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Original article

Assessment of Diverse Pelvic Pain in the First Trimester of Pregnancy with Ultrasound Guidance

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ABSTRACT

Identifying and treating a pelvic pain during pregnancy can be challenging. Pregnant women still use ultrasound as their primary imaging modality. The current study set out to investigate the potential function of ultrasonography guidance in various pelvic pain sources during the first trimester of pregnancy. The Maternity and Children Hospital (MCH) and the Department of Radiology collaborated together to perform this cross-sectional descriptive study. 50 pregnant women, ages ranging from under 20 to over 30, who had pelvic pain throughout the first trimester (up to 12 weeks gestational age) participated in the study. All women had undergone clinical evaluations then to be referred for ultrasonography scans for the confirmation of diagnosis. SPSS software (version 25) was used to analyze the data and association using Odds ratio and multivariable logistic regression. In a study of 50 pregnant women with an assisted ultrasound. Among 22 (44%) and 28(56%) women were viable and non-viable pregnant. 60 percent of the women were primigravida, and 40 percent were multigravida. With a mean BMI of 28.7±4.21, the average age was 27.3±13.18 years. The most frequent causes of pelvic pain were abortion (22%), uterine fibroid (14%), and corpus luteal cyst (12%) in addition to Scar site pregnancy, Sub chorionic hematoma, ectopic pregnancy, and acute appendicitis were 8%,6%,6% and 1% respectively. whereas 30% of a normal pregnancy was found. The most reliable and non-invasive diagnostic technique for identifying various types of pelvic pain in pregnant women is ultrasound. It has been demonstrated that the timely treatment of women through the use of ultrasonography reduces the mortality rates linked with pregnancy problems.

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INTRODUCTION

The first trimester of pregnancy is often noticeable by pelvic pain, which can have a variety of causes, from straightforward diseases requiring normal follow-up and requiring immediate surgical intervention for any complication issues. Pelvic pain during the first trimester of pregnancy is mainly triggered by ovarian torsion, hemorrhagic ovarian cysts, subchorionic hemorrhage, ectopic pregnancy, and abortion. Others but rarer causes include appendicitis and red degeneration of fibroid. Ultrasonography, blood tests, and medical background all play crucial roles for the diagnosis process, allowing for prompt and effective treatment. Transvaginal ultrasonography (TVUS) is a common diagnostic and imaging therapy used during the first trimester of pregnancy. However, there are many advantages to ultrasound imaging, including its low cost and affordability for a wide audience. The main imaging modality used for diagnosing and evaluating pregnant individuals is ultrasound (USG) [1].

The pelvic structures are assessed using both transvaginal (TVS) and transabdominal (TAS) procedures [2]. The gestational sac's echogenic ring is a crucial ultrasonography diagnostic tool for distinguishing gestational syndrome from a fluid and blood deposit in the uterus. In order to determine gestational age, identify and assess the pregnancy pouch, and assess the effectiveness of the pregnancy, ultrasound is utilized throughout the first trimester [3,4]. Uteroplacental vascularization volumes can be estimated using color Doppler imaging and high-resolution transvaginal sonography. These measurements provide predicted values and assess uteroplacental blood flow [5,6].
The aberrant uterine size, abnormal shape, abnormal yolk sac size, low insertion site, bradycardias, and abnormal yolk sac size in relation to fetal size are the most significant ultrasound findings.[7]. The study's objective was to assess the use of ultrasonography in evaluating the many factors that contribute to pelvic pain during the first trimester of pregnancy.

METHODS

Study setting

Between January 2023 and December 2023, a cross-sectional descriptive study was carried out at the Maternity and Children Hospital (MCH) in collaboration with the Department of Radiology. Fifty pregnant women with first-trimester pelvic pain who visited the Obstetrics emergency department and had a pelvic ultrasound performed were included in the study. All participants' pregnancies were confirmed by urine tests and ultrasounds. The age of the participants, gestational week, any complication such as uterine fibroid, ectopic pregnancy and abortion etc., were among the demographic characteristics considered. The study excluded women having a history of medical or surgical procedures, abdomino-pelvic injuries, or vaginal bleeding without pelvic pain. This study includes all relevant laboratory and ultrasonography findings. This study approval by Research Ethics committee Qurayyat health affairs by IRB of research project No.2023-90, Saudi Arabia.

