

Research Article

Knowledge and Expectations of Pregnant Women Regarding Antenatal Ultrasound in Indian Population: A Cross-Sectional Study at a Tertiary Care Center

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ABSTRACT

Background: Antenatal ultrasound is a vital component of modern prenatal care, assisting in fetal growth assessment, anomaly detection, and maternal reassurance. However, awareness and expectations vary considerably across Indian populations.

Objectives: To assess the knowledge, attitudes, and expectations of pregnant women regarding antenatal ultrasound and identify sociodemographic factors influencing awareness.

Methods: A cross-sectional study was conducted at Base Hospital, Delhi Cantonment, over 12 months among 750 pregnant women undergoing routine ultrasound. A pre-validated questionnaire assessed demographics, knowledge, expectations, and information sources. Statistical analysis was performed using chi-square tests, with $p < 0.05$ considered significant.

Results: Of 750 participants, 62% had adequate knowledge of ultrasound purpose, 78% recognized its role in anomaly detection, and 54% knew appropriate scan timing. However, 85% expected fetal sex disclosure despite legal restrictions. Knowledge correlated significantly with education, parity, and residence ($p < 0.05$). Healthcare professionals were the primary information source (46%).

Conclusion: Most participants demonstrated moderate awareness but persistent misconceptions. Strengthening antenatal counseling and community-based education programs can ensure informed and ethical use of obstetric ultrasound.

Keywords: Antenatal Ultrasound, Pregnancy, Knowledge, Expectations, India, Prenatal Care.

INTRODUCTION

Antenatal ultrasound has become an indispensable tool in modern obstetric care, enabling the evaluation of fetal growth, detection of congenital anomalies, and monitoring of maternal-fetal well-being (1,2). Its benefits extend beyond medical indications, often providing psychological reassurance to expectant mothers (3). However, awareness and perceptions regarding its use differ widely across populations, shaped by educational level, cultural beliefs, and socioeconomic factors (5–6).

In India, the Pre-Conception and Pre-Natal Diagnostic Techniques (PCPNDT) Act prohibits fetal sex disclosure to prevent female feticide, yet societal curiosity continues to fuel expectations for such information (9). Studies have highlighted that while many women understand the diagnostic purpose of ultrasound, misconceptions about safety, necessity, and frequency of scans persist (8). Previous studies from North India, Bangladesh, and other developing countries

have emphasized the influence of education, parity, and urban residence on women's knowledge and expectations (7). However, there remains a lack of consistent data from tertiary centers in metropolitan regions. This study aims to evaluate the knowledge and expectations of pregnant women regarding antenatal ultrasound in a tertiary care setting in Delhi and to identify demographic factors associated with awareness.

MATERIALS AND METHODS

This cross-sectional descriptive study was carried out in the Department of Radiology, Base Hospital, Delhi Cantonment, over a period of 12 months (October 2024 – October 2025). The hospital functions as a tertiary care referral center serving both urban and semi-urban populations of Delhi and neighboring regions. The study was designed to assess the level of knowledge, expectations, and perceptions regarding antenatal

ultrasonography among pregnant women attending routine obstetric scans.

Sample Size and Sampling Technique

A total of 750 pregnant women were included using a consecutive sampling method, enrolling every eligible woman reporting for routine antenatal ultrasound during the study period until the desired sample size was achieved. The sample size was estimated assuming a 50 % expected awareness rate, 5 % absolute precision, and 95 % confidence level, yielding an adequate representative cohort of the local population.

Inclusion and Exclusion Criteria

All pregnant women of any gestational age who provided informed consent were included. Exclusion criteria were:

1. Presence of psychiatric illness or cognitive impairment that could interfere with questionnaire comprehension.
2. Communication barriers such as language difficulty.
3. Emergency obstetric conditions requiring immediate intervention.

Data Collection Instrument

Data were collected using a semi-structured, pre-validated questionnaire, adapted from prior studies on obstetric ultrasound awareness (3,6,8,9). The questionnaire was initially developed in English and translated

into Hindi for better comprehension. It consisted of four sections:

1. Demographic data: age, education, residence, parity, and socioeconomic background.
2. Knowledge domain: purpose of ultrasound, timing, safety, and legal aspects.
3. Expectations: anticipated information such as fetal health, anomaly detection, or sex determination.
4. Sources of information: healthcare professionals, family/friends, or media.

A pilot study involving 30 participants was conducted to assess clarity, cultural appropriateness, and internal consistency. The reliability coefficient (Cronbach's $\alpha = 0.82$) indicated good internal reliability.

Statistical Analysis

Data were entered and analyzed using IBM SPSS Statistics for Windows, Version 25.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics such as mean, standard deviation, frequency, and percentages were calculated. Associations between categorical variables (education, residence, and parity) and knowledge levels were examined using the Chi-square test. A p -value < 0.05 was considered statistically significant. Results were summarized in tabular form for clarity and comparison with earlier literature.

RESULTS

Table 1 The Demographic Profile of the Participants.

Variable	Category	Percentage (%)
Age (years)(Mean $\pm$ SD)		26.8 $\pm$ 4.2
Residence	Urban	68
	Rural	32
Education	Graduate	34
	Secondary school	29
	Primary or none	37
Parity	Primigravida	42
	Multigravida	58

Table 2 Participants' Knowledge And Expectations Regarding Ultrasound.

Parameter	Percentage (%)
Adequate knowledge of ultrasound purpose	62
Belief ultrasound detects anomalies	78
Awareness of recommended scan schedule	54
Belief ultrasound is harmful if repeated	30
Expectation of fetal sex disclosure	85
Expectation to know fetal health	71
Expectation to see baby's face	56
Reassurance for self	49

Table 3 Sources of Information

Source of Information	Percentage (%)
Healthcare workers	46

Family/friends	30
Internet/TV	24

Table 4 Factors Significantly Associated With Better Knowledge Levels.

Factor	Association	p-value
Education level	Higher education linked with better knowledge	<0.01
Residence	Urban women more knowledgeable	0.03
Parity	Primigravida more aware	0.04

DISCUSSION

The present study revealed moderate knowledge among pregnant women regarding the role and purpose of antenatal ultrasound, consistent with findings from North Indian and South Asian populations (7,9). Education level and urban residence were significantly associated with better understanding, reaffirming that literacy and exposure to health facilities play a pivotal role in awareness (13).

A considerable proportion of participants (85%) expected fetal sex disclosure, reflecting the ongoing cultural preference for gender information despite stringent enforcement of the PCPNDT Act (4,14). Similar observations have been reported in Bangladesh and Nigeria, where societal norms continue to influence expectations from prenatal imaging (10).

Misconceptions about scan safety—such as fear of radiation or fetal harm—were noted in 30% of participants, aligning with previous studies emphasizing the need for structured antenatal counseling (3,6,12). The predominance of healthcare providers as the

main information source (46%) underscores their key role in disseminating accurate information and ethical guidance (1,2).

Improving community-based health education, integrating ultrasound awareness into antenatal classes, and training healthcare workers in culturally sensitive counseling may help address misinformation and enhance informed decision-making (8). Moreover, fostering public trust through government campaigns and the inclusion of ultrasound literacy in maternal health programs can ensure ethical and beneficial utilization of prenatal imaging across India.

CONCLUSION

Pregnant women demonstrated moderate awareness of antenatal ultrasound but persistent misconceptions regarding its safety and ethical use. Targeted educational interventions, counseling, and policy-driven awareness campaigns are essential to promote informed participation and responsible utilization of this crucial diagnostic tool in maternal healthcare.

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