Alqalam Journal of Medical and Applied Sciences. 2026;9(6):1815-1822
https://doi.org/10.54361/ajmas.269649

Original article

Ultrasonographic Findings in Reproductive-Age Women with Chronic Pelvic Pain: A Descriptive Cross-Sectional Study from Benghazi, Libya

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Abstract
Chronic pelvic pain (CPP) is a common and multifactorial condition in women of reproductive age. Ultrasound is commonly used early in the diagnostic assessment because it is accessible, non-invasive, and able to evaluate gynecological and selected non-gynecological causes of pain. This study aimed to describe the clinical characteristics and ultrasonographic findings among Libyan women presenting with CPP in Benghazi City. A descriptive cross-sectional study was conducted at Elkeish Polyclinic, Benghazi, Libya, between January and December 2018. The study included 100 Libyan women aged 15-45 years who presented with CPP. Data were collected using a structured questionnaire covering demographic characteristics, menstrual and obstetric history, pain characteristics, associated symptoms, previous imaging, and medication use. Participants underwent pelvic ultrasound using transabdominal and/or transvaginal approaches. Data were summarized using frequencies, percentages, means, medians, and standard deviations. The mean age was 30.95 ± 9.28 years. Most participants were married (61%) and housewives (51%). Dysmenorrhea was reported by 58%, and most women reported moderate pain intensity (72%). Pain duration was exactly 6 months in 35%, more than 6 months but less than 12 months in 46%, and more than 12 months in 19%. Ultrasound findings were normal in 38%. The most frequent individual abnormal findings were chronic cystitis with bladder wall thickening (6%), free fluid in the pouch of Douglas (6%), right ovarian cystic lesion (5%), polycystic ovarian morphology (4%), left hydronephrosis (4%), right hydronephrosis (4%), and multiple uterine fibroids (3%). Less frequent findings included subserosal or submucosal fibroids, dermoid cyst, endometrial cystic changes, suspected renal stone, ectopic kidney, appendicular inflammatory mass with surrounding free fluid, and pregnancy-associated findings. In this single-center Libyan sample, CPP was associated with heterogeneous clinical presentations and a high proportion of normal ultrasound examinations. When abnormal, ultrasound findings involved urinary, gynecological, adnexal, and incidental abdominal abnormalities. Pelvic ultrasound remains a useful initial imaging tool; however, a normal scan should prompt continued multidisciplinary assessment when CPP persists.
Keywords. Chronic Pelvic Pain, Ultrasound, Transvaginal Sonography, Reproductive Age, Gynecology, Libya

Introduction

Chronic pelvic pain (CPP) is generally considered cyclic or non-cyclic pain perceived in pelvic structures and persisting for at least six months. It is a clinically important problem because it can affect physical function, sexual health, psychological well-being, and health-care use. The condition is heterogeneous, and symptoms may arise from gynecological, urological, gastrointestinal, musculoskeletal, neurological, or psychosocial causes [1–5]. The diagnostic evaluation of CPP is challenging because symptom patterns are often non-specific and more than one pain generator may be present. Common associated symptoms include dysmenorrhea, dyspareunia, urinary symptoms, bowel symptoms, and non-specific lower abdominal or back pain. A careful history and clinical examination are therefore essential before imaging is interpreted in isolation [4–7].

In clinical practice, ultrasound is often selected early in the evaluation of pelvic pain because it is accessible, relatively inexpensive, and avoids ionizing radiation. The transabdominal approach provides a broad pelvic and lower abdominal survey, while transvaginal ultrasound improves evaluation of the uterus, endometrium, ovaries, adnexa, pouch of Douglas, and selected features of endometriosis or pelvic inflammatory disease. However, ultrasound may be normal in a substantial proportion of patients with CPP, particularly when pain is related to functional, neuropathic, musculoskeletal, gastrointestinal, or psychosocial factors [4,8–11]. There is limited published evidence describing the clinical profile and ultrasound findings of women with CPP in Libya. Local data may help clinicians understand the range of findings encountered in routine radiology and gynecology practice and may support the development of a multidisciplinary diagnostic pathway. This study aimed to describe the clinical characteristics and ultrasonographic findings among Libyan women presenting with CPP in Benghazi City.

