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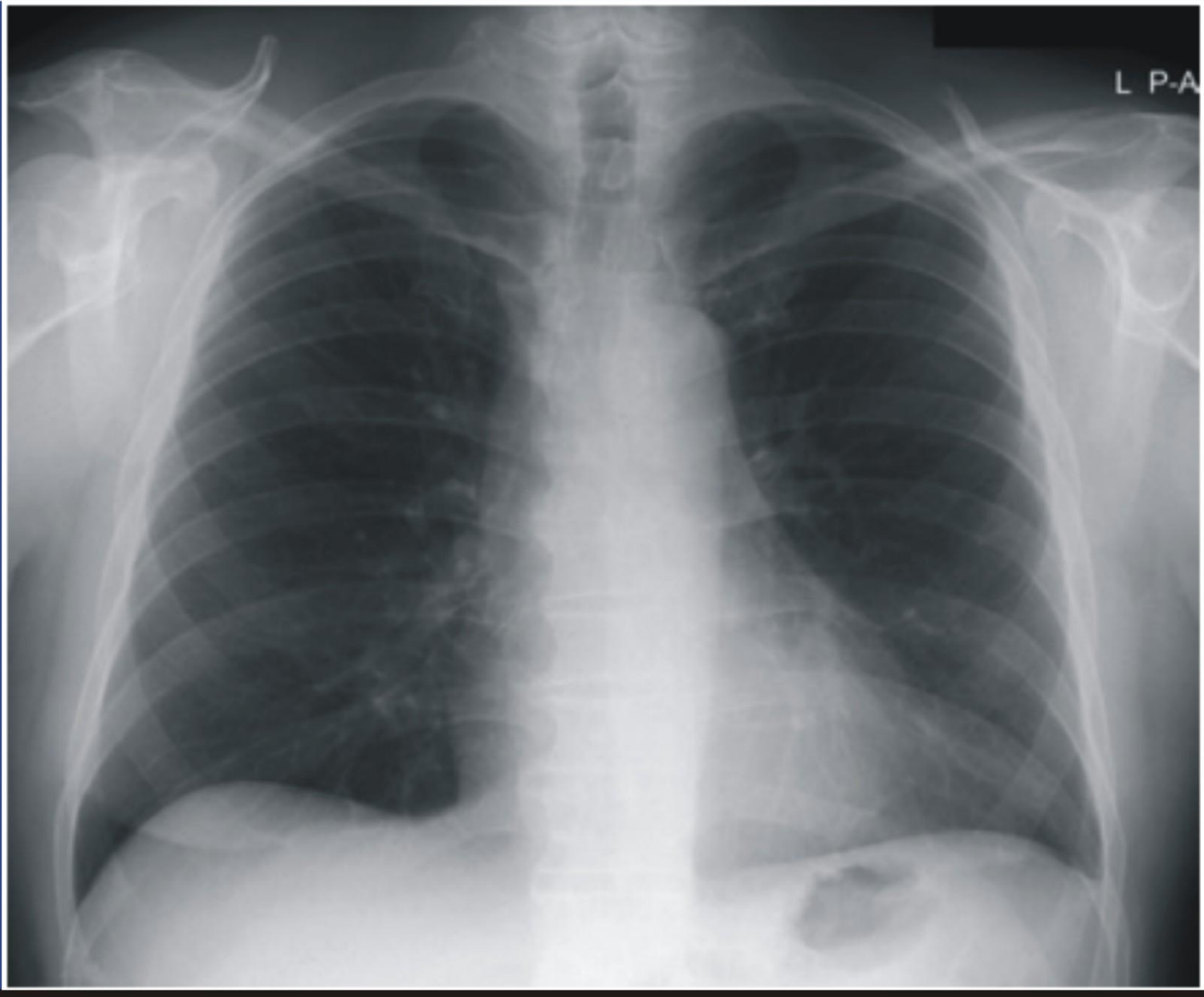

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Pattern of Pelvic Ultrasound Request and Findings in Abubakar Tafawa Balewa University Teaching Hospital (ATBUTH) Bauchi