Figuring out the participant's size

Use the method n = (z (/2)) 2 p (1p)/d2 for the percentage of a single population to determine the optimal sample size. This computation indicated that 50 was the appropriate sample size for this study.

Ultrasound imaging

3.5 MHz was the frequency of the transducer utilized for the transabdominal ultrasonography. Transvaginal ultrasonography with a transducer operating at a frequency of 5-7 MHZ was recommended for an individual participant whose transabdominal ultrasonography had shown equivocal results (fig 1). To assess their consistency, imaging results were compared to clinical data. The uterus was examined to assess for the intrauterine Gestational Sac (GS), yolk sac, part of the fetus, cervix, and cardiac activity. As well evaluation of the adnexa, including the ovaries, fallopian tubes, and the existence of any masses.

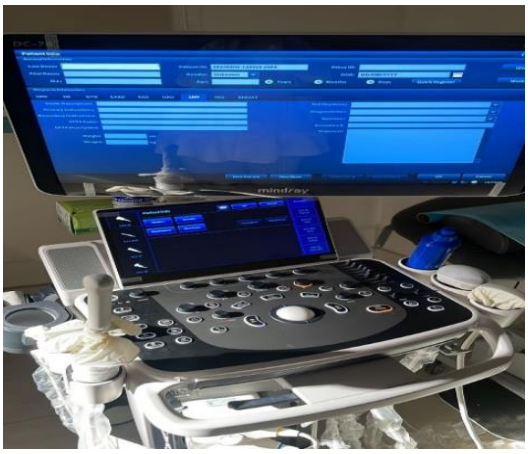

Figure 1: The ultrasound machine that used on a regular basis in this study.

Statistical study

The proper statistical SPSS software (version 25) was used to analyze the data. Proportions and percentages were used to convey qualitative data, whereas mean, range and were used to express quantitative data. P-values less than 0.05 were

regarded as statistically significant. Using multivariable logistic regression analysis, the causes of pelvic pain were determined.

RESULTS

Demographic information of all study participants.

50 pregnant women in total participated in this study. Participants' ages were split into three age groups: under 20, 20 to 29 years old, and over 30 years old. Of these, 16%, 50%, and 34% were in each age group. The majority of women are statistically significant when compared to other age groups and are between the ages of 20 and 29. at the given p value of 0.000. Overall mean age was 27.3±13.18. Indeed, BMI found 28.7±4.21. Along with 60% and 40% of primigravida and multigravida, respectively, there was a significant p value of 0.001. Nonetheless, educational background revealed that 32% were uneducated and 68% were educated (p=0.001). the viable and non-viable pregnancy were found 44% and 46% respectively. Among all pregnant women, the mean gestational week was 10.3±4.12. All of the aforementioned data is shown in Table 1,2 and figure 2.

Table 1. Demographic characteristic of this study.

Variables	Total number (n=50) %	P value
Mean age	27.3±13.18	
Age of participants (years)		
Less than 20	8 (16)	
20-29	25 (50)	0.000
Over 30	17 (34)	
Mean BMI (kg/m2)	28.7±4.21	
Gravidity		
Primigravida	30 (60)	0.001
Multigravida	20 (40)	
Educational background		
Educated	34 (68)	0.001
Non- Educated	16 (32)	
Mean Gestational age (weeks)	10.3±4.12	

Table 2. Continuity of viability of pregnancy.

