



Pelvic pain ultrasound findings in reproductive aged, non-pregnant women: influence of age.

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Upon clinical presentation, there are overlapping gynecological causes of pelvic pain in a non-pregnant female with gastrointestinal and genitourinary pathology. Pelvic ultrasonography is often the first best imaging modality for the initial assessment of non-pregnant women with pelvic pain. Ultrasound can detect any abnormalities in the female pelvic, describe it as gynecological or non-gynecological and differentiate the most different gynecological causes. To evaluate the most prevalent ultrasound findings of pelvic pain in non-pregnant women of reproductive age in Sudan and the age group impacted. In this cross-sectional study, 100 patients were selected from Altamiouz Hospital, Sudan, the period from July 2018 to January 2000 with pelvic pain as non-pregnant women of reproductive age who underwent pelvic ultrasound examination of the pelvis focusing on findings of gynecological and non-gynecological diseases. Data were collected and organized by age group, and ultrasound findings and analyzed using SPSS Version 25.0 statistical software. The study result showed that the mean age of the participants was 30.3 ± 6.5 years, and the most affected age group was (26-35) years, 52% of all participants. The ultrasound findings showed that the most common cause (31%) of pelvic pain was an ovarian cyst. A weak significant association was noted between causes and female age, p-value (0.03). The study revealed that gynecological cause was the most frequent distribution of all ultrasound findings. Most patients with acute pelvic pain were in the late third decade to the early fourth decade. Ovarian cysts were the leading cause of pelvic pain, followed by PID and uterine fibroid.

Keywords: Pelvic pain, ultrasonography, reproductive age.

INTRODUCTION

Pain in the pelvic and lower abdomen is highly prevalent among women of reproductive age in emergency centers and outpatient departments. Annually, over 1.4 million gynecologic visits were made to emergency rooms, or 24.3 per 100 women aged 15 to 44 years. Zafar & Plavsic, 2012)

Over the past few decades, ultrasound has become an important diagnostic imaging device in the field of gynecology and obstetrics. It's been commonly utilized to figure out what's causing pelvic pain. (Okaro and Valentin, 2004; Cicchiello, Hamper and Scoutt, 2011) Consequently, the results of this procedure play a decisive role in the treatment of patients for surgery or medical consultation or just watchful waiting. Therefore, it was important for the sonographer to be aware of the differential causes of pelvic pain and how ultrasound can be utilized in making the decision (Zafar and Plavsic, 2012). The adjacent anatomical and physiological associations of pelvic structures, mutual with a comparable clinical presentation of diverse diseases and

overlapping indications, predominantly in an emergency, make an exact diagnosis of pelvic pain complicated (Basta Nikolic et al. 2021). In women, this pain may refer to symptoms arising from the gynecological or non-gynecological source Basta Nikolic et al. 2021), is varying in their location, duration, and severity. Such as ovarian cysts ruptured ovarian cysts, endometriosis, pelvic inflammatory disease, adnexal torsion, fibroids, and dermoid cyst, as well as nongynecological sources of pelvic pain including acute appendicitis, inguinal hernia, ureteral stones, urine retention and others (Amirbekian and Hooley, 2014). Ultrasound exams provide several advantages over traditional exams, including mobility, speed, and accuracy (Okaro & Valentin, 2004). The present study is expected to understand what's causing women's pelvic discomfort in a non-pregnant lady using an ultrasonographic modality. The goal of this study was to characterize the sonographic findings in non-pregnant women of reproductive age who were experiencing pelvic pain and the most afflicted age group.

MATERIALS AND METHODS

This study was conducted in the period from July 2018 to January 2019. Ultrasound scanning was done using two probes – convex 3.5 MHz and transvaginal 7.5 MHz to do the scan. Transabdominal ultrasound with the bladder full, the patient had given 4 or 5 glasses of water and examined after one hour. The patient in the supine position began with transverse scans from the pubic symphysis upward to the umbilicus, then the scan moved from one side of the lower abdomen to the another in a parasagittal scan. Scan performed by a sonographic technician and expert sonologist who describe the sonographic findings. The study was authorized by Alzaiem Alazhari University's ethical and research council, as well as the faculty of radiological sciences and medical imaging. All patients gave their informed agreement to participate in the study preceding the ultrasonography exam.

