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A Descriptive Study to Assess Knowledge of Antenatal Care Among Pregnant Women

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Abstract: ***Introduction: Antenatal care (ANC) is essential for ensuring maternal and fetal well - being. Timely diagnostic screening and awareness of antenatal tests play a crucial role in reducing maternal and neonatal morbidity. However, knowledge regarding these tests remains suboptimal in many low - resource settings. Aim & Objective: This study aimed to assess the knowledge levels of pregnant women regarding antenatal laboratory tests and to identify sociodemographic factors influencing their awareness. Methodology: A cross - sectional descriptive study was conducted among 350 pregnant women attending urban primary healthcare centers. Participants in their second or third trimester were enrolled using convenience sampling. Data were collected using a structured, validated questionnaire covering demographic details and a 25 - item knowledge assessment. Statistical analysis included chi - square tests and logistic regression using SPSS version 25. Results: Only 14.9% of women demonstrated good knowledge, while 32.0% had poor knowledge. Awareness was highest for hemoglobin testing (81.7%) and lowest for the oral glucose tolerance test (18.3%). Graduate education (AOR=4.8), ≥4 ANC visits (AOR=3.2), upper socioeconomic status (AOR=5.1), and urban residence (AOR=2.4) were significantly associated with better knowledge (p<0.05). Conclusion: Educational status, frequency of ANC visits, socioeconomic position, and urban residence are key determinants of maternal knowledge about antenatal testing. Targeted interventions are needed to improve awareness among disadvantaged groups.***

Keywords: Antenatal care, pregnancy, maternal health, laboratory tests, knowledge assessment, hemoglobin test, HIV screening, glucose tolerance test, socioeconomic status, ANC visits, urban residence, health education, logistic regression, maternal awareness.

1. Introduction

Pregnancy and childbirth represent significant milestones not only in a woman's life but also for her family members and the broader community. [1] It is a critical phase that requires dedicated care starting from conception through the postnatal period. Pregnancy is a natural physiological condition, yet it involves numerous physical and emotional changes that require medical attention and support. [2] Although pregnancy is a normal biological process, it is not free from complications and risks.

Antenatal care (ANC) refers to the structured and ongoing evaluation of pregnant women, including health education, counseling, diagnostic screening, and treatment. Its primary goal is to ensure the best possible outcomes for both the mother and fetus. [3] A woman's decision to utilize antenatal services and adopt family planning practices is shaped by her personal perceptions, emotional responses, motivations, and cognitive understanding of health needs.

An individual's attitudes significantly influence behavior regardless of knowledge level and often determine the choices made in health practices. In the context of pregnancy, these behaviors include recognizing danger signs, planning for hospital visits, and making informed decisions about family planning, both during previous and current pregnancies. [4] According to the World Health Organization (WHO), ANC is an essential public health strategy designed to promote favorable pregnancy outcomes and reduce maternal and neonatal mortality and morbidity.

Milestones like pregnancy, labor, and childbirth are pivotal in a couple's life journey. The Millennium Development Goal (MDG) 5 - A specifically aimed to enhance maternal health by targeting a 75% reduction in the maternal mortality ratio (MMR) from 1990 to 2015. In India, there has been a positive trend, with MMR reducing to 178 in 2012. [5] Regular antenatal visits and access to prenatal diagnostic services have contributed significantly to lowering maternal deaths, birth complications, low birth weight, congenital abnormalities, and neonatal infections.[6]

According to WHO, around 300 million women in low - resource countries endure temporary or long - term health complications related to pregnancy and childbirth. In India, the maternal mortality ratio during 2011–2013 stood at 167 per 100, 000 live births, against the MDG goal of 109 per 100, 000 by 2015. Additionally, challenges such as high infant mortality (50 per 1, 000 births), neonatal mortality (29 per 1, 000 live births), and the limited proportion of deliveries attended by skilled personnel (45% as per NFHS - 3) continue to affect maternal and child health outcomes. [7]

2. Aims and Objectives

The study aims to:

- Assess the level of knowledge regarding antenatal laboratory tests among pregnant women.
- Identify sociodemographic factors (e. g., education, parity, access to ANC) associated with knowledge levels.

