Vol. 5 No. 1 (2026)

Pakistan Journal of Medical & Cardiological Review

https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387

Print ISSN 3007-2379

Rashid et al - 2026

DOI: http://doi.org/10.5281/zenodo.19436959

Comparison between Transvaginal and Transabdominal Ultrasound for Detection of Fetal Heartbeat During Gestational Periods 5-8 Weeks in Obese Women

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Keywords:

Received on 01 Feb, 2026
Accepted on 17 March, 2026
Published on 31 March, 2026

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Abstract

Introduction: Early confirmation of fetal viability is a critical step in prenatal care, typically achieved through ultrasound imaging. In women with elevated body mass index (BMI), the accuracy of transabdominal ultrasound may be compromised due to soft tissue interference. Transvaginal ultrasound, which provides closer access to pelvic structures, is believed to offer improved image. clarity in such cases. Given the global rise in maternal obesity, establishing the most reliable method for early heartbeat detection is increasingly important.

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Print ISSN 3007-2379

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DOI: http://doi.org/10.5281/zenodo.19436959

Objective: This study aims to evaluate and compare the effectiveness of transvaginal ultrasound. (TVUS) and transabdominal ultrasound (TAUS) in detecting fetal cardiac activity during early gestation (5-8 weeks) in obese pregnant women

Methodology: A clinical assessment was carried out involving obese women in their early firsttrimester. Each participant underwent both TAUS and TVUS examinations. Data were collected regarding gestational sac appearance, crown-rump length (CRL), and the presence of fetal heart activity. The clarity of imaging and detection success rate for each modality were compared. Special attention was given to cases involving abnormal pregnancies, such as anembryonic gestation or bradycardia.

Results: The findings revealed that TVUS was significantly more effective in visualizing early fetal heart activity, often as early as 5 weeks gestation. It provided superior resolution in cases where TAUS failed to detect clear fetal structures due to increased maternal adiposity. All instances of nonviable pregnancies were successfully identified using the transvaginal approach, while transabdominal imaging frequently lacked diagnostic clarity before the 7-week mark.

Conclusion: Transvaginal ultrasound demonstrates greater reliability than transabdominal ultrasound in identifying fetal heartbeat in obese patients during the early stages of pregnancy. It is recommended as the preferred imaging technique in such cases, ensuring earlier and more accurate assessments of pregnancy viability

INTRODUCTION

Ultrasound imaging, or sonography, is a safe, painless, and non-invasive test that helps doctors diagnose and treat medical conditions. It uses high-frequency sound waves sent through a small probe and gel on the skin to create images of the inside of the body

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(Florian Recker, 2024). Ultrasound is widely used in obstetric practice to detect fetal abnormalities with a view to provide prenatal opportunities for further investigations including genetic testing and discussion of management options (Leung, 2021).

Ultrasound imaging operates on the principle of echolocation. High-frequency sound waves, when transmitted into the body by a transducer, are reflected back by internal tissues and organs. These reflected sound waves, or echoes, are then captured by the transducer and translated into visual images by a computer. The varying densities and compositions of bodily tissues result in different echo patterns, enabling the visualization of structures within the body, such as organs, blood vessels, and, in the case of obstetrics, the developing fetus (Florian Recker, 2024),

The evaluation of early pregnancy patients in the Emergency Department (ED) commonly involves the utilization of ultrasonography. This can include transabdominal ultrasound (TAUS), transvaginal ultrasound (TVUS), or both (Christopher Thom, 2024).

Transabdominal ultrasound performed with the patient in a supine position without emptying the bladder and with the head of the bed slightly elevated. The transducer placed in the suprapubic region of the maternal abdomen and manipulated until the desired structures came into view. Transabdominal ultrasound doesn't require needles or injections and doesn't expose patients to radiation (Christopher Thom, 2024). It's easily accessible in various healthcare settings and is generally less expensive than other imaging methods like CT scans or MRIs. Ultrasound uses sound waves and does not involve ionizing radiation, making it safe for both the mother and the developing fetus. There are no known harmful effects associated with ultrasound during pregnancy. Ultrasoun is the ideal imaging modality to use in the pregnant patient; it lacks ionizing

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radiation and present minimal risk to the mother and the developing fetus. (Bernard, et al., 2025)

