

KNOWLEDGE AND ATTITUDE REGARDING OBSTETRIC ULTRASOUND
AMONG PREGNANT WOMEN AT HAYATABAD MEDICAL COMPLEX,
PESHAWAR, PAKISTAN: A CROSS-SECTIONAL STUDY

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Abstract

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Background: Obstetric ultrasonography is widely used during antenatal care to estimate gestational age, assess fetal number and growth, identify selected fetal or placental abnormalities, and support clinical decision-making. However, pregnant women may not fully understand its purposes, capabilities, and limitations. Understanding their knowledge and attitudes can guide patient education and communication. **Objective:** To assess knowledge and attitudes regarding obstetric ultrasound among pregnant

women attending Hayatabad Medical Complex, Peshawar, Pakistan. **Methods:** A descriptive cross-sectional study was conducted over four months at Hayatabad Medical Complex. A convenience sample of 288 pregnant women attending antenatal care and willing to participate was recruited. Data were collected using a structured questionnaire covering demographic characteristics, knowledge of ultrasound applications, and attitudes toward safety, pain, accuracy, comfort, and importance. Data were entered and analyzed using SPSS version 22. Frequencies and percentages were used to summarize responses. **Results:** Of 288 participants, 176 (61.1%) were aged 20–30 years, 193 (67.0%)

were reported as illiterate, and 272 (94.4%) were homemakers. A total of 124 (43.1%) reported previous ultrasonography for a reason other than pregnancy. Most participants recognized that ultrasound could estimate gestational age (264, 91.7%) and assess fetal wellbeing (253, 87.8%). Fewer identified its role in detecting abnormal pregnancy (221, 76.7%), assessing fetal/cord/placental position (199, 69.1%), or estimating the expected date of delivery (178, 61.8%). Regarding attitudes, 201 (69.8%) agreed that ultrasound was safe, 166 (57.6%) disagreed that it caused pain, 214 (74.3%) reported feeling comfortable during examination, and 210 (72.9%) considered ultrasound essential during pregnancy. Responses about accuracy were mixed: 138 (47.9%) agreed that ultrasound findings were more accurate, while 110 (38.2%) disagreed. **Conclusion:** Participants generally recognized several common uses of obstetric ultrasound and reported positive views about its importance and comfort. Nevertheless, knowledge gaps remained regarding its broader diagnostic role, and some participants expressed uncertainty or negative views about safety and accuracy. Clear, culturally appropriate counselling during antenatal care may help women understand the benefits and limitations of ultrasound.

Keywords: obstetric ultrasound; pregnancy; antenatal care; knowledge; attitude; cross-sectional study; Pakistan

1. Introduction

Antenatal care aims to support the health of pregnant women and their babies through timely assessment, prevention, counselling, and management of pregnancy-related risks. Obstetric ultrasonography is an important imaging method in this process [1]. It uses high-frequency sound waves to produce images of the pregnancy and can provide information about pregnancy location, fetal number, fetal cardiac activity, gestational age, fetal growth, and, where appropriate expertise and equipment are available, selected fetal anatomical features and placental location. The information obtained can support clinical decisions and help identify pregnancies that require further assessment or care [2].

The World Health Organization recommends that one ultrasound scan be offered before 24 weeks of gestation to estimate gestational age, improve detection of fetal anomalies and multiple pregnancies, reduce induction of labor for post-term pregnancy, and improve the pregnancy experience [3]. Ultrasound findings should nevertheless be interpreted in the context of gestational age, the quality of the equipment, the skills of the operator, and the clinical question. A normal scan cannot guarantee that all fetal abnormalities or later pregnancy complications will be absent, and some findings require follow-up or additional diagnostic assessment [4].

The value of obstetric ultrasound depends not only on access to imaging but also on women's understanding of why the examination is recommended and what its results can and cannot establish. Misconceptions may contribute to anxiety, unrealistic expectations, or confusion about the need for further testing [5]. Conversely, understandable explanations before and after scanning can support informed participation and help women interpret results appropriately. Attitudes may also be influenced by education, previous experience, communication with healthcare staff, cultural beliefs, service availability, and the way the examination is conducted [6].