3. Methodology

A cross - sectional descriptive design was adopted to assess the knowledge of pregnant women regarding antenatal laboratory tests. The study was conducted in Government sub - district hospital Kotdwar, uttarakhand, selected purposively

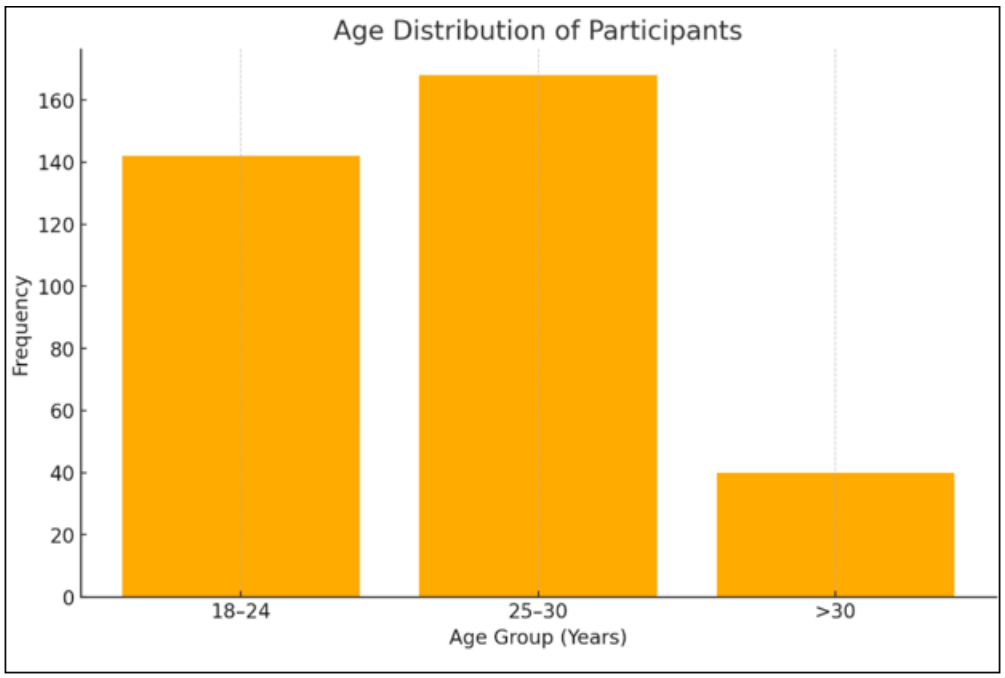
to represent diverse socioeconomic backgrounds. Data were collected over six months from october 2024 to march 2025 among 350 pregnant women in their second or third trimester, attending routine antenatal check - ups. Participants were recruited via convenience sampling, with inclusion criteria comprising women aged 18 years or older, gestational age confirmed by medical records, and willingness to provide informed consent. Exclusion criteria included women with cognitive impairments or critical pregnancy complications that hindered participation. A structured questionnaire, developed based on WHO (2016) antenatal care guidelines and validated through expert review, was utilized to collect data. The tool comprised two sections: sociodemographic variables (age, education, parity, occupation, and ANC attendance) and a 25 - item knowledge assessment evaluating understanding of test types, purposes, timing, and interpretation. Content validity was ensured through revisions by maternal health experts, and internal consistency was confirmed via a pilot study (Cronbach's $\alpha = 0.82$) involving 30 pregnant women from a non - participating facility. Trained female interviewers administered the questionnaire in participants' preferred language to minimize bias, and responses were anonymized to ensure confidentiality. Data analysis was performed using SPSS version 25, with descriptive statistics (frequencies, percentages, means) summarizing knowledge levels and inferential statistics (chi - square, logistic regression) identifying associations between sociodemographic factors and knowledge scores. Ethical clearance was obtained from Government sub - district hospital Kotdwar, uttarakhand, and principles of voluntary participation, informed consent, and confidentiality were strictly upheld throughout the study.