Statistical analysis

To analyze the data, statistical package for the social sciences software system version 25.0 for Windows was applied. Cross-tabulation and the Spearman's rho test were used to evaluate the association between age group and sonographic findings. P<0.05 was considered statistically significant.

RESULTS

Concerning the sonographic assessment of 100 non-pregnant woman with pelvic pain the mean age of them was 30.34±6.5 years. And classified into three groups, the most frequent distribution of patient age in (Figure1)

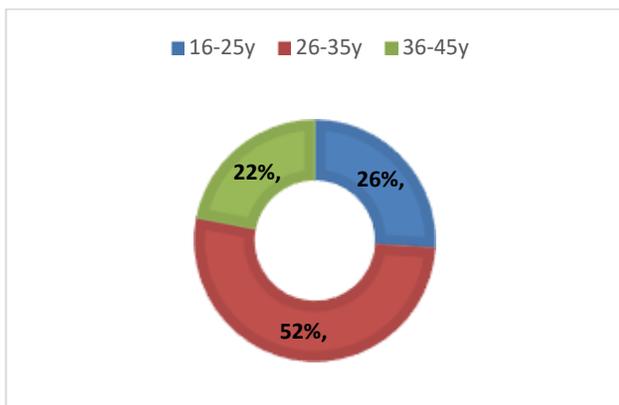


Figure 1: pelvic pain patient's age group frequency

the age group (26-35) years was about 52% of all patients, 26% of them in the age group (16-25) years and 22% in the age group 36-45 year. In most of the cases, 84% were gynecological causes (Table 1), an ovarian cyst had the highest frequency distribution (31%) and was more common in the age group (26-35) years. The second most common cause was pelvic inflammatory disease

(PID), which affected 20% of participants (Table 1), which was predominant in the age group of 25 to 35 years (Figure 2), followed by uterine fibroid (17%) (Table 1), which is a common prevalence in the age group (36-45) years (Figure 2)

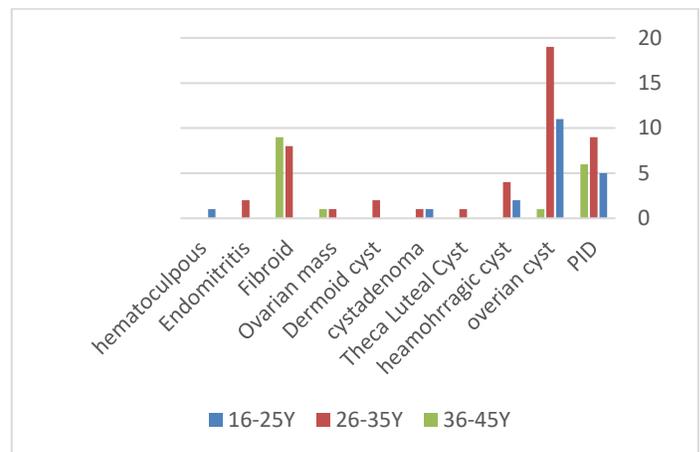


Figure 2: Crosstabulation of pelvic pain gynecological sonographic findings with patient age group

There was no evidence of fibroid in the youngest age group. The association between sonographic results and patient age groups was assessed using Spearman's rank correlation. (Table 2). There was a weak positive correlation between variables, r (98) = .21, p = 0.03



Figure 3: Transabdominal view demonstrate dilated fallopian tube filled with anechoic fluid (hydrosalpinx) represented PID.