Studies from other settings have reported variable levels of knowledge and generally favorable attitudes toward obstetric ultrasound, alongside persistent gaps in understanding its indications, limitations, safety, and recommended timing. In a multicenter study in Ethiopia, Molla and colleagues reported that 35.5% of participants had good knowledge and 69.5% had a positive attitude toward obstetric ultrasound [1]. A study in public hospitals in Addis Ababa reported good knowledge in 51.4% and positive attitudes in 70.1%, while also identifying service-related barriers such as waiting time and concerns about privacy and handling [4].

Research in Saudi Arabia has also examined pregnant women's knowledge and perceptions of antenatal ultrasound, demonstrating continuing interest in patient understanding across different healthcare settings [5]. Local evidence is important because the educational needs and experiences of pregnant women may differ between health systems and communities. The present study assessed knowledge and attitudes regarding obstetric ultrasound among pregnant women attending Hayatabad Medical Complex in Peshawar, Pakistan. By describing what participants understood about ultrasound and how they perceived its safety, accuracy, comfort, and importance, the study aims to identify topics that could be addressed through routine antenatal counselling [6].

2. Materials and Methods

2.1 Study design and setting

A descriptive cross-sectional study was conducted at Hayatabad Medical Complex, Peshawar, Pakistan.

2.2 Study population and eligibility

The study population comprised pregnant women presenting for antenatal care during the study period. During the study, women who were willing to participate and able to communicate during the interview were eligible. Women with severe emergency conditions, pain or discomfort during the interview, unwillingness to participate, or inability to communicate were excluded [7].

2.3 Sample size and sampling technique

The sample size was calculated using the single-proportion formula $n = Z^2p(1-p)/e^2$, with a 95% confidence level ($Z = 1.96$), an assumed proportion of 25%, and a margin of error of 5%. This produced an estimated sample size of approximately 288 participants. Non-probability convenience sampling was used to recruit 288 pregnant women [8].

2.4 Data collection instrument and procedure

Data were collected using a structured questionnaire included in the study. The questionnaire recorded age category, education, occupation, and previous ultrasound exposure for a reason other than pregnancy. Five knowledge items asked whether ultrasound could determine gestational age, confirm fetal wellbeing, identify abnormal pregnancy, determine fetal/cord/placental position, and estimate the expected date of delivery [9]. Five attitude items addressed perceived safety, whether the scan causes pain, perceived accuracy of findings, comfort during examination, and whether ultrasound is essential during pregnancy [10].

2.5 Statistical analysis

Data were analyzed using Statistical Package for the Social Sciences (SPSS), version 22. Descriptive statistics were reported as frequencies and percentages. The study did not report inferential testing or adjusted analyses; therefore, findings are presented descriptively and no causal or associative conclusions are drawn.

2.6 Ethical considerations

Ethical approval for the study was reportedly obtained from the Research Committee of Ahmad Medical Institute, and permission to conduct the study was obtained from Hayatabad Medical Complex, Peshawar, Pakistan. Informed consent was obtained from participants before data collection. Participation was voluntary, and participants were informed about the purpose of the study. Confidentiality of the collected information was maintained, and the data were used for research purposes only. The study was conducted in accordance with the ethical principles applicable to research involving human participants.

3. Results

A total of 288 pregnant women were included in the analysis. Demographic characteristics and previous ultrasound exposure are summarized in Table 1.

Table 1: *Demographic characteristics and previous ultrasound exposure (N = 288)*

Characteristic	Category	N	%
Age	Less than 20 years	33	11.5
	20–30 years	176	61.1
	More than 30 years	79	27.4

Education	Illiterate	193	67.0
	School education	71	24.7
	Graduate	24	8.3
Occupation	Working	16	5.6
	Homemaker	272	94.4
Previous ultrasound for a reason other than pregnancy	Yes	124	43.1
	No	164	56.9

3.2 Knowledge regarding obstetric ultrasound

Recognition of the listed applications of obstetric ultrasound varied across questionnaire items. Estimation of gestational age was the most frequently recognized function (91.7%), followed by assessment of fetal wellbeing (87.8%). Approximately three-quarters recognized a role in identifying abnormal pregnancy (76.7%). Lower proportions identified assessment of fetal, cord, or placental position (69.1%) and estimation of the expected date of delivery (61.8%). These findings are presented in Table 2.