Received*: 26-04-2026 -* ***Accepted****: 24-06-2026 -* ***Published****: 30-06-2026*

Methods

Study design and setting

This was a descriptive cross-sectional study conducted at Elkeish Polyclinic, Benghazi, Libya, from January to December 2018. The study is reported in accordance with the principles of the STROBE statement for observational studies [12].

Participants

The study included 100 Libyan women aged 15-45 years who presented with chronic pelvic pain. Chronic pelvic pain was defined as pelvic pain lasting at least six months. Women with acute pelvic pain, aged below 15 years or above 45 years, and non-Libyan nationality were excluded.

Data collection

Data were collected using a structured questionnaire. Variables included age, marital status, occupation, age at menarche, fertility history, abortion history, parity, mode of delivery, cesarean-section history, contraception use, pregnancy status, menstrual regularity, amenorrhea, dysmenorrhea, menorrhagia, pain duration, pain intensity, pain character, pain site, aggravating and relieving factors, associated symptoms, medication use, previous imaging, and past surgical history.

Ultrasound examination

All participants underwent pelvic ultrasonography using a Philips HD11XE ultrasound machine. Transabdominal ultrasound was performed with a 3.5-5 MHz convex probe, using the urinary bladder as an acoustic window when appropriate. Transvaginal ultrasound was performed in eligible ever-married participants using a 6.9-9 MHz endocavitary transducer after explanation of the procedure, bladder emptying, lithotomy positioning, and application of acoustic gel. Scanning was performed in sagittal and transverse planes. Ultrasound findings were recorded as normal or abnormal and were summarized by individual diagnosis.

Statistical analysis

Data were analyzed using SPSS version 22.0. Continuous variables were summarized using means, standard deviations, medians, modes, and ranges. Categorical variables were summarized using frequencies and percentages. Because the study objective was descriptive, no causal inference was attempted.

Ethical considerations

Ethical approval and administrative permission were obtained from the Research Ethics Committee and the relevant administrative authorities at Elkeish Polyclinic before the start of data collection. The purpose of the study and the ultrasound procedure were explained to all eligible participants before enrollment. Verbal informed consent was obtained from adult participants. For participants aged 15-17 years, consent was obtained from a parent or legal guardian before participation, and participant assent was obtained when required by the Research Ethics Committee. Confidentiality of all collected data was maintained, and participants' privacy was ensured throughout the ultrasound examination.

Results

Participant characteristics

The study included 100 women with CPP. The mean age was 30.95 ± 9.28 years, with a median and mode of 30 years and a range of 15-45 years. Most participants were married (61%), followed by single (36%) and divorced (3%) women. More than half were housewives (51%), followed by students (27%), skilled workers (20%), and professional workers (2%). Participant characteristics are summarized in (Table 1).

Table 1. Participant characteristics.

Characteristic	Frequency/value	Percentage/spread
Age, years	Mean 30.95; median 30; mode 30	SD 9.28; range 15-45
Marital status: single	36	36%
Marital status: married	61	61%
Marital status: divorced	3	3%
Occupation: housewife	51	51%
Occupation: student	27	27%
Occupation: skilled job	20	20%
Occupation: professional job	2	2%
Age at menarche, years	Mean 13.09; median 13; mode 13	SD 1.26; range 10-16
Fertile among ever-married women	58/64	90.6%

Received*: 26-04-2026 -* ***Accepted****: 24-06-2026 -* ***Published****: 30-06-2026*

History of abortion among ever-married women	22/64	34.4%
Delivered among ever-married women	55/64	85.9%
Pregnant at assessment among ever-married women	5/64	7.8%

Menstrual and pain characteristics

Regular menstruation was reported by 75% of participants, amenorrhea by 15%, dysmenorrhea by 58%, and menorrhagia by 9%. Pain was most commonly of moderate intensity (72%). Pain duration was exactly 6 months in 35%, more than 6 months but less than 12 months in 46%, and more than 12 months in 19%. Menstrual and pain characteristics are summarized in (Table 2).