Variables	Number (%)
Normal pregnancy	15 (30)
Uterine fibroid	7 (14)
Total	22 (44)

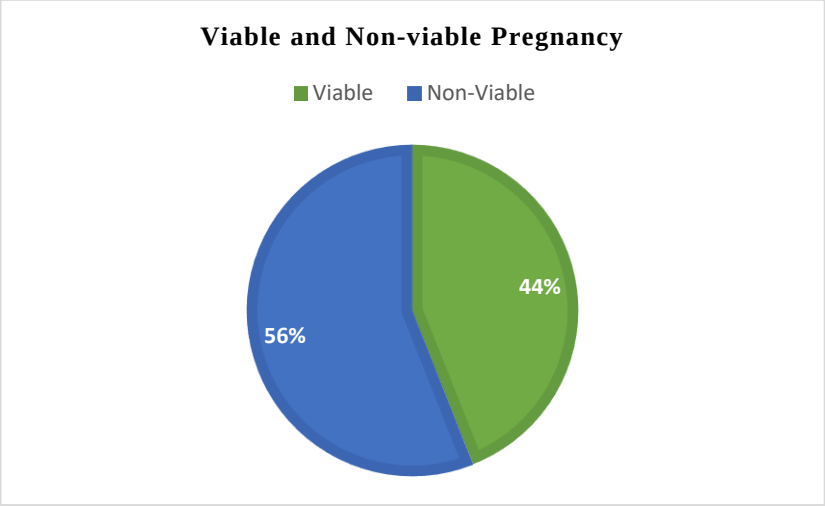

Figure 2. Variable and non-viable pregnancy among all participants of the study

Finding reasons of pelvic pain in the study participants

The causes of pelvic pain during the first trimester of pregnancy in this study are shown in table 3 and figure 3. Abortion (22%), uterine fibroid (14%), and Corpus luteal cyst (12%), were the most frequent causes. Acute appendicitis, scar site pregnancy, subchorionic hematoma, and ectopic pregnancy were the remaining causes identified. 30% of the cases were normal pregnancies.

Table 3. Caused of pelvic pain among all participants.

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Variables	Total number(n=50) %
Ectopic pregnancy	3 (6)
Uterine fibroid	7 (14)
Abortion	11 (22)
Corpus luteal cyst	6 (12)
Sub chorionic hematoma	3 (6)
Scar site pregnancy	4 (8)
Acute appendicitis	1 (2)
Normal pregnancy	15 (30)

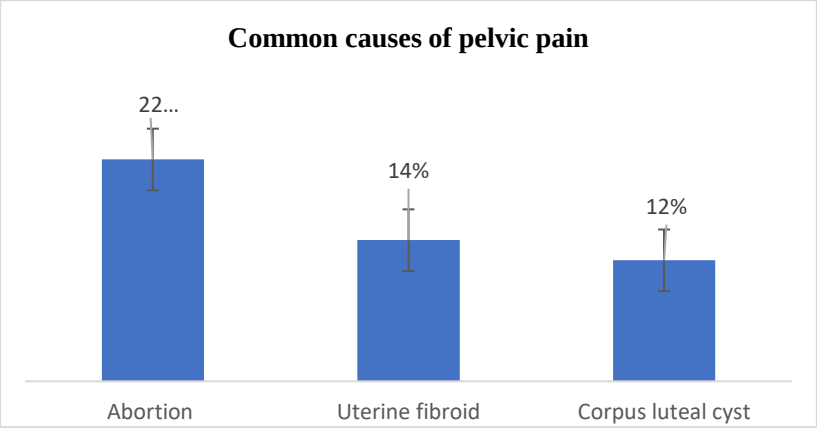


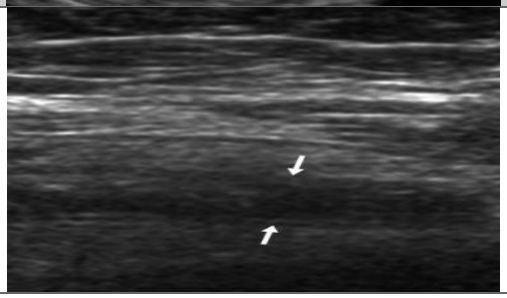
Figure 3. Most common causes of pelvic pain among this study participants.

Ultrasound imaging

Details ultrasound finding displayed in the table 4 with reference [8-10].