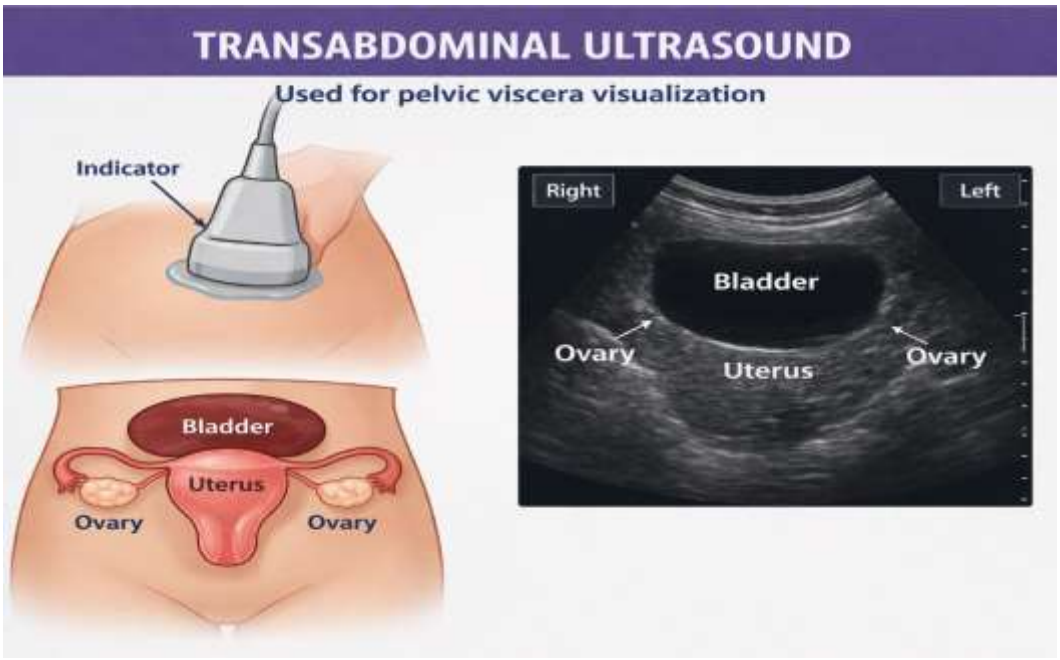

Figure 01: Transabdominal ultrasound for pelvic viscera visualization.

(https://radiopaedia.org, n.d.)

Transvaginal ultrasound (TVUS) provides clear imaging of the uterus, ovaries, and small lesions. When combined with abdominal ultrasound, it helps diagnose conditions like endometriosis, ectopic pregnancy, and uterine fibroids. It is safe for both the mother and fetus, as it involves no ionizing radiation (Sam Hsu MD, 2012) Age, parity, gestational age, special features regarding maternal gestational history-such as Rh-Rh isoimmunization, ultrasonographic findings, CRL or GS diameter, and fetal cardiac activity, as well as the presence/absence of subchorionic hematoma (SCH), multiple pregnancies, anembryonic pregnancy, adnexal mass, ectopic pregnancy, caesarean scar pregnancy, molar pregnancy, leiomyoma, and/or uterine anomalies, were noted in the ultrasonographic examination.

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All anembryonic pregnancies were diagnosed by the transvaginal technique using a 5Hz probe. A mean GS diameter >20 mm (transvaginal ultrasound) without a visualized embryo was considered as an anembryonic pregnancy. (Sohaey R, 1996)

Figure 02: Transvaginal ultrasound (https://www.google.com/transvaginalultrasound, n.d.)

A normal fetal heart rate (FHR) typically ranges between 110 and 160 beats per minute (bpm), but can vary slightly, and monitoring it is crucial for ensuring fetal well-being during pregnancy. Fetal wellbeing is commonly assessed by monitoring the fetal heart rate (FHR). Standard obstetric definition of fetal bradycardia is a sustained fetal heart rate < 110 bpm over at least 10 min (Dominik S. Westphal 1, 2022).

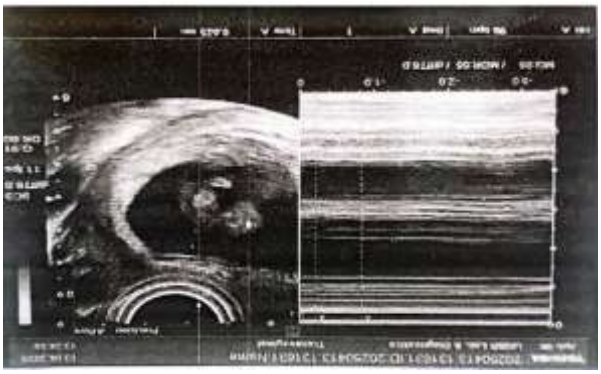

Figure 03: Transabdominal ultrasound scan showing a viable early intrauterine pregnancy. The Bmode image (right) displays a gestational sac with a fetal pole, while the M-mode

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trace (left) confirms fetal cardiac activity with a heart rate of 96 bpm. Scan performed on 13 January 2025 using Toshiba Aplio 500 at UMER Lab & Diagnostics.

A rapid fetal heart rate is termed a fetal tachycardia and is usually defined as: FHR >180 bpm FHR around 170 bpm may be classified as borderline fetal tachycardia. A rapid and irregular fetal heart rate is usually termed a fetal tachycardia. FHR around 170 bpm may be classified as borderline fetal tachycardia. (Dominik S. Westphal, 2022).

Chromosomally normal first trimester fetuses with an increased nuchal translucency measurement have an elevated risk of congenital heart defect (CHD). So, there is an increased demand for imaging the fetal heart during the first and early second trimesters of pregnancy. (Hamelmann, et al., 2020).

The fetal heart begine forming early in pregnancy, starting as a simple tube around 3-4 weeks after conception. It starts beating by about 21 days after fertilization and bocomec detectable on ultrasound by 5weeks.