Table 2. Menstrual and pain characteristics

Variable	Frequency	Percentage
Regular menses	75	75%
Amenorrhea	15	15%
Dysmenorrhea	58	58%
Menorrhagia	9	9%
Pain during menses	38	38%
Pain during the proliferative phase	5	5%
Pain during mid-cycle	27	27%
Pain during the secretory phase	30	30%
Pain duration: exactly 6 months	35	35%
Pain duration: >6 months and <12 months	46	46%
Pain duration: >12 months	19	19%
Pain severity: mild	20	20%
Pain severity: moderate	72	72%
Pain severity: severe	8	8%
Most common pain character: dull aching and intermittent	35	35%

Associated symptoms, pain sites, and modifiers

Associated symptoms frequently overlapped across systems. Urological symptoms alone were reported by 19%, gynecological symptoms alone by 18%, and general symptoms alone by 18%. Combined symptom categories were also common. The most frequently reported pain sites were suprapubic pain alone (15%), suprapubic and groin pain (13%), suprapubic and right iliac fossa pain (9%), bilateral loin pain (8%), left loin pain (8%), right loin pain (7%), and suprapubic plus bilateral loin pain (7%). Physical activity (43%) and menstruation (42%) were the most commonly reported aggravating factors. Bed rest was the most common relieving factor (67%). Associated symptoms, pain sites, and modifiers are summarized in (Table 3).

Table 3. Associated symptoms, pain sites, and modifiers

Symptom or modifier	Frequency	Percentage
Urological symptoms only	19	19%
Gynecological symptoms only	18	18%
General symptoms only	18	18%
General and gynecological symptoms	16	16%
General and urological symptoms	14	14%
Gynecological and urological symptoms	8	8%
General, gynecological, and urological symptoms	4	4%
Gastrointestinal symptoms only	2	2%
Gynecological and gastrointestinal symptoms	1	1%
Aggravated by physical activity	43	43%
Aggravated by menstruation	42	42%
Relieved by bed rest	67	67%
Relieved by herbal drinks	19	19%

Previous imaging and surgical history

Nineteen participants had undergone previous ultrasound examination; among them, 57.8% had normal previous ultrasound findings, and 15.7% had a left ovarian cystic lesion. Only two participants reported a previous MRI. Most participants (90%) had no past surgical history. Reported previous surgeries included

Received*: 26-04-2026 -* ***Accepted****: 24-06-2026 -* ***Published****: 30-06-2026*

cholecystectomy, tonsillectomy, left ovarian cystectomy, cesarean section, appendectomy, salpingectomy, and fibroid excision.

Current ultrasonographic findings

Current ultrasound findings were normal in 38% of participants. Abnormal findings were heterogeneous and included urinary/bladder, adnexal/ovarian, uterine, peritoneal, pregnancy-related, and incidental abdominal findings. The most frequent individual findings are summarized in (Table 4).

Table 4. Current ultrasonographic findings.

Current ultrasound finding	Frequency	Percentage
Normal ultrasound	38	38%
Chronic cystitis with a thickened urinary bladder wall	6	6%
Free fluid in the anterior Douglas pouch	6	6%
Right ovarian cystic lesion	5	5%
Polycystic ovarian morphology	4	4%
Left hydronephrosis	4	4%
Right hydronephrosis	4	4%
Multiple uterine fibroids	3	3%
Small subserosal fibroid	2	2%
Right ovarian simple cyst with minimal cul-de-sac fluid	2	2%
Right ovarian dominant follicle	2	2%
Gall bladder stone	2	2%
Free fluid in the Douglas pouch with endocervical canal dilatation	2	2%
Gaseous abdomen	2	2%
Other individual findings (see table footnote)	1 each (18 total)	1% each

Table footnote: Other individual findings included dermoid cyst; small cystic lesions in a thickened endometrium; subcutaneous cesarean-scar endometrioma; intrauterine varicosity; posterior wall fibroid; bulky right ovary; midline ovary with para-aortic lymph nodes; left hydronephrosis with chronic cystitis; submucosal fibroid; gravid uterus with varicosities; suspected renal stone; right ectopic kidney; appendicular inflammatory mass with surrounding free fluid; bulky uterus with enlarged lymph nodes; chronic cystitis with right ovarian follicle; gravid uterus with chronic cystitis; gravid uterus with right ovarian cyst; polycystic ovarian disease with bilateral bulky ovaries. Each finding was observed in one participant (1%).