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ABSTRACT

Background: Pelvic ultrasonography involves the evaluation of pelvic organs and structures. It is valuable in the diagnosis of pathological conditions which are likely causes of pelvic pain.
Purpose: The objective of this study was to evaluate the pattern of pelvic ultrasound request and findings in Abubakar Tafawa Balewa University Teaching Hospital (ATBUTH) Bauchi.
Methods: A retrospective study was conducted in the radiology department of ATBUTH. A total of 1,320 ultrasonography records of patients for pelvic examination were reviewed from January 2016 to February 2017, and tabulated according to age, sex, clinical indication and ultrasound findings. Data were analyzed using SPSS version 20.0 to determine the mean, frequency and percentages. Pearson's correlation was used to determine the relationship between clinical indication and ultrasound findings.
Results: The age group of 21-30 years and 31- 40 years had the highest frequency (n = 627, 47.5 %) and (n = 321, 24.3%), respectively. Gender distribution were 1158 (87.7 %), for females and 162 (12.3 %) for males. Pelvic pain had the highest indication, 72.3% (n = 955), followed by PID, 9.2% (n = 121), then BPH, 3.4% (n=45) and, ovarian cyst, 2.7 % (n = 36).
Conclusion: The highest indication and findings are pelvic pain and pelvic inflammatory diseases, among females while benign prostatic hypertrophy was the highest in males.
Keywords: Pelvic ultrasound, requests, findings, diagnosis, pathology

Introduction

Ultrasound scan (USS) of the pelvis employs the use of high frequency sound waves to produce images of the structures and organs in the lower abdomen and pelvis. It involves the use of a small transducer and ultrasound gel placed directly on the skin [1]. High frequency sound waves are transmitted from the transducer through the gel into the body. The transducer collects the echo and the computer then uses sound waves reflected back to create an image [2].

Pelvic ultrasound images are captured in real-time, and they are done for both male and female depending on the provisional diagnosis. Pelvic USS is most often performed to evaluate the uterus, cervix, ovaries, fallopian tubes and bladder in females[1, 2]. Pelvic USS is also performed in women to monitor the health and development of an embryo or foetus during pregnancy. In males, it is often done to assess the prostate gland and urinary bladder [3].

Ultrasound examination can help diagnose signs and symptoms experienced by women such as pelvic pain, abnormal vaginal bleeding and other menstrual problems[4].The examination also helps to identify palpable masses such as ovarian cyst, uterine fibroids, ovarian and uterine scar [2, 3]. Other pelvic ultrasound examination in women includes trans-vaginal ultrasound usually carried out to visualize the endometrium, the ovaries and myometrium [3]. In men, pelvic USS is usually done to evaluate the prostate gland, seminal vesicles and urinary bladder. Trans-rectal ultrasound is a specialized study to evaluate the prostate gland by inserting a specialized transducer into the man`s rectum [3].

Generally, pelvic USS has been found useful in the assessment of renal calculi, bladder tumors, polyps,

diverticulum, trabeculation, and many other pathology [4]. In children and infants it is useful in evaluating pelvic masses, pelvic pain, ambiguous genitalia, early or delayed puberty in girls [3,5]. To prepare for pelvic ultrasound in both male and female it is necessary to drink enough water (at least one litre of water 45 minutes prior the scan) so that the patients can have full bladder [5].In medicine, ultrasound is used to detect changes in appearance, size or contour of organs, tissues and vessels or to detect abnormal masses such as tumor. Sonohysterosalpingography has been found useful in pelvic ultrasound assessment [6].

Some limitations of pelvic ultrasound have been reported in many studies, such as disruption by air or gas [3,5]. However to compensate for that, other imaging modalities most appropriate for pelvic examination such as computed tomography, magnetic resonance imaging and barium studies have vital roles to play in keeping with evidence based medical imaging [5, 6] The aim of this study is to evaluate the pattern of pelvic ultrasound requests and findings in Abubakar Tafawa Balewa University Teaching Hospital (ATBUTH), Bauchi, Nigeria.