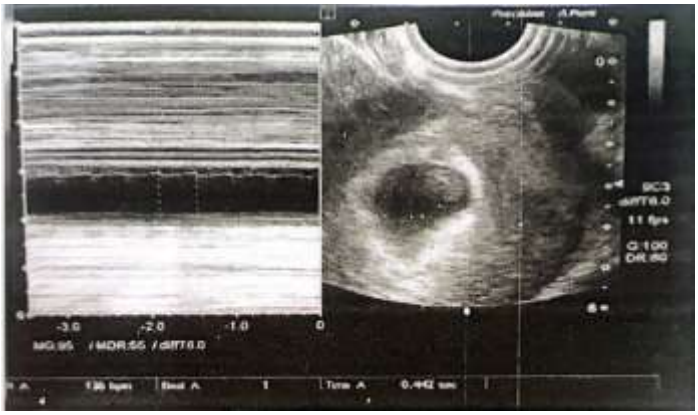

Figure 04: Waveform and flow patterns of heartrate through Transvaginal approach in the early gestational age (at 5weeks and 2days) at UMER Lab & Diagnostics.

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Between 5 and 10 weeks, the heart develops chambers and valves, becoming fully formed by the 10th week. Doppler ultrasound can also measure fetal heart rate (FHR) by analysing blood flow patterns (Steinman, 2020).

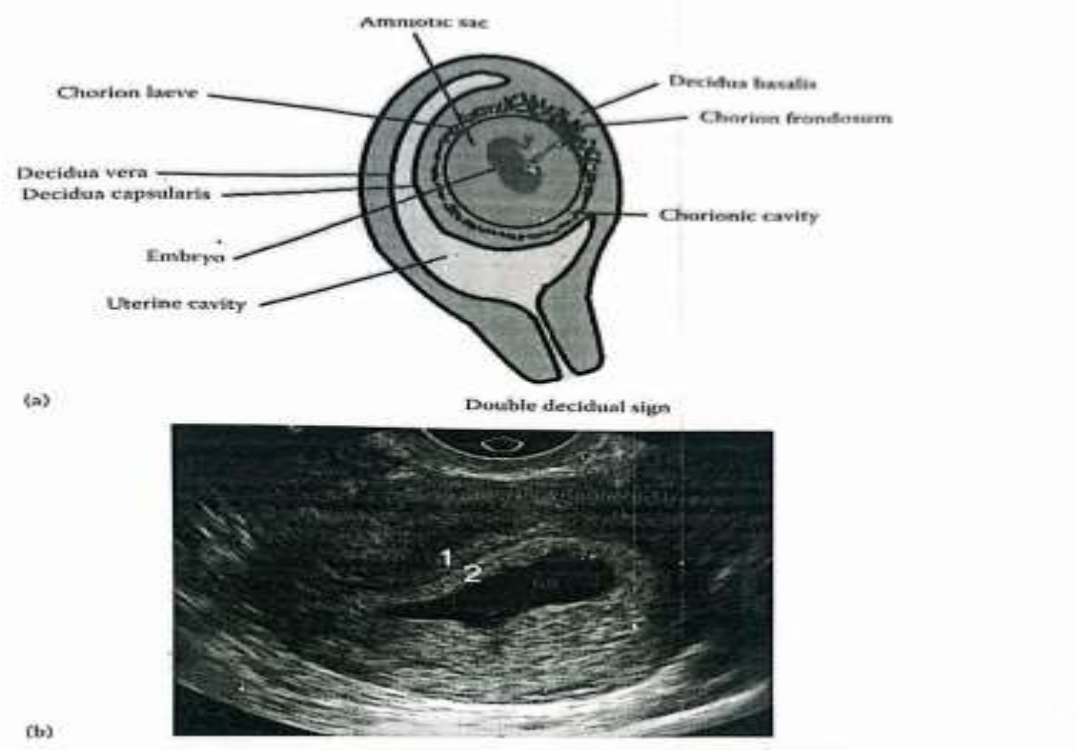

Figure: 05(a) Illustrates double decidual sac sign (DDSS) and (b) illustrating two concentric rings of normal pregnancy. (https://radiologykey.com/first-trimester-2/, n.d.)

Early detection of fetal heartbeat is vital for confirming pregnancy viability between 5-8 weeks. In obese women, transabdominal ultrasound (TAUS) often yields poor image quality due to excess tissue. Transvaginal ultrasound (TVUS) offers better resolution and may improve early detection in this group. With rising obesity rates, identifying the most effective imaging method is increasingly important. Comparing TAUS and TVUS will help guide optimal early pregnancy assessment in obese patients.

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OBJECTIVE

To compare the effectiveness of transvaginal and transabdominal ultrasound in detecting fetal cardiac activity during the early gestational period (5-8 weeks) in obese women, in order to determine the most reliable imaging modality for early pregnancy assessment in this population

HYPOTHESIS

Null Hypothesis (Ho):

There is significant difference between transvaginal and transabdominal ultrasound in detecting fetal heart activity during the early gestational period (5-8 weeks) in obese women.

Alternative Hypothesis (H_2):

There is no significant difference between transvaginal and transabdominal ultrasound in detecting fetal heart activity during the early gestational period (5-8 weeks) in obese women.

MATERIAL AND METHODS

Study Design: A Cross-sectional study design is followed to find an effective and efficient way to analyse.