Table 4. Details finding of causes of pelvic pain by ultrasound among the study

Variables	Imaging	Finding
Uterine fibroid		A well-defined, spherical, hypoechoic lesion without degenerative alterations was the appearance of the uterine fibroid.
Abortion		A cystic lesion exhibiting internal reticulations was observed in hemorrhagic corpus luteal cyst.

Sub chorionic hematoma		Variably hypoechoic subchorionic collection on USG
Ectopic pregnancy		Right adnexal mass that is heteroechoic (Blob sign)
Cardiac activity		Detected of fetal cardiac activity with normal pregnancy
Corpus luteal cyst		Internal reticulations and a cystic lesion were the initial symptoms of a hemorrhagic corpus luteal cyst.
Scar site pregnancy	 	USG demonstrated anterior myometrial thinning and GS at the scar site.
Acute appendicitis		At the site of peak tenderness, a US examination of the right lower quadrant reveals a 9-mm noncompressible blind-ending tubular formation, which is compatible with acute appendicitis.

Multivariate logistic regression analysis

Age, gravidity and educational background in the first trimester of pregnancy were associated with causes of pelvis pain in the analyses utilizing multivariable logistic regression that represented in table 5

Table 5. Multivariable logistic regression for associated common factors with pelvic pain

Variables	Total number (n=50)	Crude		Adjusted	
		cOR*	95% CI	cOR*	95% CI
Age					
20-29	25	1		1	
Less than 20	8	0.89	0.24-3.21	1.14	0.29-4.32
Over 30	17	1.10	0.24-4.11	0.78	0.19-3.61
Gravidity					
Primigravida	30	1		1	
Multigravida	20	1.45	0.60-3.07	1.87	0.42-7.23
Educational background					
Educated	34	1		1	
Non- Educated	16	1.22	0.59-3.12		0.45-6.18

DISCUSSION

The current study uses ultrasound to assess for different types of pelvic pain during pregnancy. Ultrasonography is one of the main ways that pelvis pain evidence is interpreted. Nonetheless, the focus of the current study was on the range of ultrasonographic results in participants who come with pelvic pain during the first trimester of pregnancy. This is a typical symptom of this participants and is frequently related to morbidity and even death.

Usually employed as the first imaging modality, USG can diagnose certain conditions without the need for further imaging. Acquaintance with various causes of pelvic pain and understanding of their ultrasonography results aids in the early identification of anomalies and consequences to avoid delays in diagnosis and treatment, thereby enhancing the well-being of the fetus and mother.

In the present study, the demographic characteristic included age, gravidity, BMI and educational background, while age divided into three groups such as less than 20, 20 to 29 and over 30 years and as well as most of the participants the age between 20 to 30 years that considered a statistically significant (p=0.00) comparison to the other age groups. However, previous study also reported same results regarding age group [11]. In the current study 50 pregnant women had presented the pelvic pain among most of the participants were primigravida around 60% and multigravida 40 % respectively, while other study came to a same conclusion [12]. Further results shown the most of the participants were educated 68% and uneducated 32%. In this study, there were 44% viable pregnancies and 56%, non-viable pregnancies. Of the seventy non-viable pregnancies, eleven (22%) had undergone a different kind of abortion, three (6%), had an ectopic pregnancy, and seven (14%) had uterine fibroids. An earlier study found that 80% of non-variable pregnancies resulted in abortion in 67.5% of cases, while ectopic pregnancies occurred in 12.5% of cases. Similar findings were also found in other studies. [13,14]. However, in most cases, adnexal tumors or cysts are asymptomatic and affect between 1% and 5.3% of pregnancies [15]. While, the most common adnexal masses during pregnancy are corpus luteum, which are usually hemorrhagic. In addition to acute appendicitis (1%), other findings from this study that contribute to pelvic pain included scar site pregnancy (8%), subchorionic hematoma (6%), and corpus luteal cyst (12%).