Methodology

The study was a retrospective study conducted in the Radiology department of ATBUTH Bauchi, North-Eastern Nigeria. A total of one thousand, three hundred and twenty patients' records were retrieved from the ultrasound section of the hospital records. The information was obtained from January 2016 to February 2017. Full ethical clearance was obtained before carrying the study. Information sought included patients' ages, request/clinical indication, gender and ultrasound findings. All the patients were scanned using ALOKA 2000 and ALOKA 1500 ultrasound machined in supine position using trans-abdominal, trans-vaginal and trans-rectal approaches with 3.5 MHz and 7.5 MHz transducers where applicable. The data obtained were tabulated according to age, sex, clinical indication and ultrasound findings. Descriptive statistics was employed in analyzing the data using SPSS Version 20.0 software to obtain mean percentages and frequencies. Pearson's correlation was used to determine the relationship between clinical indications and ultrasound findings. Statistical significance was set at $p \leq 0.05$.

Results

A total of 1320 record of patients in ATBUTH Bauchi were studied with ages between 1 to 80 years. Results from table 1 shows that age group of 21-30 years and 31-40 years had the highest frequencies and percentages of 627 (47.5%) and 321 (24.3%) respectively, while those within the age group of 1-10years 2 (0.2%) and 32 (2.4%) had the least frequencies and percentages. Table 2 shows the gender distribution of patients with females having the highest distribution 1158 (87.7%) while males had 162(12.3%). Table 3 presented various clinical indications of patients presenting for pelvic ultrasound. Pelvic pain had highest indication 72.3% (n = 955). Table 4 shows pattern of pelvic ultrasound findings with normal findings dominating (n = 418, 31.7%). Table 5 shows the pattern of ultrasound findings in relation to age. The highest age group with normal study was 21-30years (n=223) while the least was 1-10years (n=1). Table 6 shows the pattern of findings in relation to sex. Out of the total of 418 normal studies, males had 36 while females had 382 normal findings. There were a total of 162 males and 1158 females with various pelvic USS findings. Table 7 shows that there is no statistically significant relationship between clinical indications and ultrasound findings ($p = 0.224$).

Table 1. Age distribution of patients

Age groups	Frequency	Percentage
21-30	627	47.5
31-40	321	24.3
11-20	135	10.2
41-50	108	8.2
51-60	52	3.9
61-70	43	3.3
71-80	32	2.4
1-10	2	0.2
Total	1320	100.0

Table 2. Sex distribution of patients

Sex	Frequency	Percentage
Female	1158	87.7
Male	162	12.3
Total	1320	100.0

Table 3. Clinical Indication of patients presenting for Pelvic Ultrasound

Clinical Indication	Frequency	%
Pelvic Pain	955	72.3
PID	121	9.2
BPH	45	3.4
Ovarian Cyst	36	2.7
PV Bleeding	31	2.3
Uterine Fibroid	20	1.5
Primary infertility	18	1.4
2^o Infertility	18	1.4
Amenorrhea	17	1.3
UTI	14	1.1
Ovarian Tumour	7	0.5
Threatened Abortion	5	0.4
Incomplete abortion	5	0.4
Irregular Menses	4	0.3
Appendicitis	4	0.3
Dysmenorrhea	3	0.2
Cystitis	3	0.2
PV bleeding	2	0.2
Miscarriage	2	0.2
Cervical Cancer	2	0.2
Acute Urinary pain	1	0.1
Hepatitis	1	0.1
Hematuria	1	0.1
Endometriosis	1	0.1
Lipoma	1	0.1
Vaginal Cystocoele	1	0.1
Complete Abortion	1	0.1
Total	1320	100.0

Discussion

This study investigated 1320 ultrasound records of patients who underwent pelvic ultrasound in ATBUTH Bauchi, from January 2016 to February 2017. The study shows that the age is between 1-80 years for both gender. Majority of the patient were between the ages of 21 -30 (47.5 %, n = 627), then followed by 31-40 years (24.3 %,n = 321). Ages of 11-20 years had 10.2 % (n = 135) patients, 41-50 had 8.2 % (n =108) patients, 51- 60 years had 3.9 % (n = 52) patients, 61-70 years had 3.3 % (n = 43) patients, while 71-80 years had 2.4 % (n = 32) patients. This agrees with findings of Geoffrey *et al*. who reported 30-39 years, in North-western Nigeria, and Njoku *et al.* in South-eastern Nigeria, who reported age of 25-30 years [5,6].