Settings: The study was conducted at Umer Lab and Diagnostic Centre. Kot Addu and from here collected at least 71 cases data which discussed in procedure.

Duration of Study: After approval of the topic, the period of at least 3-6 months till the final defence of our study according to university guidelines.

Sample Size: Applied the EPI tool to determine the sample size from a total population of 1,072,180, based on the official population statistics of District Kot Addu provided by the Punjab Census Population Department (LD, 2001). The calculated sample size was 126

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patients. However, due to resource constraints, including limited availability of eligible participants meeting the study's inclusion criteria during the data collection period, I selected 71 petients out of the 126 for detailed sample size analysis and experimental results discussion.

Sample Selection:

Inclusion Criteria:

- Age between 18-40 years
- First trimester (5th to 8th weeks)
- Obese women

Exclusion Criteria:

- Neurological disorders (llan E. Timor Tritsch)

PROCEDURE

The study involves comparing transvaginal sonography (TVS) and transabdominal sonography (TAS) to determine which method is more effective in detecting fetal heart activity during early pregnancy (5-8 weeks) in obese women. The aim is to evaluate which lechnique provides more accurate and mely results in this specific population.

Transvaginal Sonography (TVS):

Preparation:

The patient needs to empty her bladder before the scan. This is because a full bladder can distort the view in vaginal imaging.

Equipment:

A high-frequency transvaginal probe (5-12 MHz) is gently inserted into the vaginal canal. The high frequency offers high-resolution images, making it ideal for visualizing small early pregnancy structures.

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Imaging Capability:

- TVS can detect the following structures at early gestational ages:
- Gestational sac: usually visible by 3.5 to 4weeks.
- Yolk sac: appears by 5 weeks.
- Fetal pole with cardiac activity: seen by 5 to 5.5 weeks.

Fetal Heart Rate Measurement:

The M-mode ultrasound setting is used to safely measure the fetal heart rate (FHR), which normally ranges between 110-160 beats per minute in early pregnancy. M-mode captures heart motion without applying Doppler energy, which is safer in early gestation.

Transabdominal Sonography (TAS):

Preparation: The patient must have a full bladder. This helps push the uterus upward, creating an "acoustic window" for better visualization through the abdominal wall.

Equipment:

A low-frequency curvilinear probe (2-4 MHz) is used. While this provides deeper penetration, it offers lower resolution, especially problematic in obese women, as adipose tissue further weakens image quality.

Imaging Challenges:

TAS may struggle to clearly visualize early pregnancy

structures in: Women with higher BMI due to poor sound wave penetration,

Very early gestation, when structures are still small,

Clinical Importance:

Viability Assessment: Detecting a fetal heartbeat is the key marker of pregnancy viability. If cardiac activity is absent in an embryo with a CRL (crown-rump length) greater than 7 mm, it strongly suggests pregnancy fallure or a missed miscarriage.

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Ultrasound Machine Used:

The procedures use the Toshiba Aplio 500 ultrasound system, equipped with:

- 2-4 MHz curvilinear probe for TAS.
- 5-12 MHz transvaginal probe for TVS

This comparison helps determine which ultrasound technique is more reliable in obese women during early pregnancy, where accurate and timely detection of fetal heartbeat can influence important clinical decisions.

Results:

Study Population and Design

This study included 71 obese pregnant women in early gestation (5–8 weeks). The objective was to evaluate and compare the effectiveness of transabdominal ultrasound (TAUS) and transvaginal ultrasound (TVUS) in detecting fetal cardiac activity. Clinical variables such as fetal heart rate patterns, gestational age, and obesity levels were analyzed.

Fetal Heart Rate Patterns

Category	Percentage
Normal	67.6%
Tachycardia	4.2%
Bradycardia	4.2%
Absent	23.9%

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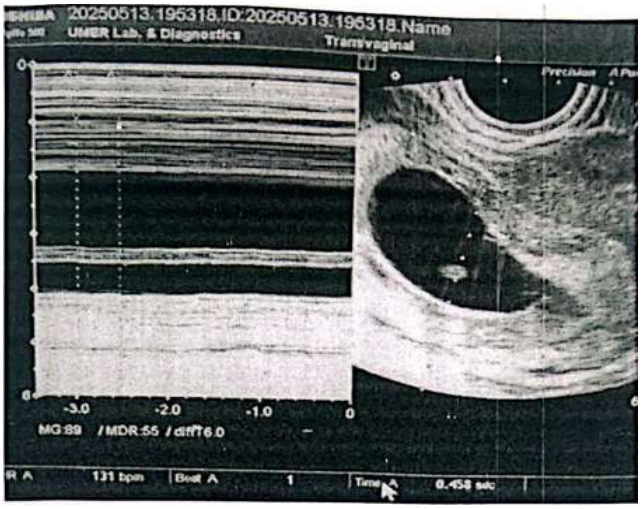

Figure 06: Transvaginal ultrasound scan showing a viable early intrauterine pregnancy. The B mode image (right) displays a gestational sac with a fetal pole, while the M-mode trace (left) confirms fetal cardiac activity with a heart rate of 131 bpm. Scan performed on 17 January 2025 using Toshiba Apllo 500 at UMER Lab & Diagnostics.