Table 1: occurrence of sonographic findings in non-pregnant women patients with pelvic pain

	Sonographic findings	f	%
Gynecological findings	HOC	6	84%
	PID	20	
	Ovarian Cyst	31	
	cystadenoma	2	
	Theca Luteal cyst	1	
	Uterine Fibroid	17	
	Ovarian Mass	2	
	Endometritis	2	
	Dermoid cyst	2	
	imperforated Hymen	1	
Non-gynecological findings	cystitis	5	9%
	Appendicitis	3	
	vesicle stone	1	
Normal findings	Normal	7	7%

Table 2: Correlation and size effect of pelvic pain causes in women's age groups

Cause Of Pelvic Pain		Spearman Correlation	P-Value	Cramer's V	P-Value
	Age Group	0.21	0.03*	0.43	0.00

*Correlation is significant at the 0.05 level (2-tailed)



Figure 4: Transabdominal ultrasound views demonstrated fibroid with heterogeneous echotexture.

DISCUSSION

Many symptoms and indicators of pelvic pain in women are insensitive and generic, making diagnosis difficult. Some conditions are life intimidating (e.g., appendicitis, ruptured ovarian cyst) and circumstances that jeopardize fertility (e.g., pelvic inflammatory disease, ovarian torsion). In addition to physical examination, a comprehensive history focused on pain aspects, regular review, and gynecological, sexual, and social history can assist reduce the differential diagnosis. The most common prevalent causes of pelvic pain are pelvic inflammatory

disease, ruptured ovarian cysts, and appendicitis; however, many other differential diagnoses can mimic these conditions and often require imaging (Hecht et al. 2019).

An interesting aspect that emerged from the analysis was that the middle age group (26-35) years had the highest occurrence of pelvic pain at 52%, and the second occurrence for the youngest group (16-25) years had 26% the frequency decreased in the elder group (36-45) years had 22%. We believed that due to hormonal hyperactivity in middle age reproductive, which was consistent with the study performed by (Geofery et al. 2015).

In women of reproductive age all around the world, functional ovarian cysts are a prevalent gynecological issue. These cysts may require surgery if they are enormous, persistent, or painful, and in some cases, the ovary may be removed (Grimes et al. 2011). The use of ultrasound to diagnose cysts and adnexa mass is very beneficial. Interestingly, it was also observed that the ovarian cyst was the most common cause of pelvic pain and affected the age group 26-35 years, the middle reproductive age group. These results were complemented those attained by previous studies (Burai et al. 2019; Jones, 2001) who stated that ovarian cysts were the most prevalent source of discomfort in women and affected the age group 20-39 years, according to their studies, the follicle rupture in some females can induce discomfort of different intensity at the time of ovulation. Such discomfort is natural and does not necessitate medical intervention (Basta Nikolic et al. 2021). These results differ slightly from those reported by (Henrichsen et al. 2021) stated Simple ovarian cysts are frequent in

postmenopausal women and can be a source of discomfort; similar trends have been reported by (Basta Nikolic et al. 2021) in their work on imaging of acute pelvic pain review finding that an ovarian cyst more common in premenopausal women. (Basta Nikolic et al. 2021).

"(Pelvic inflammatory disease) PID is an infection condition of the upper genital tract" (Horrow, 2004). It represents as many sonographic appearances as salpingitis (Figure 3) and tubo-ovarian abscess; both are fluid in cul-de-sac and endometrium, with increased pelvic fat echogenicity, etc..(Horrow, 2004; Horrow, Rodgers, and Naqvi, 2007; Rumack et al. 2011). This variety of sonographic appearance depends on the inflammation severity and the genital tissues involved (Basta Nikolic et al. 2021); as shown in the results section, it was the second cause of 20% of PP occurrence, and that contrary to (Geofery et al. 2015) conclusion, who specified pelvic inflammatory disease (PID) in Nigeria has the extreme rate of incidence. According to another survey, PID is identified in roughly 2% of girls aged 16–45 years old in England and Wales by speaking with their primary care or general practitioner (Greydanus, Cabral, and Patel, 2021) this could be since PID is easily spreadable and caused by a variety of species with sexual intercourse (Geofery et al. 2015).