Among the five pregnant participants identified at assessment, two had otherwise normal ultrasound findings, while three had abnormal associated findings: gravid uterus with varicosities, gravid uterus with chronic cystitis, and gravid uterus with right ovarian cyst.

The appendicular inflammatory mass with surrounding free fluid was recorded as a coexisting ultrasound finding in one participant who fulfilled the chronic pelvic pain inclusion criteria. This participant was not enrolled as a case of acute pelvic pain.

Received*: 26-04-2026 -* ***Accepted****: 24-06-2026 -* ***Published****: 30-06-2026*

Selected representative ultrasound images are shown in (Figures 1–4).

Figure 1. Transabdominal ultrasound image showing irregular urinary bladder wall thickening, suggestive of chronic cystitis/interstitial cystitis

Figure 2. Transabdominal ultrasound image showing a posterior uterine wall hypoechoic solid lesion consistent with a uterine fibroid

Received*: 26-04-2026 -* ***Accepted****: 24-06-2026 -* ***Published****: 30-06-2026*

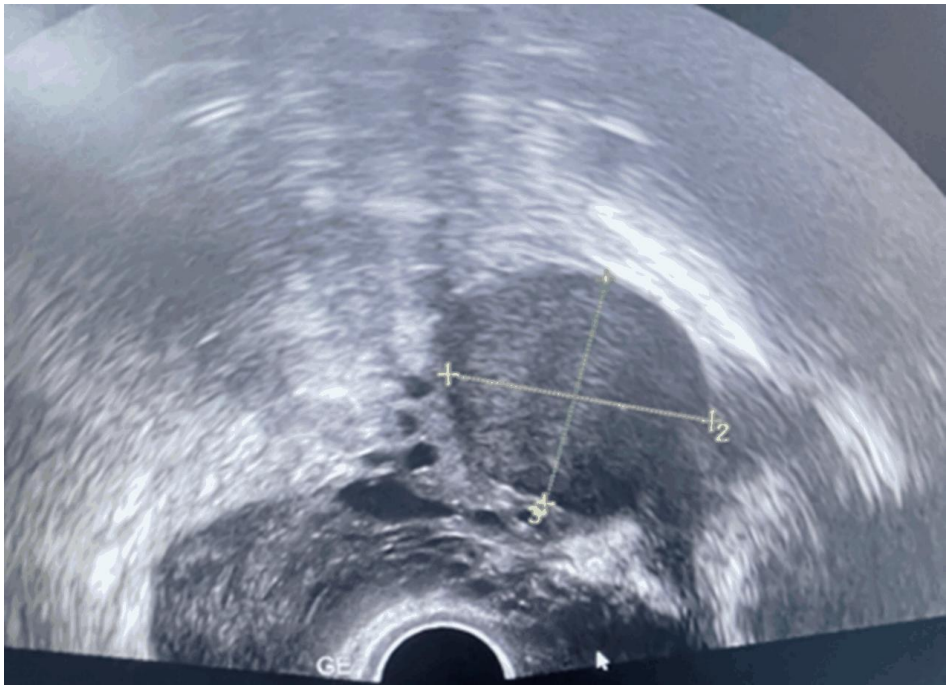

Figure 3. Transvaginal ultrasound image showing an avascular ground-glass right ovarian cystic lesion, compatible with ovarian endometrioma