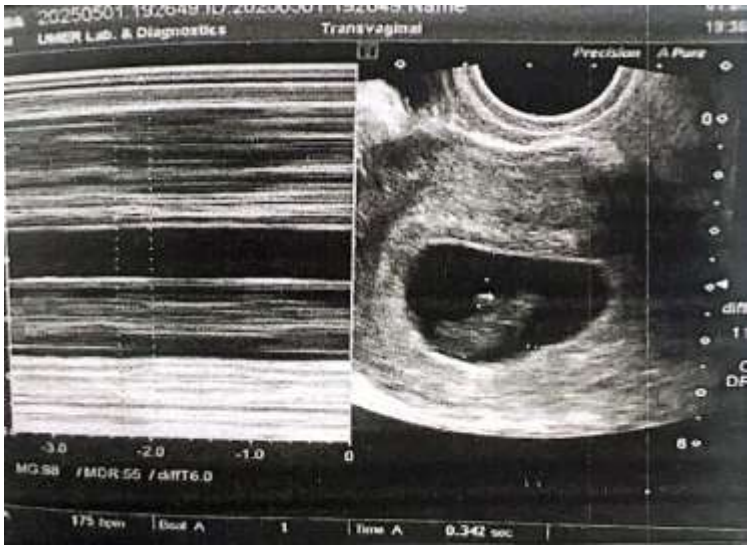

Figure 7.0: Transvaginal ultrasound scan showing increase heartrate (Tachycardia). The B-mode image (night) displays a gestational sac with a fetal pole, while the M-mode trace

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(left) confirms tetal cardiac activity with a heart rate of 175 bpm. Scan performed on 01May 2025 using Toshiba Aplio 500 at LIMER Lab & Diagnostics.

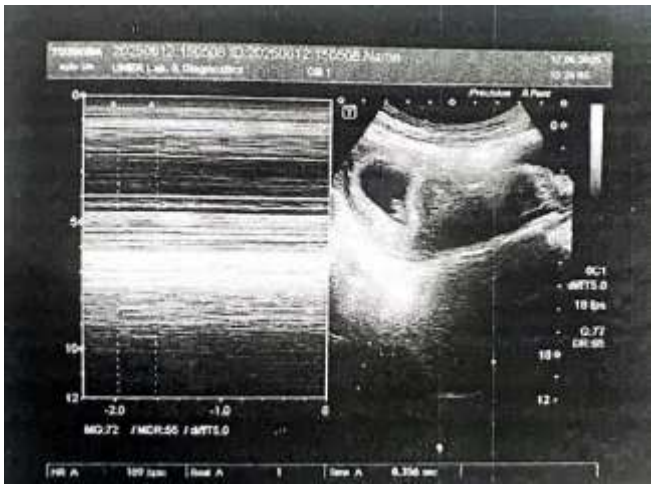

Figure 08: Transabdominal ultrasound scan showing an increase heartrate (Tachycardia). The mode image (right) displays a gestational sac with a fetal pole, while the M-mode trace (left) confirms fetal cardiac activity with a heart rate of 169 bpm. Scan performed on 12 June 2025 asing Toshiba Aplio 500 at UMER Lab & Diagnostics.

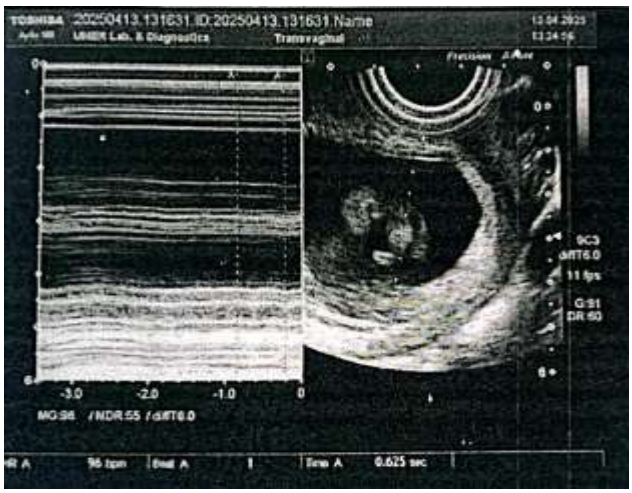

Figure 09: Transvaginal ultrasound scan showing a decrease heartrate (Tachycardia). The B-mode image (right) displays a gestational sac with a fetal pole, while the M-mode trace

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(left) confirma fetal cardiac activity with a heart rate of 96 bpm. Scan performed on 13 April 2025 using Toshiba Apllo 500 at UMER Lab & Diagnostics