The gender distribution of patients showed 1158 (87.7%) for female and 162 (12.3%) for male. This is not surprising as many studies both within and outside the shores of Nigeria have reported a wide proportion of women to men in pelvic examination, 1:10 for male to female. This agrees with the studies of Pitts *et al.*, 2008 among Australian women [7]. This may be as a result of higher pelvic pain in women, hormonal changes, dysmenorrhea, dyspareunia, and pelvic pains associate with women of child bearing age and the higher rate of gynecological conditions in most populations [7].

In women, the highest clinical indication was pelvic pain 72.3 % (n = 955), followed by pelvic inflammatory disease 9.2 % (n =121), ovarian cyst with, 2.7 % (n = 36), pelvic bleeding with 0.2 % (n = 31), uterine fibroid with 1.5 % (n = 20) and infertility with 1.4 % (n = 18) for both primary and secondary, respectively. The highest request in male subjects was for BPH.

The pelvic ultrasound findings showed PID having the highest occurrence of 20.2 % (n = 267) in female, while BPH had the highest occurrence in male. This could be because PID could be easily transmittable by sexual intercourse and easily transmittable via toilets or sharing underwear. This corroborates with the study by Geoffrey *et al.*, 2015, in North western Nigeria [6].

The higher number of benign prostatic hypertrophy recorded in men, is because most of the pelvic ultrasound among men were between the ages of 51-60 years, 61-70 years and 71-80 years. This could be as a result of aging among the men. A higher percentage of patients presented with normal findings (n = 418, 31.7 %). This concurs with another study in North West Nigeria [6].

Conclusion

The highest indication and finding for pelvic ultrasound in ATBUTH Bauchi was pelvic pain and pelvic inflammatory disease for females, and benign prostatic hypertrophy for males, respectively. There was no statistically significant relationship between clinical indications and findings for pelvic ultrasound.

Table 4. Pattern of pelvic ultrasound findings

Ultrasound Findings	Frequency	Percentage
Normal Study	418	31.7
PID	267	20.2
Uterine Fibroid	146	11.1
Ovarian Cyst	137	10.4
BPH	98	7.4
Cyesis	53	4.0
Adnexal Cyst	31	2.3
Incomplete Abortion	26	2.0
Cystitis	17	1.3
UTI	16	1.2
Complete Abortion	15	1.1
Endometriosis	13	1.0
Missed Abortion	10	0.8
Cervical mass	10	0.8
Incomplete Miscarriage	9	0.7
Ovarian Tumour	8	0.6
Molar gestation	8	0.6
Follicular Cyst	7	0.5
Appendicitis	4	0.3
Urinary bladder mass	4	0.3
Urinary Bladder Calculus	3	0.2
Threatened Abortion	2	0.2
Asherman's Syndrome	2	0.2
Pyelonephritis	2	0.2
Endometritis	2	0.2
Uterine Nodular mass	1	0.1
PCOS	1	0.1
Lipomatic Cyst	1	0.1
Enteritis	1	0.1
Sepsis	1	0.1
Hydrosalpinx	1	0.1
Renal Cyst	1	0.1
Prostatic Abscess	1	0.1
Hypoplastic Uterus	1	0.1
Ectopic pregnancy	1	0.1
Mild ascites	1	0.1
Bilateral Obstructive Uropathy	1	0.1
Total	1320	100

