this study ovarian cysts were found in 30 patients accounting for 22.9%. No characterization into benign or malignant cysts was done in this study. This is one major factor that limits

specificity of ultrasonography - the impossibility of distinguishing the benign from malignant tumour. Despite this the technique is invaluable as it provides reliable evidence to back up clinical suspicion. (2).

Pelvic inflammatory disease is a general term for acute subacute, reccurent or chronic infection of the fallopian tubes, ovaries, often with involvement of adjacent tissues. In the acute phase, salpingitis and less commonly endometritis are obvious clinically and it is rare for ultrasonography to be necessary. At ultrasonography pelvic inflamation is shown by thickening of the pelvic areas, fluid collection in the cul-de-sac, or by pelvic masses - abscesses. (4, 31).

In this study pelvic inflammation was diagnosed sonographically in 26 (19.8%) patients. Pelvic abscess was found in 3 (2.3%) of patients with adnexal disease.

Pelvic inflammatory disease is thought to constitute about 8% of pelvic masses (30). The high figure in this series is most likely due to the fact that the adnexal lesions are analysed separately from masses arising from the uterus.

Ectopic pregnancy is defined as the implantation of a fertilized ovum outside the endometrial lining of the uterus. 95 - 97% of ectopic pregnancies occur in the fallopian tubes. Adnexal ectopic pregnancies sometimes occur outside the fallopian tubes - within the ovary (< 1%) or within the leaves of the broad ligament.

It is often not possible to predict the exact anatomical position of an adnexal ectopic pregnancy prior to surgery. (2, 4, 5, 31).

Ultrasound is of greatest help in excluding ectopic pregnancy in cases where a normal intrauterine pregnancy can be demonstrated.

Sonographic features of an ectopic pregnancy include:

A moderately enlarged uterus with no intrauterine gestational sac.

Demonstration of a gestational sac or a foetus in an extrauterine location.

Adnexal mass with a ring-like structure or a complex mass occupying the adnexa and cul-de-sac.

Detection of fetal heart motion within the extrauterine mass on real-time scanning.

Demonstration of a tubal-ring. This has been used to infer absence of tubal rupture

Other features include, free peritoneal fluid, adnexal haematoma, or fluid in the cul-de-sac.

11 (8.4%) of patients with adnexal disease were diagnosed as ectopic pregnancy. Those diagnosed to have mixed adnexal disease e.g. endometrosis and ovarian cyst were 10 constituting 7.6%

Fibroids (Leiomyomas) are estimated to be present in 20-25% of reproductive age women indicating that they are the most common human neoplasms. They are not detectable before puberty and normally grow only during the reproductive years; when they can produce a wide spectrum of problems ranging from infertility to haemorrhage. (5,31)

Fibroids are usually multiple, discrete and spherical or irregularly lobulated. They usually originate from the myometrium and are classified by anatomic location, into subserous intramural, cervical, and submucous.

Myomas may be asymptomatic, symptoms being present in only 35 - 50% of patients. Common clinical presentation include:

- Abnormal uterine bleeding

- Pelvic pain

- Pressure effects

- Infertility

In this study fibroids were clinically suspected in 56 (14%) of the patients. (Table 2).This compares well with the study carried out by D. Ndushabandi at Kenyatta National Hospital (5) in which uterine fibroids were clinically suspected in 74 (21%) of 350 patients studied. It was the third most common clinical diagnosis. Fibroids (Leiomyomas) were the most common sonographic diagnosis among those with uterine disease. (Table 6). They were found in 78 (80.4%) of 97 patients who had uterine disease. These were mainly solid masses in the myometrium.

Cervical mass was found in 4 (4.1%) of patients. This was mainly in patients with suspected or proven diagnosis of carcinoma of the cervix. One of these patients had an associated fluid collection in the endometrial cavity which was sonographically suspected to be a pyometra.

Endometrial hyperplasia was seen in 3 (3.1%) patients. Endometrial abnormalities are very uncommon during the premenstrual years. If present it is almost always a collection within the vaginal (colpos) obstruction (4). In the fertile years almost all abnormalities are related to pregnancy. Patients with pregnancy related pelvic disease, except those with ectopic pregnancy were excluded from this study.

Adenomyosis was diagnosed sonographically in 3 patients accounting for 3.1% (Table 6).
Adenomyosis was rarely suspected clinically (Table 2).