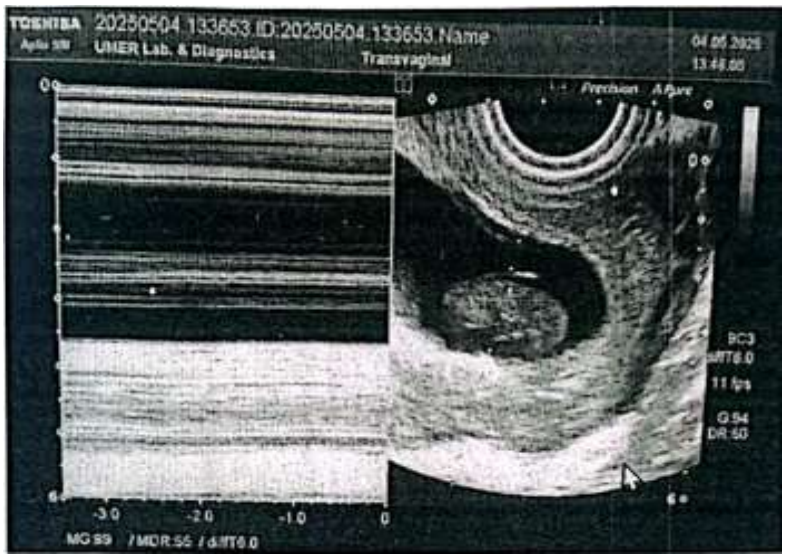

Figure 10: Transabdominal ultrasound scan showing straight wavelform (No cardiac activity). Scan performed on 04 May 2025 using Toshiba Apllo 500 at UMER Lab & Diagnostics.

The distribution of fetal heart rate patterns showed that the majority of cases had normal cardiac activity, while a smaller proportion exhibited abnormal patterns such as tachycardia, bradycardia, or absence of heartbeat.Normal fetal heart rate was observed in 67.6% of cases, indicating healthy embryonic development. Tachycardia and bradycardia were each observed in 4.2% of cases, while 23.9% showed no detectable fetal heartbeat.These findings highlight that although most pregnancies progress normally, early gestational stage and technical limitations may affect detection.

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Gestational Age Distribution

Weeks	Percentage
5 weeks	47.9%
6 weeks	29.6%
7 weeks	16.9%
8 weeks	5.6%

A large proportion of participants were in very early gestation (5–6 weeks). This explains the difficulty in detecting fetal heartbeat and highlights the importance of sensitive imaging techniques.

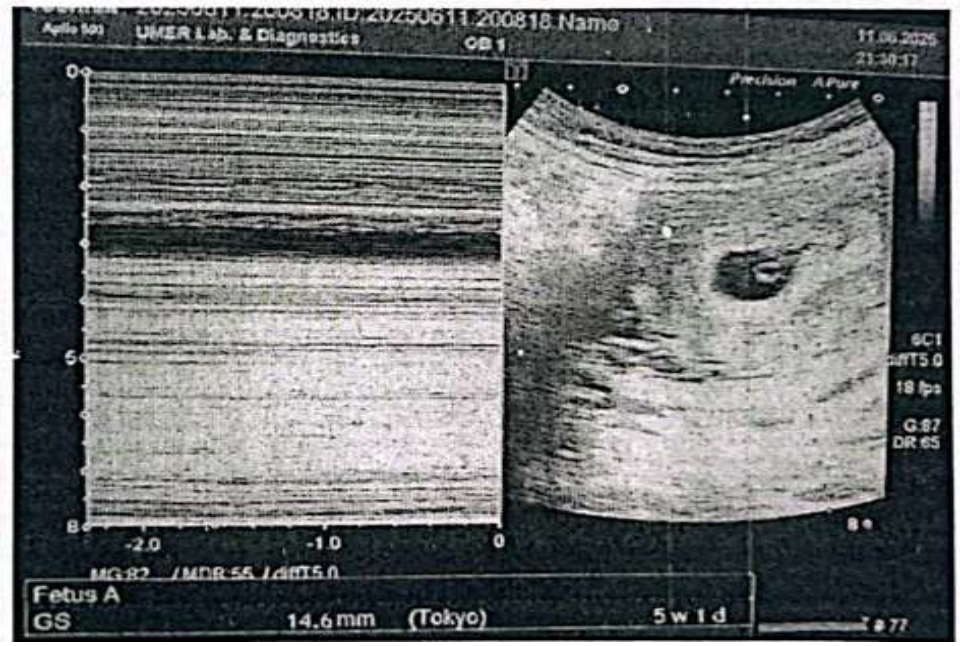

Figure 11: Transabdominal ultrasound scen showing a viable early intrauterine pregnancy. The Bmode image (right) displays a gestational sac with a fetal pole of age Swesk 1day, while the M mode trace (left) confirms fetal cardiac activity with a heart rate. Scan performed on 11 June 2025 sing Toshiba Apllo 500 at UMER Lab & Diagnostics.

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Figure 12: Transvaginal ultrasound scan showing a viable earty intrauterine pregnancy, demonstrating a gestational sac with CRL, diameter of 0.1mm (@week 3days). Scan performed on 4April 2025 using Toshiba Aplio 500 at UMER Lab & Diagnostics