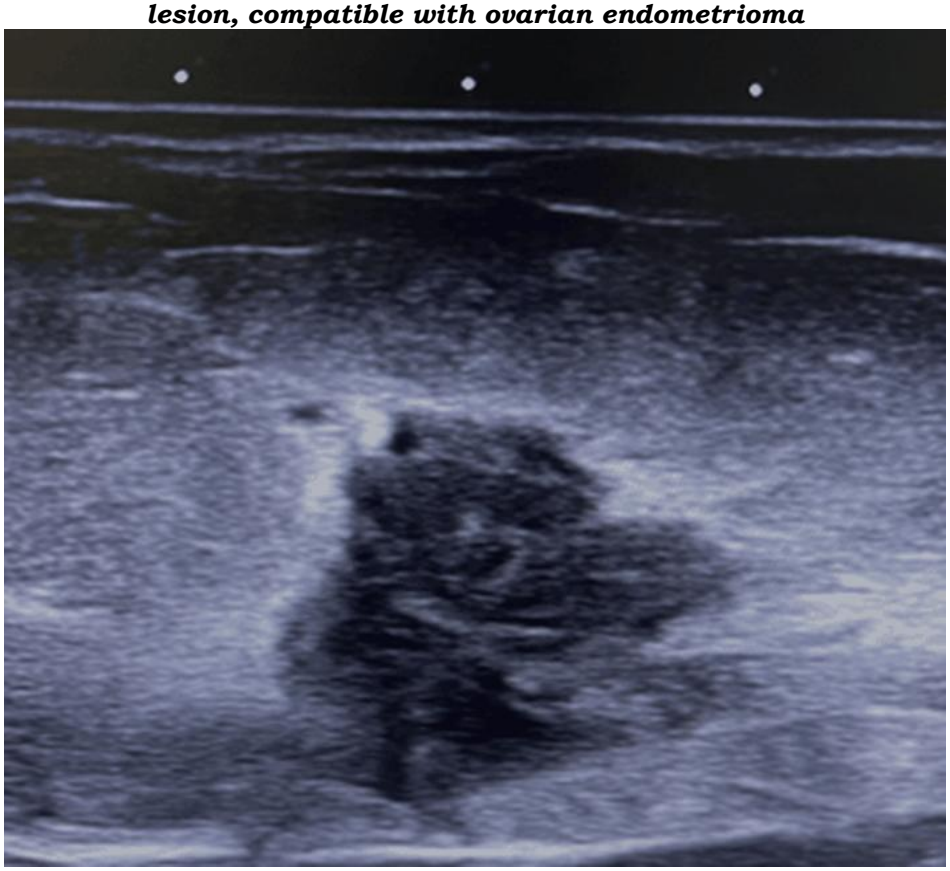

Figure 4. Transabdominal ultrasound image showing a heterogeneous hypoechoic subcutaneous lesion at a cesarean-scar site, consistent with subcutaneous cesarean-scar endometrioma

Discussion

This study describes the clinical profile and ultrasound findings of 100 Libyan women presenting with CPP in Benghazi. The principal findings were that the clinical presentation was heterogeneous, dysmenorrhea was common, most participants reported moderate pain intensity, and more than one-third had a normal ultrasound examination. Among abnormal ultrasound findings, no single diagnosis predominated; rather, findings were distributed across urinary, gynecological, adnexal, and incidental abdominal categories. The mean age of participants was approximately 31 years, which is consistent with the reproductive-age distribution reported in other CPP studies [8,13]. The predominance of married women and housewives may reflect local health-care-seeking patterns, reproductive history, and the clinic population rather than the

Received*: 26-04-2026 -* ***Accepted****: 24-06-2026 -* ***Published****: 30-06-2026*

true population distribution of CPP in the community. Because this was a facility-based study, the findings should not be interpreted as prevalence estimates for Benghazi or Libya. Dysmenorrhea was the most frequent menstrual symptom and was present in more than half of the participants. This supports the need to evaluate gynecological causes of cyclic pain, including endometriosis, adenomyosis, fibroids, and ovarian lesions. However, the study also showed frequent urological and general symptoms, reinforcing the concept that CPP is often multifactorial and may involve overlapping pain conditions [4,9,10]. A key finding was that 38% of women had normal ultrasound examinations. This finding is clinically important. Normal sonographic appearances may reduce the likelihood of many structural pelvic abnormalities, but they should not be taken as ruling out CPP, endometriosis without visible endometrioma, pelvic floor dysfunction, bladder pain syndrome, irritable bowel syndrome, neuropathic pain, adhesions, or psychosocial contributors. Therefore, ultrasound should be interpreted as part of a broader clinical pathway rather than as a stand-alone diagnostic endpoint [5,9–11].

