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Sonographic Assessment of Various Causes of Pelvic Pain in The First Trimester of Pregnancy Across Different Age Groups

Mahnoor Riaz [1], Ume Tayyba [2], Munaza Shahid [3], Sawera Akhtar [4], Mahrukh Afzal [5], Nazish Bibi [6], Khadija Shabir [7], Muhammad Zain Ul Abidin [8]

[1,2,4,5,6,7] Student BSMIT Superior University Lahore
[3] Lecturer Faculty of Allied Health Science Superior University Lahore
[8] Neuroradiology Specialist Services Institute of Medical Science Lahore
Corresponding Author: Mahnoor Riaz Mahnoorriaz354@gmail.com

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Abstract:
Background: Acute pelvic pain during early pregnancy presents diagnostic challenges due to varying underlying causes. Ultrasonography is the primary imaging modality used in these scenarios due to its safety and diagnostic accuracy
Objective: To evaluate the effectiveness of ultrasonography in identifying various causes of pelvic pain during the first trimester of pregnancy across different age groups.
Methods: A descriptive study was conducted at the University of Lahore Teaching Hospital. A total of 82 symptomatic pregnant women in their first trimester were included through convenience sampling. Transabdominal and transvaginal ultrasounds were performed. Data analysis was conducted using SPSS v24
Results: Among 82 participants, 35.4% experienced bleeding. The most common findings were fibroids (22%), corpus luteal cysts (17.1%), and ectopic pregnancies (9.8%). A strong association was noted between fibroids and bleeding ($p < 0.001$). The majority of patients (63.4%) had normal findings, and younger women (18–27 years) represented the most affected age group.
Conclusion: Ultrasonography is essential in diagnosing pelvic pain causes during early pregnancy. Fibroids, corpus luteal cysts, and ectopic pregnancies are the predominant pathologies, with a higher prevalence among younger patients.

Keywords: pelvic pain, early pregnancy, ultrasound, fibroids, corpus luteal cyst, ectopic pregnancy

Introduction:

Pelvic pain during the first trimester is a common complaint in emergency and outpatient settings. Hormonal shifts, uterine growth, and increased blood flow often contribute to physiological pain. However, pain accompanied by vaginal bleeding or systemic signs can indicate more serious pathologies such as ectopic pregnancy, miscarriage, or ovarian torsion. Ultrasound provides real-time, non-invasive insight into these conditions, aiding prompt diagnosis and management.

Materials and Methods:

Study Design: Descriptive cross-sectional
Setting: University of Lahore Teaching Hospital

Duration: 4 months
Participants: 82 pregnant women, aged 16–44, experiencing lower abdominal pain during the first trimester
Inclusion Criteria: Symptomatic lower abdominal pain, confirmed first-trimester pregnancy
Exclusion Criteria: Asymptomatic patients
Data Collection: Data were recorded using structured forms noting patient age, ultrasound findings (gestational sac, CRL, FHR, fibroids, cysts), and symptomatology
Imaging Protocol: Both transabdominal (2–5 MHz) and transvaginal (5–7.5 MHz) ultrasound scans were performed
Analysis: Descriptive statistics and chi-square tests were used to evaluate associations using SPSS v24

Results:

Age Range	Number of Patients
18–24	26
25–27	23
28–34	14
35–40	18
41–44	4
Total	**82**

The total number of patients in the study or dataset is 82. This breakdown shows the age distribution of the sample, with the highest number of patients in the 18–24 years and 25–27 yea

Descriptive Statistics						
	N	Minimum	Maximum	Mean	Std. Deviation	Variance
Age	82	18	44	28.28	7.222	52.155
Valid N (listwise)	82					

Crosstab						
Count						
		Final Diagnosis				
		Fibroids	Intramural Fibroid	Normal	Submucosal Fibroid	subserosal fibroid
Cause of Pain Bleeding	No	0	0	40	1	0
	Yes	1	6	12	3	3

The table provides statistical measures for the age of patients. The minimum age recorded was 18 years, and the maximum was 44 years. The mean age was 28.28 years, with a standard deviation of 7.222, indicating moderate variability in patient age.