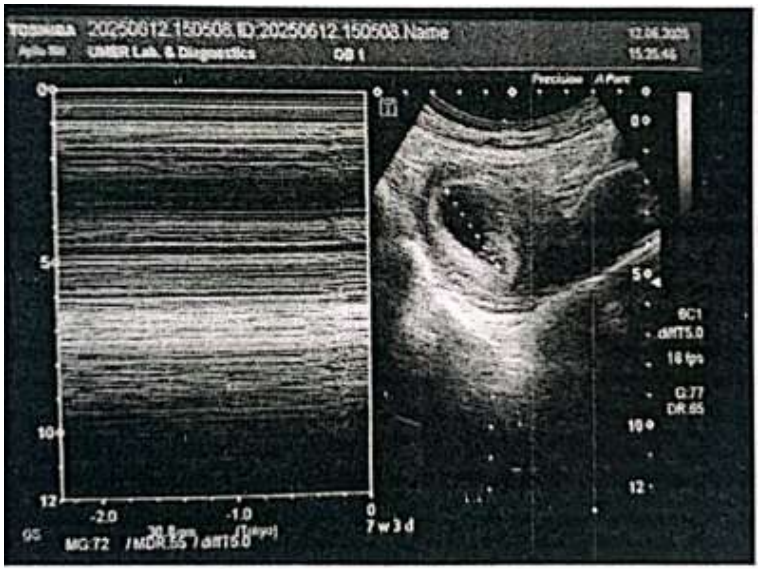

Figure 13: Transabdominal ultrasound scan showing a viable early intrauterine pregnancy. The Emode image (right) displays a gestational sac with a fetal pole of age 7week 3days,

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while the M-mode trace (left) confirma fetal cardiac activity with a heart rate. Scan performed on 12 June 2025 using Toshiba Apllo 500 at UMER Lab & Diagnostics

Figure 14: Transvaginal ultrasound scan showing a viable early intrauterine pregnancy, demonstrating a gestational sac with CRL diamater of 15.8mm (8weeks), Scan performed on tmay 2025 using Toshiba Apillo 500 at UMER Lab & Diagnostics

Obesity Classification of Participants

Obesity Level	Percentage
Minimal	7%
Level 1	36.6%
Level 2	39.4%
Level 3	16.9%

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Figure 18: with a level 3 BMI and a not-particularly-full bladder. Of course, it's not as clear as the trans vaginal ultrasounds. (https://www.reddit.com, n.d.)

The majority of participants belonged to moderate to severe obesity categories. This significantly affected ultrasound imaging quality, particularly for transabdominal scanning.

Effectiveness of Transabdominal Ultrasound

Outcome	Percentage
Heartbeat Detected	43.7%
Not Detected	56.3%

Transabdominal ultrasound showed limited effectiveness, failing to detect fetal heartbeat in more than half of the cases. This limitation is primarily due to poor penetration of ultrasound waves in obese patients.

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Summary of Overall Study Results:

Parameter	Key Finding	Interpretation
Fetal Heart Rate	67.6% normal, 23.9% absent	67.6% normal, 23.9% absent
Tachycardia & Bradycardia	4.2% each	Rare cases, may indicate clinical conditions or temporary variation
Gestational Age	Majority at 5–6 weeks	Early stage limits heartbeat detection
Obesity Level	56.3% in Level 2 & 3	Higher obesity reduces imaging accuracy
TAUS Detection	43.7% detected	Low sensitivity in early pregnancy
TVUS Performance	TVUS Performance	More accurate due to better resolution and proximity
Imaging Limitation	Affected by obesity & early gestation	May lead to false-negative results
May lead to false-negative results	Clinical Preference	TVUS preferred

DISCUSSION

The study compares the effectiveness of transvaginal and transabdominal ultrasound in detecting fetal heartbeat during early pregnancy. Detection of fetal heartbeat serves as

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the primary outcome, influenced by the ultrasound method used. Factors like maternal obesity, gestational age, and consistent scanning conditions are controlled to ensure reliable comparison. The findings of this study support the hypothesis that fetal heart rate and observed fetal condition significantly influence the selection of prenatal diagnostic imaging methods. Specifically, higher levels of fetal observation and abnormal heart rates were associated with decreased use of transabdominal imaging and a corresponding increase in transvaginal ultrasound. These results are consistent with clinical practices, where transvaginal sonography is typically reserved for more complex or uncertain cases due to its higher resolution and internal vantage point.

The moderate correlation between gestational week and fetal observation levels (r=.299) aligns with developmental expectations-more advanced gestational stages reveal more observable features, aiding in diagnosis. The low variance in TRNSOBD and TRNSVAG suggests consistent clinical criteria for when these methods are used, whereas the high variance in HRTRT reflects a broader spectrum of patient conditions.

The regression model, although modest in explanatory power, statistically confirms that heart rate and observation levels are significant predictors of diagnostic choice. The chi-square test further validates the non-random, condition-dependent nature of these decisions. The high t-values reinforce the validity of the mean scores and confirm that these variables represent substantive clinical indicators.

These findings carry implications for standardizing diagnostic protocols in obstetrics. By formalizing decision trees that consider heart rate and observation level, clinicians may improve diagnostic accuracy and resource allocation. However, the study is limited by its sample size and retrospective design. Future research should incorporate larger, multicentre datasets and examine additional predictors, including maternal health factors.