Table 2: *Participants’ responses to knowledge items*

Knowledge item	Yes, n (%)	No, n (%)
Can determine the age of pregnancy / gestational age	264 (91.7)	24 (8.3)
Can confirm fetal wellbeing	253 (87.8)	35 (12.2)
Can help identify abnormal pregnancy	221 (76.7)	67 (23.3)
Can help determine fetal/cord/placental position	199 (69.1)	89 (30.9)
Can estimate the expected date of delivery	178 (61.8)	110 (38.2)

3.3 Attitudes toward obstetric ultrasound

Most participants agreed that ultrasound was safe during pregnancy (69.8%), felt comfortable during the examination (74.3%), and considered it essential during pregnancy (72.9%). For the item asking whether ultrasound causes pain, 57.6% disagreed and 37.5% agreed. Perceptions of accuracy were less consistent: 47.9% agreed that ultrasound findings were more accurate, 38.2% disagreed, and 13.9% were neutral. The attitude responses as reported in the thesis are summarized in Table 3.

Table 3: *Attitude responses reported in the thesis. The original questionnaire appears to use yes/no response options, whereas the results tables report agree/neutral/disagree categories; this discrepancy should be checked against the original questionnaire and dataset before submission.*

Attitude statement	Agree, n (%)	Neutral, n (%)	Disagree, n (%)
Obstetric ultrasound is safe during pregnancy	201 (69.8)	62 (21.5)	25 (8.7)
Ultrasound scan causes pain	108 (37.5)	14 (4.9)	166 (57.6)
Ultrasound findings are more accurate	138 (47.9)	40 (13.9)	110 (38.2)
I feel comfortable during ultrasound examination	214 (74.3)	22 (7.6)	52 (18.1)
Ultrasound is an essential investigation during pregnancy	210 (72.9)	55 (19.1)	23 (8.0)

4. Discussion

This study assessed knowledge and attitudes regarding obstetric ultrasound among 288 pregnant women attending Hayatabad Medical Complex, Peshawar. Participants commonly recognized ultrasound as a method for estimating gestational age and assessing fetal wellbeing. Views were generally favourable regarding comfort and the importance of ultrasound during pregnancy. However, knowledge was less consistent for some additional applications, and responses regarding perceived accuracy were divided. These findings suggest that familiarity with ultrasound does not necessarily mean that women have a complete understanding of its diagnostic role and limitations.

4.1 Knowledge of Ultrasound Applications

More than nine in ten participants recognized the role of ultrasound in estimating gestational age, and nearly nine in ten recognized its role in assessing fetal wellbeing. These findings are clinically relevant because early pregnancy dating and assessment of key fetal features are among the purposes of antenatal ultrasound. WHO recommends one ultrasound before 24 weeks of gestation to estimate gestational age and improve detection of multiple pregnancies and selected fetal anomalies, among other benefits [11].

Recognition was lower for identifying abnormal pregnancy, assessing fetal/cord/placental position, and estimating the expected date of delivery. These responses may reflect differences in how the questionnaire items were understood or the extent to which specific indications had been explained to participants. The data do not establish why a participant answered in a particular way, and the questionnaire did

not appear to measure depth of understanding or distinguish between different types of abnormalities. Nevertheless, the pattern indicates that antenatal counselling could go beyond simply telling women that a scan is needed and explain the specific clinical questions it is intended to address [12].

4.2 Attitudes, safety, comfort, and accuracy

Approximately 70% of participants agreed that ultrasound was safe, while about one-fifth were neutral and a smaller proportion disagreed. These responses indicate that some women may be uncertain about safety. Counselling should explain that diagnostic ultrasound uses sound waves rather than ionizing radiation and should be performed for a medical purpose by appropriately trained personnel, using prudent scanning practices. At the same time, the study's questionnaire response alone cannot establish a participant's detailed safety beliefs or determine whether her understanding was accurate [12].

