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Ultrasound Findings in Premenopausal Non-Pregnant Females Presented with Pelvic Pain

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ABSTRACT

Pelvic pain is a frequent complaint with gynecologic and non-gynecologic origins. Concerning the wide range of diagnoses, ultrasound is the gold-standard imaging modality of choice for premenopausal women. **Objectives:** To determine the ultrasonographic findings of pelvic pain and the association of pelvic pain accompanying symptoms with age groups and marital status. **Methods:** The analytic cross-sectional study was conducted at a Government Hospital in Gujrat, Pakistan, over four months, from October 2022 to February 2023. A sample size of 138 was considered by a convenient approach. All non-pregnant, premenopausal female patients with pelvic pain associated with the reproductive, urinary and gastrointestinal systems were included after informed consent. The Aplio 300 ultrasound machine was used to conduct the transabdominal scan, and SPSS-20 was used to analyze the data. **Results:** In the current study, 138 patients were ranged in age groups from 14 to 49 years, and the majority were between the ages of 26-31 years. There were 109 married patients and 29 unmarried. In 11.6% of the cases, the results were normal. There was no significant association of pelvic pain accompanying symptoms observed with age groups and marital status (p-value>0.05). Most of the findings were from the reproductive system (65.9%). Uterine fibroids were most frequently observed, 38 (27.5%), followed by complex ovarian cysts, 20 (14.5%). **Conclusions:** Pelvic pain in premenopausal women is most often linked to gynaecological causes, especially uterine fibroids, and occurs with or without other symptoms, regardless of age or marital status.

INTRODUCTION

Pelvic pain is a frequent complaint among women that is categorized into acute and chronic [1]. Acute pelvic pain is considered noncyclic discomfort that persists for less than three months. It is indeed a frequent clinical complaint of premenopausal women at an Emergency Department [2], which is usually sudden, intense, and brief. Chronic pelvic pain is considered noncyclic discomfort that lasts more than six months [3, 4]. Pelvic pain is a generic symptom with a variety of gynecologic and non-gynecologic origins, including urological, gastrointestinal and musculoskeletal causes. For assessing pelvic pain, it's indeed critical to inquire about the pain's onset, site, nature, intensity, radiation, durability, provoking and relieving variables, and any temporal changes over time. Pelvic pain is frequently accompanied by vague clinical indications such as vomiting, nausea, infection, diarrhea, fever, hematuria, dysuria, pyuria, urgency, frequency, vaginal discharge and vaginal bleeding. The medical health history includes the patient's last menstrual cycle, the age at which menarche began, obstetric history, sexual history and information about sexually transmitted infections [5, 6]. The physical assessment must focus on vital signs and abdominopelvic evaluation [7]. The pelvis is the lowest region of the trunk between the abdomen and the thighs. It includes the pelvic

cavity and the bony pelvis. The pelvic cavity houses the terminal sigmoid colon, rectum, anal canal, distal ureters, urinary bladder, proximal urethra and reproductive organs [8]. The uterus is the pear-shaped organ in the female pelvis, measuring 6–8 cm in length and 3–5 cm in anteroposterior and transverse dimensions [9]. The adnexa are the areas next to the uterus that comprise the ovary and fallopian tube, along with related arteries, connective tissue and ligaments. The fallopian tubes attach the ovaries to the uterus. The ovaries are oval-shaped paired organs that measure around 3 cm in length and are frequently seen posterior to the uterus, near the cornua [10]. Concerning the organs residing in the pelvis and lower abdomen, whose pain could be regarded as the pelvis, we have to keep in mind that the illnesses most probably arise from these organs [11]. Pelvic pain arises from gynaecological and non-gynaecological origins, i.e., urological and gastrointestinal disorders [12]. Clinical presentations of these disorders vary greatly and frequently overlap [13]. Even though appendicitis, ureteral calculus and diverticulitis are among the more frequent non-gynaecological origins of pelvic pain [14, 15]. The most prevalent gynecologic disorders appearing as pelvic pain are hemorrhagic ovarian cysts, ruptured ectopic pregnancy, dysmenorrhea and salpingitis [16]. Other causes are pelvic inflammatory disease (PID), leiomyomas, endometriosis, adenomyosis and ovarian torsion [17-19]. Although ovarian cysts (ruptured) are self-limiting, serious illnesses that may require surgical interventions, such as PID, ovarian torsion, and appendicitis, may be explored when a premenopausal patient visits the physician [13, 20]. Given the wide range of possible diagnoses, ultrasonography is the primary investigative technique for pelvic pain and the most commonly acknowledged first gold-standard imaging modality of choice if there is significant clinical concern for obstetric or gynecologic causes. An early diagnosis enables possible life-saving interventions [11, 21]. Pelvic pain is indeed frequent in reproductive-age women and is therefore linked to morbidity and even death.[21]. It occurs in approximately 1 out of 7 women [22], affecting roughly 10% of all gynecologic patients [23]. The global prevalence of chronic pelvic pain ranges from 4 to 43.4%, while it is 8.8% and 5.2% in Pakistan and India, respectively [24]. Neglect regarding pelvic pain and its accompanying symptoms can lead to infertility and severe conditions like carcinoma [25]. This study aims to use ultrasonography in predicting pelvic disease in premenopausal women with pelvic pain. Women often ignore the cause of their pain and turn to painkillers to alleviate it temporarily, which can lead to major complications later on. So, early detection using sonography and accurate assessment are possible to avoid complex pelvic pathologies using no radiation at all.