Two patients were diagnosed to have a bulky uterus where no cause of the bulkiness could be identified

Table 7 shows the distribution of pelvic disease by age in years. This table shows clearly that the bulk of patients diagnosed to have pelvic disease are between 21 and 40 years. These are the fertile years during which period most women undergo pelvic ultrasonography. (4). This is further exemplified in figure III

In a woman who is known to have an intrauterine device (IUD) scans are performed primarily to determine whether the device is still in place and well positioned within the uterus. Additional evidence of associated pelvic inflammatory disease and pregnancy can be sought. It is difficult and often impossible to identify perforation (4).

In this study intrauterine device was demonstrated in 18 patients and in all it was in its normal location. It was associated with a tubo-ovarian mass in 1 patient, hydrosalphinx in 1 patient and endometrial hyperplasia in 1 patient. IUD associated with a uterine fibroid was seen in one patient (no causal relationship).

Disease of vagina and urinary bladder were rarely diagnosed in this study only 1 (0.3%). Patient was found to have a thickened bladder walls which was suspected to be due to cystitis. This is probably because the diagnosis of vaginal mass is well established by clinical examination rather than ultrasonography. (16).

The urinary bladder is used as a 'window' to see the other pelvic organs and is probably not 'looked at' itself.

Congenital lesions of the uterus are usually not detected by ultrasound. On occasion ultrasound can detect two uterine horns. Transvaginal ultrasonography may better define congenital abnormalities.(4) No congenital abnormalities of the uterus was seen in this study.

CONCLUSIONS

Most patients in the study were between 21 and 50 years with a mean age of 33 years. The commonest female pelvic disease at Kenyatta National Hospital is adnexal constituting about 32.8% of patients undergoing ultrasonography.

Non-obstetric female pelvic ultrasonography in females under 20 years comprised < 6%.

Vaginal and bladder disease is very rarely seen at female sonography at Kenyatta National Hospital.

RECOMMENDATIONS

Patients in this study mainly had transabdominal (TA) pelvic ultrasonography done. A 3.5 mH₃ problem was used. This transducer focuses deep into the pelvis and obtains an overview of the pelvic structures. Transvaginal (TV) examination allows for greater detail of the uterus and adnexa. There are no gynaecologic contraindications to the use of a TV probe. It is therefore recommended that transvaginal (TV) sonography be combined with the TA scanning.

In this study only one patient was found to have bladder disease and one patient had a vaginal mass. This could be due to the sonographer or sonologist concentrating on the uterus and the adnexa. It is recommended that the bladder and the vagina be deliberately examined at pelvic sonography.

As noted earlier ultrasonography is non-specific in terms of defining a benign and malignant lesions. A study to compare sonographic and histological findings at K.N.H. is recommended.

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APPENDIX A

SERIAL NUMBER	RESTROSPECTIVE OR PROSPECTIVE	AGE (yrs)	CLINICAL DIAGNOSIS	SONOGRAPHIC FINDINGS/ DIAGNOSIS				COMMENTS
				UTERUS	ADNEXAE (R/L)	URINARY BLADDER	VAGINA	

APPENDIX B

A. **Type of Study**
1. Retrospective
2. Prospective

B. **Sign and Symptoms**
0. No history
1. Pelvic Pain
2. Pelvic Mass
3. P.V. bleeding
4. P.V. discharge
5. Other (specify)

C. **Clinical Diagnosis**
0. Not given
1. Pelvic Mass

3. Ca- cervix
4. Ectopic Pregnancy
5. Ovarian. Cyst/malignacy
6. Pelvic Inflammatory Diseases/Abscess
7. Other (Specify)

D. **Sonographic findings/Diagnosis**

E. **Uterus**
0. Normal
1. Fibroids
2. Adenomyosis
3. Endometrial mass
   31. Cystic
   32. Mixed echo
   33. Solid
4. Cervical mass
5. I.U.C.D
6. Other (specify)

F. **Adnexae (R/L)**
0. Normal
1. Ovarian mass
   11. Cystic
   12. Mixed echo
   13. Solid
2. Tubo-ovarian mass
   21. Cystic
   22. Mixed echo
   23. Solid
3. Hydrosalphinx?Pyosalphinx
4. Endometriosis
5. Abscess
6. Other (specify)

G. **Vagina**
0. Normal
1. Mass
   11. Cystic
12. Mixed echo
   13. Solid
2. Other (specify)

H. **Urinary bladder**
0. Normal
1. Stones
2. Cystitis
3. Mass
   31. Cystic
   32. Mixed echo   2 Fibroids
33. Solid
   4. Other (specify