The majority of myomas (Figure 4) are symptomless or have just minor symptoms. Myomas, on the other hand, can produce discomfort in around one-third of patients because of degeneration or twisting (Basta Nikolic et al. 2021). This study revealed that uterine fibroid was the third etiology 17% of pelvic pain occurrence; these findings provided support for (Geofery et al. 2015) theory which proved the prevalence of 18% of African American women have a uterine fibroid; this study showed most of them occurred in the elder age group; 36-45years, this collected data are consistent with (Henrichsen et al. 2021) who stated, "In perimenopausal women, uterine fibroids are the second most prevalent cause of acute pelvic pain." No detectable fibroid in the youngest age group. This finding is supported by (Rumack et al. 2011), who published that "Leiomyomas (fibroids) are the most common neoplasms of the uterus; they occur in 20% to 30% of females over age 30 years and are more common in black women."

The fascinating outcome emerging from our data was hemorrhage of ovarian cysts, a less common cause of pelvic pain, opposing to what has been reported in some previous studies, which indicate that the hemorrhage of ovarian cysts was the most common cause in non-pregnant females of reproductive age (Basta Nikolic et al. 2021; Cicchiello et al. 2011; Geofery et al. 2015).

Non-gynecological causes of pelvic pain play a role in differential diagnosis considering many other organs located in the pelvis and lower abdomen, whose pain may be referred to as Appendicitis, the most common cause of non-gynecological pain, can be diagnosed by ultrasound with sensitivity (in several studies) and specificity ranging

from 67% to 88% and 78% to 100%, compared with CT sensitivity and specificity ranged from 76% to 96% and 75% to 97%, respectively (Bahabara et al. 2021) found that appendicitis was the common non-gynecological causes of female pelvic pain followed by ureteric stones, the results of this study contradict with them and noticed the most common cause of non-gynecological pain is cystitis followed by appendicitis.

As shown in the results section (Table 1), there was a notable 7% of the patients had normal findings; while the patients were in pain, which suggested that it may be related to a disease that is still in its early stages and has not yet been detected by ultrasound, similar trends have been reported in some previous studies (Burai et al. 2019; Geofery et al. 2015).

A significant difference was found between the cause of pain with groupage, indicating that the incidence of pelvic pain associated with age group and the correlation effect was the weak effect (Cohen Jacob, 1988). Similar conclusions were drawn by (Burai et al. 2019), who revealed age was a risk consideration for pelvic pain.

CONCLUSION

In conclusion, these findings demonstrate that there was a variety of etiologies of lower abdominal pain in non-pregnant women of reproductive age, which differed between gynecological and non-gynecological findings. These findings imply that ovarian cysts are the most common cause of pelvic pain in women of reproductive age. Besides the patient's age, plays an essential role in differential diagnosis to know the cause of pelvic pain. Identifying the cause (s) for abdominal or pelvic discomfort can be difficult for physicians. It necessitates careful clinical judgment, innovative technology, and collaboration with various colleagues in a sincere effort to obtain the proper diagnosis and decrease the risk of consequences.

The most important limitation lies in the fact that the small sample size used in addition to further study by adding patient history and symptoms may help to know the nature of many differential diagnoses. Increasing women's PID frequency in one of the third world countries needs additional data collection that would help investigate young, aged girls to differentiate between the inflammation prognosis due to sexual intercourse or lack of cleaning during adolescent age.

CONFLICT OF INTEREST

The author declared that no conflict of interest

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AUTHOR CONTRIBUTIONS

ME designed the study, wrote, and edited the manuscript.

MF performed the data collection and participated in manuscript editing. EK reviewed the manuscript. AG performed the statistical analysis and manuscript reviewing. MS participated in manuscript editing, and all authors participated in financial support. All authors read and approved the final version.

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