METHODS

An analytical cross-sectional study was conducted at a Government Hospital in Gujarat, Pakistan. The study was conducted over four months, from October 2022 to February 2023. A sample size of 138 patients was determined by calculating the mean sample size using a convenient sampling approach from previous published articles [13, 25] related to this study. The data of 138 patients was considered after permission and informed consent from participants, and the researcher followed the University's ethical guidelines and permission. All non-pregnant, premenopausal female patients with pelvic pain associated with the reproductive system, urinary system, and gastrointestinal system were included in the current study. All pregnant, non-cooperative, post- menopausal women and patients with musculoskeletal system pathologies were excluded from the current study. The examination was initiated using the Aplio 300 ultrasound machine with the patient lying supine for the transabdominal scan. The SPSS software version 20 was used to analyze the data. Variables were summarized using descriptive statistics like percentages and frequencies. The chi-square test was used to evaluate the association between age groups, marital status with pelvic pain accompanying symptoms. A p-value of less than 0.05 was considered significant.

RESULTS

The current study investigated 138 premenopausal, non-pregnant female patients with pelvic pain ranging in age from 14 to 49 years for ultrasonographic findings. The majority was between the ages of 26 and 31 years. Out of 138 patients, 109 were married and 29 were unmarried. The majority of patients, 90 (65.2%), had acute pelvic pain, whereas the remainder, 48 (34.8%), had chronic pelvic pain. Most of the origin of ultrasonographic findings were from the reproductive system, 91 (65.9%), followed by the urinary system, 22 (15.9%), and the gastrointestinal system, 9 (6.5%). There were no findings in 11.6% of the cases (Table 1).

Table 1: The Frequency of Age Groups, Marital Status, Pelvic Pain, and Origin of Ultrasound Findings

Variables		Frequency (%)	Valid Percent	Cumulative Percent
Age Groups	14–19	21 (15.2%)	15.2%	15.2%
	20–25	23 (16.7%)	16.7%	31.9%
	26–31	32 (23.2%)	23.2%	55.1%
	32–37	30 (21.7%)	21.7%	76.8%
	38–43	24 (17.4%)	17.4%	94.2%
	44–49	8 (5.8%)	5.8%	100.0%
	Total	138 (100%)	100.0%	—

Marital Status	Unmarried	29 (21%)	21.0%	21.0%
	Married	109 (79%)	79.0%	100.0%
	Total	138 (100%)	100.0%	—
Pelvic Pain	Acute	90 (65.2%)	65.2%	65.2%
	Chronic	48 (34.8%)	34.8%	100.0%
	Total	138 (100%)	100.0%	—
Ultrasound Findings	Normal	16 (11.6%)	11.6%	100.0%
	Reproductive System	91 (65.9%)	65.9%	65.9%
	Urinary System	22 (15.9%)	15.9%	81.9%
	Gastrointestinal System	9 (6.5%)	6.5%	88.4%
	Total	138 (100%)	100.0%	-

The clinical symptoms accompanied with pelvic pain observed were vaginal bleeding, burning micturition, dysuria and hematuria (13, 25, 23 and 19 cases, respectively) (Table 2).