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DOI: http://doi.org/10.5281/zenodo.19436959

Conclusion

This study demonstrates that transvaginal ultrasound (TVUS) is significantly more effective than transabdominal ultrasound (TAUS) in detecting fetal cardiac activity during the early gestational period (5-8 weeks) in obese women. The findings confirm that maternal adiposity can impair the effectiveness of TAUS, whereas TVUS, by bypassing abdominal adipose tissue, provides clearer visualization and more consistent detection of fetal heartbeat. The data showed a higher mean detection rate and lower variance for TVUS compared to TAUS, indicating not only superior performance but also greater consistency in clinical use. A moderate positive correlation between gestational age and fetal visualization ($r = 0.299$) suggests that detection generally improves with fetal development, although TVUS consistently outperformed TAUS even in earlier weeks. Furthermore, fetal heart rate (FHR) anomalies, such as bradycardia and tachycardia, were more reliably evaluated using TVUS, making it the preferred method in cases requiring precise cardiac assessment. Overall, the study underscores the importance of selecting the most appropriate imaging modality for early pregnancy assessments in obese patients. TVUS emerges as a more dependable tool, especially when early and accurate fetal cardiac monitoring is crucial for pregnancy management.

References:

Bernard, O. E., Taofeek, A. O., David, O. A., Olufemi, A. O., Adesoji, S. A., & Olaide, R. A. (2025). Comparing Transabdominal Ultrasound Scans with Digital Vaginal Examinations in Labour,

Christina Hernandez Engelhart, K. G. (2023). Reliability and agreement in intrapartum fetal heart rate monitoring interpretation: A systematic review.

Pakistan Journal of Medical & Cardiological Review
https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387
Print ISSN 3007-2379

DOI: http://doi.org/10.5281/zenodo.19436959

Christopher Thom, K. L. (2024). Comparison of transvaginal ultrasound utilization between radiology and point of care ultrasound in first trimester pregnancy. University of Virginia Health System, USA.

Dominik S. Westphal, M. H. (2022). Fetal Bradycardia Caused by Monogenic Disorders.

Florian Recker, U. G. (2024). Clinical Ultrasound Applications in Obstetrics and Gynecology in the Year 2024. University Hospital Bonn, Germany.

Hamelmann, P., Vullings, R., Kolen, A. F., Bergmans, J. W., Laar, J. O., & Tortoli, P. (2020). Doppler Ultrasound Technology for Fetal Heart Rate Monitoring.

Judith Krossøy Pedersen, C. S. (2022). Handheld transabdominal ultrasound, after limited training, may confirm first trimester viable intrauterine pregnancy.

Kaur, A., & Kaur, A. (2011). Transvaginal ultrasonography in first trimester of pregnancy and its comparison with transabdominal ultrasonography. Government Medical College and Rajindra Hospital, Punjab, India.

Leung, K.-Y. (2021). Applications of Advanced Ultrasound Technology in Obstetrics. Gleneagles Hong Kong, Hong Kong, China.

Pai-Jong Stacy Tsai MD, M. (. (2015). Obesity and the challenges of ultrasound fetal abnormality diagnosis. USA.

Sam Hsu MD, R. (2012). Ultrasound in Pregnancy, USA.

Shital T. Mehta, P. A. (2022). Utility of first trimester ultrasound before 12 weeks of gestation. NHL Municipal Medical College, Ahmedabad, Gujarat, India.

Steinman, J. (2020). Non-Invasive Ultrasound Detection of Cerebrovascular Changes in a Mouse Model of Traumatic Brain Injury.

Theodor I. Stefos MD, D. E. (1998). Embryonic heart rate in early pregnancy.

Pakistan Journal of Medical & Cardiological Review
https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387
Print ISSN 3007-2379

DOI: http://doi.org/10.5281/zenodo.19436959

Shin Hashiramoto, M. K. (2024). Factors affecting the accuracy of fetal cardiac ultrasound screening in the first trimester of pregnancy.

Shital T. Mehta, P. A. (2022). Utility of first trimester ultrasound before 12 weeks of gestation. NHL Municipal Medical College, Ahmedabad, Gujarat, India.

Ahemaitijiang Pahading, R. A. (2023). Study on the effectiveness of combined diagnosis of transabdominal ultrasonography and transvaginal ultrasonography in patients with acute abdomen.

Bernard, O. E., Taofeek, A. O., David, O. A., Olufemi, A. O., Adesoji, S. A., & Olaide, R. A. (2025). Comparing Transabdominal Ultrasound Scans with Digital Vaginal Examinations in Labour.

Christina Hernandez Engelhart, K. G. (2023). Reliability and agreement in intrapartum fetal heart rate monitoring interpretation: A systematic review.

Christopher Thom, K. L. (2024). Comparison of transvaginal ultrasound utilization between radiology and point of care ultrasound in first trimester pregnancy. University of Virginia Health System, USA.

Dildora Xudoyarova, N. T. (2024). SYMPTOMS OF ACUTE ABDOMINAL IN WOMEN OF REPRODUCTIVE AGE.

Dominik S. Westphal 1, 2. H.-M.-F.-G. (2022). Fetal Bradycardia.

Dominik S. Westphal, M. H. (2022), Fetal Bradycardia Caused by Monogenic Disorders.

Florian Recker, U. G. (2024), Clinical Ultrasound Applications in Obstetrics and Gynecology in the Year 2024. University Hospital Bonn, Germany.

Hamelmann, P., Vullings, R., Kolen, A. F., Bergmans, J. W., Laar, J. O., & Tortoli, P. (2020). Doppler Ultrasound Technology for Fetal Heart Rate Monitoring.