It has been demonstrated that ultrasound is a highly successful technique for pinpointing the exact cause of vaginal bleeding during the first trimester, with a 100% specificity rate in diagnosing an assaulted abortion and uterine fibroid. This is because ultrasonography is 100% successful in diagnosing these types of conditions. With USG, the diagnostic accuracy for both an ectopic pregnancy and a complete abortion was 98% [16]. Nonetheless, the results of this study showed that ultrasound was very accurate in identifying and assessing the source of pelvis pain in the first trimester, as well as totally sensitive in screening for the disease.

CONCLUSION

In the first trimester of pregnancy, ultrasonography is thought to be the primary method to identify the source of pelvic pain. It has been shown to provide accurate disease diagnosis and is easy to use and appropriate for emergency situations. This allows the physician to respond swiftly and effectively.

The study had some limitations. A small patient sample and the fact that the patients were only from one hospital were limitations of the research. Maternity and Children Hospital (MCH), situated in Sakaka, is the only government hospital of its kind in the Aljouf region. This study uses imagines from references due to a technical issue.

Conflict of interest

The author declares no conflict of interest.

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تقييم آلام الحوض المتنوعة في الثلث الأول من الحمل باستخدام توجيه الأشعة فوق الصوتية

مهند فالح العنزي*

قسم الطب الباطني، قسم الأشعة، كلية الطب، جامعة الجوف، سكاكا، المملكة العربية السعودية

الملخص

يمكن التعرف على آلام الحوض خلال فترة الحمل وعلاجها تحدياً. لا يزال النساء الحوامل يستخدمن الأشعة فوق الصوتية كوسيلة رئيسية للتصوير. تهدف هذه الدراسة إلى استكشاف الدور المحتمل لتوجيه الأشعة فوق الصوتية في مصادر آلام الحوض المتنوعة خلال الثلث الأول من الحمل. تعاون مستشفى النساء والولادة وقسم الأشعة لإجراء هذه الدراسة الوصفية. شارك في الدراسة 50 امرأة حامل، تتراوح أعمارهن بين أقل من 20 وأكثر من 30 عامًا، وكانت تعاني من آلام حوضية خلال الثلث الأول من الحمل (حتى الأسبوع 12 من العمر الجنيني). خضعت جميع النساء لتقييمات سريرية ثم تم إحالتهن لإجراء فحص الأشعة فوق الصوتية لتأكيد التشخيص. استخدم برنامج SPSS (الإصدار 25) لتحليل البيانات والعلاقات باستخدام نسب الاحتمال والانحدار اللوجستي متعدد المتغيرات. أظهرت الدراسة التي أجريت على 50 امرأة حامل مع مساعدة الأشعة فوق الصوتية وجود 22 امرأة (44٪) لديها الالم و28 امرأة (56٪) من غيرالالم. وكانت 60 في المائة من النساء حوامل لأول مرة، بينما كانت 40 في المائة منهن حوامل متعددة. كان متوسط مؤشر كتلة الجسم 28.7 ± 4.21، ومتوسط العمر 27.3 ± 13.18 عامًا. كانت أكثر الأسباب شيوعًا لآلام الحوض الإجهاض (22٪)، وورم الرحم الليفي (14٪)، وكيس الجسم الاصفر (12٪) بالإضافة إلى الحمل في موقع ندبة العملية القيصرية السابقة، والورم الدموي تحت المشيمة، والحمل خارج الرحم، والتهاب الزائدة الدودية الحاد وكانت نسبهم 8٪، 6٪، 6٪ و1٪ على التوالي. في حين تم العثور على 30٪ من الحمل الطبيعي. تعتبر فحوص الأشعة فوق الصوتية الأكثر موثوقية وغير مخترقة للجسم وآمنة في التشخيص والتحديد لمختلف أنواع آلام الحوض لدى النساء الحوامل. أظهرت النتائج أن العلاج والتشخيص المبكر للنساء باستخدام الأشعة فوق الصوتية تقلل من معدلات الوفيات المرتبطة بمشاكل الحمل.

الكلمات الدالة. تصوير الموجات فوق الصوتية، آلام الحوض، الأشهر الثلاثة الأولى، الإجهاض، الأورام الليفية الرحمية.