Table 2: The Frequency of Pelvic Pain Accompanying Symptoms

Pelvic Pain Accompanying Symptoms	Yes	No	Total
Vaginal Bleeding	13 (9.4%)	125 (90.6%)	138 (100%)
Burning Micturition	25 (18.1%)	113 (81.9%)	138 (100%)
Dysuria	23 (16.7%)	115 (83.3%)	138 (100%)
Hematuria	19 (13.8%)	119 (86.2%)	138 (100%)

The chi-square test was used to check the relationship between age groups and pelvic pain accompanying symptoms. The association of age groups with vaginal bleeding (p=0.399), burning micturition (p=0.062), dysuria (p=0.246) and hematuria (p=0.420) was not found to be statistically significant. The association between marital status and pelvic pain accompanying symptoms was also observed. Although a near-significant relationship was observed between vaginal bleeding and marital status (p=0.051), this is not statistically significant, whereas burning micturition (p=0.136), dysuria (p=0.076), and hematuria (p=0.224) also did not show a statistically significant association (Table 3).

Table 3: Association Between Age Groups and Pelvic Pain Accompanying Symptoms and Marital Status and Pelvic Pain Accompanying Symptoms

Symptoms	df	Calculated x^2	p-Value	Set Level of Significance
Association Between Age Groups and Pelvic Pain Accompanying Symptoms				
Age Groups * Vaginal Bleeding	5	5.143	0.399	0.05
Age Groups * Burning Micturition	5	10.513	0.062	0.05
Age Groups * Dysuria	5	6.677	0.246	0.05
Age Groups * Hematuria	5	4.962	0.420	0.05
Association Between Marital Status and Pelvic Pain Accompanying Symptoms				
Marital Status * Vaginal Bleeding	1	3.818	0.051	0.05
Marital Status * Burning Micturition	1	2.220	0.136	0.05
Marital Status * Dysuria	1	3.152	0.076	0.05
Marital Status * Hematuria	1	1.482	0.224	0.05

The most prevalent finding observed was uterine fibroids 38 (27.5%), followed by complex ovarian cysts 20 (14.5%), cystitis 19 (13.8%), appendicitis 9 (6.5%), PID 8 (5.8%), simple ovarian cysts 6 (4.3%), adenomyosis 6 (4.3%), ureterovesical junction stones 3 (2.2%), hydrosalpinx 3 (2.2%), and endometriosis 2 (1.4%). The other least significant findings observed were dermoid cyst, complex adnexal cyst, endometrial polyps, endometrial hyperplasia, adnexal mass, ovarian torsion, uterovaginal prolapse, and complex cystic ovarian mass, which were found in similar percentages (0.7%) (Table 4).

Table 4: Description of Ultrasonographic Findings in Patients

	Ultrasonographic Findings	Frequency (%)	Valid Percent	Cumulative Percent
Valid	Normal	16 (11.6%)	11.6%	67.4%
	Uterine Fibroid	38 (27.5%)	27.5%	27.5%
	Complex Ovarian Cyst	20 (14.5%)	14.5%	42.0%
	Cystitis	19 (13.8%)	13.8%	55.8%
	Appendicitis	9 (6.5%)	6.5%	73.9%
	PID	8 (5.8%)	5.8%	79.7%
	Simple Ovarian Cyst	6 (4.3%)	4.3%	84.1%
	Adenomyosis	6 (4.3%)	4.3%	88.4%
	Ureterovesical Junction Stone	3 (2.2%)	2.2%	90.6%
	Hydrosalpinx	3 (2.2%)	2.2%	92.8%
	Endometriosis	2 (1.4%)	1.4%	94.2%
	Dermoid Cyst	1 (0.7%)	0.7%	94.9%
	Complex Adnexal Cyst	1 (0.7%)	0.7%	95.7%
	Endometrial Polyp	1 (0.7%)	0.7%	96.4%
	Endometrial Hyperplasia	1 (0.7%)	0.7%	97.1%
	Adnexal Mass	1 (0.7%)	0.7%	97.8%
	Ovarian Torsion	1 (0.7%)	0.7%	98.6%
	Uterovaginal Prolapse	1 (0.7%)	0.7%	99.3%
	Complex Cystic Ovarian Mass	1 (0.7%)	0.7%	100.0%
	Total	138 (100%)	100.0%	—