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Conflict of interest – Nil

Table 5. Pattern of ultrasound findings in relation to age

Findings	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80
Normal Study	1	40	223	102	35	8	6	3
Ovarian Tumour	0	0	4	1	0	2	1	0
Ovarian Cyst	0	21	66	41	5	1	2	1
PID	0	33	150	63	18	2	1	0
Missed Abortion	0	4	5	1	0	0	0	0
Molar gestation	0	1	6	0	1	0	0	0
Adnexal Cyst	0	3	20	6	1	1	0	0
UTI	0	1	9	2	1	2	0	1
BPH	0	0	5	4	14	23	27	25
Uterine Fibroid	0	6	59	54	23	3	1	0
Incomplete Miscarriage	0	2	4	3	0	0	0	0
Threatened Abortion	0	1	1	0	0	0	0	0
Uterine Nodular mass	0	0	0	1	0	0	0	0
Endometriosis	0	3	5	3	1	1	0	0
Asherman's Syndrome	0	0	1	1	0	0	0	0
Cyesis	0	8	34	10	1	0	0	0
Follicular Cyst	0	0	6	1	0	0	0	0
PCOS	0	0	1	0	0	0	0	0
Lipomatic Cyst	1	0	0	0	0	0	0	0
Appendicitis	0	0	0	0	0	1	1	2
Enteritis	0	1	0	0	0	0	0	0
Incomplete Abortion	0	3	10	11	2	0	0	0
Complete Abortion	0	5	5	4	1	0	0	0
Cystitis	0	1	5	1	3	4	3	0
Cervical mass	0	0	2	6	1	1	0	0
Pyelonephritis	0	0	1	1	0	0	0	0
Sepsis	0	0	1	0	0	0	0	0
Urinary Bladder Calculus	0	0	1	0	1	0	1	0
Hydrosalpinx	0	0	0	1	0	0	0	0
Renal Cyst	0	0	0	1	0	0	0	0
Prostatic Abcess	0	0	1	0	0	0	0	0
Hypoplastic Uterus	0	1	0	0	0	0	0	0
Ectopic preg	0	0	0	1	0	0	0	0
Urinary bladder mass	0	0	1	1	0	2	0	0
Mild ascites	0	0	0	1	0	0	0	0
Endometritis	0	1	1	0	0	0	0	0
Bilateral Obstructive Uropathy	0	0	0	0	0	1	0	0
Total	**2**	**135**	**627**	**321**	**108**	**52**	**43**	**32**

Table 6. Pattern of findings in relation to gender

Findings	Male	Female	Total
Normal Study	36	382	418
Ovarian Tumour	0	8	8
Ovarian Cyst	0	137	137
PID	0	267	267
Missed Abortion	0	10	10
Molar gestation	0	8	8
Adnexal Cyst	0	31	31
UTI	7	9	16
BPH	93	0	93
Uterine Fibroid	0	146	146
Incomplete Miscarriage	0	9	9
Threatened Abortion	0	2	2
Uterine Nodular mass	0	1	1
Endometriosis	0	13	13
Asherman's Syndrome	0	2	2
Cyesis	0	53	53
Follicular Cyst	0	7	7
PCOS	0	1	1
Lipomatic Cyst	0	1	1
Appendicitis	4	0	4
Enteritis	0	1	1
Incomplete Abortion	0	26	26
Complete Abortion	0	15	15
Cystitis	10	7	17
Cervical mass	0	10	10
Pyelonephritis	0	2	2
Sepsis	0	1	1
Urinary Bladder Calculus	3	0	3
Hydrosalpinx	1	0	1
Renal Cyst	0	1	1
Prostatic Abscess	1	0	1
Hypoplastic Uterus	0	1	1
Ectopic pregnancy	0	1	1
Urinary bladder mass	4	0	4
Mild ascites	0	1	1
Endometritis	0	2	2
Bilateral Obstructive Uropathy	1	0	1
Total	162	1158	1320

Table 7. Correlation between Clinical indications and ultrasound findings

		Indication	Findings
Clinical Indication	Pearson Correlation	1	.033
	Sig. (2-tailed)		.224
	N	1320	1320
Ultrasound Findings	Pearson Correlation	.033	1
	Sig. (2-tailed)	.224	
	N	1320	1320

At $p < 0.05$ relationship was not statistically significant

Also, no significant correlation was noted

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