Most participants reported feeling comfortable during the examination, and nearly three-quarters considered ultrasound essential during pregnancy. These favourable responses offer an opportunity for healthcare professionals to reinforce positive engagement with antenatal care. A respectful explanation of the procedure, privacy, consent, and an opportunity to ask questions may help sustain comfort and trust. However, 18.1% disagreed that they felt comfortable, which indicates that comfort should not be assumed for every patient [13].

Attitudes toward the accuracy of ultrasound findings were mixed. Nearly half agreed that findings were more accurate, while more than one-third disagreed. The item is not sufficiently specific to establish what participants meant by "more accurate," including whether they were comparing ultrasound with clinical examination or referring to fetal diagnosis generally. Ultrasound is useful but not infallible; its performance depends on the clinical indication, gestational age, operator expertise, equipment, fetal position, and the condition being assessed. Clinicians should communicate these limitations and explain when follow-up imaging or other investigations are needed [12].

4.3 Comparison with previous studies

The overall pattern of substantial recognition of ultrasound's role alongside remaining knowledge gaps is consistent with studies from other settings. Molla and colleagues reported good knowledge in 35.5% of participants and a positive attitude in 69.5% in public hospitals in Ethiopia. A separate study of 422 pregnant women in Addis Ababa reported good knowledge in 51.4% and positive attitudes in 70.1%, while also identifying practical barriers to use. These percentages should not be directly equated with the present study's item-level responses because the studies used different

instruments, definitions, sampling procedures, and scoring thresholds. The current thesis did not define a composite “good knowledge” or “positive attitude” score, so such overall classifications cannot be calculated from the available results [14].

Research in Saudi Arabia has also assessed knowledge and perceptions of antenatal ultrasound, supporting the relevance of patient education across different settings. However, the present study should be interpreted primarily as a descriptive account of responses from one hospital rather than as a representative estimate for all pregnant women in Peshawar or Pakistan [13].

4.4 Implications for antenatal care

The results support brief, structured counselling during antenatal visits. Explanations should cover why the scan is recommended, the information it can provide, the limitations of a normal scan, and the circumstances in which further evaluation may be required. Information should be provided in language that matches the patient’s preferred language and level of health literacy, with opportunities for questions. Given that 67.0% of the sample was recorded as illiterate, visual aids and verbal explanations may be especially useful in this study population; however, the study did not test an educational intervention and cannot demonstrate its effectiveness [15].

4.5 Strengths and limitations

A strength of the study is that it documents specific knowledge and attitude responses from a defined clinical setting and includes a sample of 288 participants. The item-level presentation helps identify topics for counselling. Several limitations should be acknowledged. First, convenience sampling at a single hospital limits generalizability and may introduce selection bias. Second, the cross-sectional design describes responses at one time and cannot establish causal relationships. Third, the questionnaire’s development, translation, pretesting, and psychometric properties were not clearly documented in the thesis text reviewed. Fourth, the attitude questionnaire apparently contains yes/no options, while the results are presented as agree/neutral/disagree; this inconsistency needs resolution using the original forms and dataset. Fifth, only descriptive statistics were reported, and no confidence intervals or associations with demographic characteristics were presented [14].

4.6 Recommendations for future research

Future studies could recruit participants from multiple public and private facilities, use a validated questionnaire, and report a prespecified scoring method for knowledge and attitude. Analyses could examine whether education, age, parity, previous ultrasound experience, or other variables are associated with responses, provided these variables are collected and the sample size is adequate. An intervention study could evaluate

whether brief, culturally appropriate antenatal counselling improves understanding of the purpose, limitations, and recommended timing of obstetric ultrasound.

5. Conclusion

Among 288 pregnant women attending Hayatabad Medical Complex, recognition of ultrasound's role in estimating gestational age and assessing fetal wellbeing was high, and most participants reported comfort with the examination and considered ultrasound important during pregnancy. Knowledge was less consistent regarding other applications, and views on the accuracy of ultrasound findings were mixed. Antenatal services should provide clear, accessible explanations of the purpose and limitations of ultrasound and invite questions from patients. Because the study was conducted at one hospital using convenience sampling and descriptive analysis, the findings should not be generalized beyond similar settings without further evidence.

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