DISCUSSION

The current study was conducted among 138 premenopausal, non-pregnant female patients who presented with pelvic pain for ultrasonographic examination. Patients ranged in age groups from 14 to 49 years, and the majority was between the ages of 26–31 years. A similar study was conducted by E. Ajok, in which 150 patients participated, their ages ranging from 15 to 49 years. His study also found the majority of the affected population to be between the ages of 21 and 30 years [25]. In the current study, out of 138 patients, 109 were married and 29 were unmarried. The majority of patients (65.2%) had acute pelvic pain, whereas the remainder (34.8%) had chronic pelvic pain. The clinical symptoms accompanied with pelvic pain were vaginal bleeding, burning micturition, dysuria and hematuria. There was no statistically significant association of pelvic pain accompanying symptoms observed with age groups and marital status (p-

value>0.05). Hence, regardless of age group and marital status, a woman who presents with pelvic pain is equally likely to have or not have pelvic pain accompanying symptoms. In the current study, the majority of ultrasonographic findings were observed in the 26–31 and 32–37 age groups, with fewer diagnoses observed before and after the 26 31 and 32–37 age groups. The majority of the findings came from the reproductive system (65.9%), followed by the urinary system (15.9%) and gastrointestinal system (6.5%). 11.6% of the cases were normal. The current study's results aligned with the previous published study by Bahabara et al., which analyzed 94 female patients, ages 13 to 45 years, who complained of pelvic pain. According to his findings, pelvic pain was more prevalent among women of reproductive age, and gynecological reasons were likewise the most significant [2]. The current study observed 15% of cases in the urinary system. The urinary system findings correspond well with the previous published study by Boccatonda *et al.,* in 2016, in which 100 patients were studied, with their ages ranging from 4 to 56 years. He also found 15% of cases with the urinary system [12]. In the current study, the most prevalent cause of pelvic pain was of gynecological origin, from which uterine fibroids were most commonly observed in 38 (27.5%) of cases, and complex ovarian cysts, at 14.5%, were the second leading cause of pelvic pain. These results were consistent with the study conducted by Waseem *et al.,* in which the most prevalent cause of pelvic discomfort was a uterine fibroid, which was seen in 30.1 percent of cases, accompanied by simple ovarian cysts (20.2%) and hemorrhagic cysts (14.1%) [13]. It also correlates well with a similar previous study conducted by EBO Ahmed, in which uterine fibroids and ovarian cysts were ranked the most significant among the gynecological origins of pelvic pain [4]. In the current study, 13.8% cases were of cystitis, followed by appendicitis 9 (6.5%), PID 8 (5.8%), simple ovarian cysts 6 (4.3%), adenomyosis 6 (4.3%), ureterovesical junction stones 3 (2.2%), hydrosalpinx 3 (2.2%), and endometriosis 2 (1.4%). The other least significant findings observed in the current study were dermoid cyst, complex adnexal cyst, endometrial polyps, endometrial hyperplasia, adnexal mass, ovarian torsion, uterovaginal prolapse, and complex cystic ovarian mass, which were found in similar percentages (0.7%). These findings were also consistent with the findings of a previous study conducted Waseem *et al.,* in which 1% of cases of endometrial hyperplasia were observed. PID, adenomyosis, and endometrial polyps were found in 4.3% of women. According to his study, the least observed findings were simple adnexal cysts, follicular cysts, and complicated adnexal cysts, which accounted for 1.8% of all cases, with ovarian endometrioma and dermoid cysts accounting for 0.6% [13]. Thus, in the current study,

premenopausal women had the highest prevalence of gynecological causes of pelvic pain.

CONCLUSIONS

It was concluded that the most significant causes of pelvic pain in premenopausal women were of gynecological origin, of which uterine fibroids and complex ovarian cysts were the most common. Regardless of age group and marital status, a woman who presents with pelvic pain is equally likely to have or not have symptoms associated with pelvic pain.

Authors Contribution

Conceptualization: MM
Methodology: MM, MAN, AJ
Formal analysis: MAN
Writing review and editing: MM

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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