Among abnormal findings, chronic cystitis with bladder wall thickening and free fluid in the pouch of Douglas were the most frequent individual findings. Hydronephrosis and suspected renal stone were also reported, suggesting that urinary tract assessment may be relevant in selected women with CPP, especially when pain is suprapubic, loin-based, or associated with urinary symptoms. Bladder pain syndrome and recurrent urinary tract conditions are well-recognized contributors to chronic pelvic symptoms and may coexist with gynecological disorders [10,14,15]. Ovarian and uterine findings included ovarian cystic lesions, polycystic ovarian morphology, fibroids, dermoid cysts, and endometrial cystic changes. Although some of these findings may be incidental, others may be clinically relevant depending on symptom pattern, lesion size, menstrual history, and examination findings. The presence of heterogeneous findings emphasizes the value of systematic ultrasound reporting and clear communication with referring clinicians regarding which findings are likely to explain pain and which may be incidental. Suspected endometriosis-related lesions should be interpreted with attention to established imaging and CPP-management guidance [16,17]. The study has several strengths. It provides local data from Benghazi, includes both clinical and ultrasound variables, and reflects routine practice in a resource-conscious setting. The use of both transabdominal and transvaginal approaches when appropriate improved pelvic assessment compared with transabdominal ultrasound alone.

The study also has important limitations. First, it was a single-center descriptive study with a modest sample size, limiting generalizability. Second, no control group was included, so the frequency of ultrasound findings cannot be compared with that of asymptomatic women. Third, ultrasound findings were not correlated with laboratory tests, laparoscopy, MRI, or follow-up outcomes. Finally, because many ultrasound findings were rare and some were potentially incidental, causal relationships cannot be inferred. Future studies should use a prospective design, consecutive sampling, standardized pain assessment tools, and predefined ultrasound reporting categories. Larger multicenter studies in Libya could compare women with normal and abnormal ultrasound findings and evaluate the diagnostic contribution of ultrasound, MRI, laparoscopy, urine testing, pelvic floor assessment, and psychosocial evaluation.

Conclusion

Among women presenting with CPP at a Benghazi polyclinic, ultrasound findings were normal in a substantial proportion, and abnormal findings were heterogeneous. The most frequent abnormal findings involved the bladder/urinary tract, pouch of Douglas fluid, ovarian/adnexal lesions, and uterine fibroids. Pelvic ultrasound is a valuable initial imaging investigation for CPP, but persistent symptoms with normal or non-specific ultrasound findings require multidisciplinary clinical evaluation.

Author Contributions

Eman N. Elareibi contributed to data acquisition, ultrasound assessment, data interpretation, manuscript drafting, and approval of the final manuscript. Khalid Gashoot contributed to study supervision, methodology, data interpretation, critical revision of the manuscript, and approval of the final manuscript. Both authors agree to be accountable for all aspects of the work.

Acknowledgments

This manuscript was proofread using ChatGPT (OpenAI) for grammar, clarity, and journal-format checking only. The authors reviewed and approved all changes and remain responsible for the scientific content.

Conflicts of Interest

Eman N. Elareibi declares no conflict of interest. Khalid Gashoot declares no conflict of interest.

Funding Sources

The authors received no funding for this study.

Data Availability

Received*: 26-04-2026 -* ***Accepted****: 24-06-2026 -* ***Published****: 30-06-2026*

The data supporting the findings of this study are available from the corresponding author upon reasonable request, subject to institutional and ethical approval requirements.

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Received*: 26-04-2026 -* ***Accepted****: 24-06-2026 -* ***Published****: 30-06-2026*