Cause of Pain Bleeding * Final Diagnosis
This table cross-analyzes the presence of bleeding with final diagnoses. It shows that most normal cases (40 out of 52) did not report bleeding, while fibroid-related cases and corpus luteal cysts had a mix of bleeding and non-bleeding cases.

Crosstab

Count

		Final Diagnosis			
		Corpus luteal cyst	Dermoid cyst	Dermoid Cyst	Ectopic pregnancy
Cause of Pain Bleeding	No	2	2	3	5
	Yes	2	1	0	1
Total		4	3	3	6

This table shows the relationship between bleeding and corpus luteal cysts. Among 14 cases diagnosed with corpus luteal cysts, 10 were in non-bleeding patients, while 4 were in bleeding patients.
This table cross-analyzes the presence of bleeding with final diagnoses. It shows that most normal cases (40 out of 52) did not report bleeding, while fibroid-related cases and corpus luteal cysts had a mix of bleeding and non-bleeding cases.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	27.400[a]	8	.001
Likelihood Ratio	31.097	8	.000
N of Valid Cases	82		

a. 16 cells (88.9%) have expected count less than 5. The minimum expected count is .35.

Cause of Pain Bleeding * Ectopic pregnancy

Crosstab

Count

		Ectopic pregnancy		Total
		No	Yes	
Cause of Pain Bleeding	No	47	6	53
	Yes	27	2	29
Total		74	8	82

This crosstab shows that among 8 cases diagnosed with ectopic pregnancy, 6 were from patients who did not report bleeding, while 2 cases were from those who did.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.417[a]	1	.519		
Continuity Correction[b]	.066	1	.798		
Likelihood Ratio	.438	1	.508		
Fisher's Exact Test				.706	.412
N of Valid Cases	82				

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 2.83.
b. Computed only for a 2x2 table

Cause of Pain Bleeding * fibroids

Crosstab				
Count				
		fibroids		Total
		No	Yes	
Cause of Pain Bleeding	No	52	1	53
	Yes	12	17	29
Total		64	18	82

This table highlights the strong correlation between fibroids and bleeding. Out of 18 cases with fibroids, 17 (94.4%) were from patients reporting bleeding, whereas only 1 case was from a non-bleeding patient. The Chi-Square test suggests a statistically significant association ($p < 0.001$).

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	35.214[a]	1	.000		
Continuity Correction[b]	31.981	1	.000		
Likelihood Ratio	37.054	1	.000		
Fisher's Exact Test				.000	.000
N of Valid Cases	82				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 6.37.
b. Computed only for a 2x2 table

Discussion:

This study confirms ultrasound's role as a reliable diagnostic modality for first-trimester pelvic pain. Normal pregnancy was the most common finding, aligning with prior literature. Fibroids were significantly associated with bleeding, suggesting their contribution to pain and potential complications. Corpus luteal cysts, although frequent, were typically benign. Ectopic pregnancies, though less common, remain critical due to their risk of rupture and maternal morbidity.

Comparative literature supports these findings. Studies have shown fibroids are more prevalent in older reproductive-aged women and linked to increased miscarriage risk. Ectopic pregnancy, present in 1–2% of pregnancies, often lacks classic symptoms, necessitating routine ultrasound in symptomatic cases. Sonography also offers early visualization of intrauterine pregnancies and distinguishes viable from non-viable gestations.

Conclusion:

Ultrasound is invaluable for evaluating pelvic pain in early pregnancy. While most patients exhibit normal findings, fibroids, corpus luteal cysts, and ectopic pregnancies are key

pathological contributors. Fibroids, in particular, show a strong association with bleeding and highlight the importance of early imaging, especially in younger patients.

Limitations:

- Image quality may be compromised in obese patients
- Early gestations may be challenging to detect
- Operator-dependent variability
- Limited access to transvaginal ultrasound in some settings

Recommendations:

Future studies should include larger, more diverse populations and investigate the influence of maternal age and other risk factors on pelvic pathologies.

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