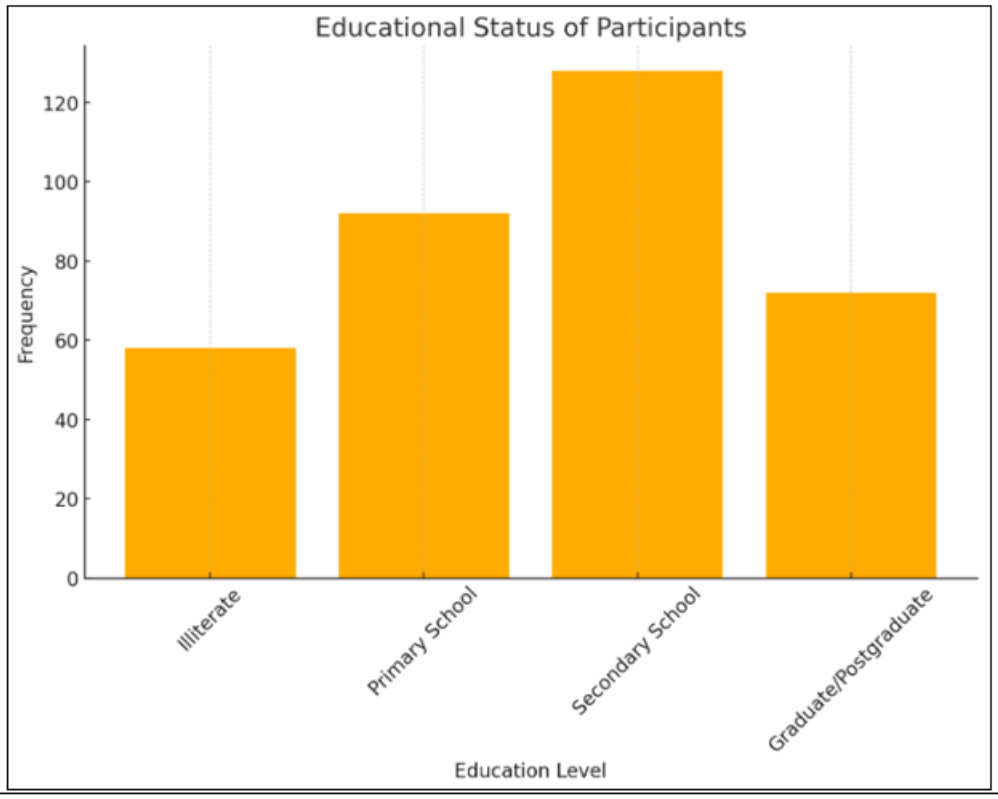
4. Result

Table 1: Sociodemographic Profile of Participants (N=350)

Characteristic	Frequency (%)	Mean ± SD
Age (years)		26.4 ± 4.2
- 18–24	142 (40.6%)	
- 25–30	168 (48.0%)	
- >30	40 (11.4%)	
Education		
- Illiterate	58 (16.6%)	
- Primary School	92 (26.3%)	
- Secondary School	128 (36.6%)	
- Graduate/Postgraduate	72 (20.6%)	
Socioeconomic Status (Kuppuswamy Scale)		
- Upper Class (I)	28 (8.0%)	
- Upper Middle (II)	64 (18.3%)	
- Lower Middle (III)	122 (34.9%)	
- Upper Lower (IV)	104 (29.7%)	
- Lower (V)	32 (9.1%)	

The above table illustrates that out of total study participants, the mean age was 26.4 ± 4.2 years. The majority of participants were aged between 25–30 years (168; 48.0%), followed by 18–24 years (142; 40.6%), and more than 30 years (40; 11.4%). Regarding educational status, 58 (16.6%) were illiterate, 92 (26.3%) had completed primary school, 128 (36.6%) had secondary school education, and 72 (20.6%) were graduates or postgraduates. As per the Kuppuswamy socioeconomic classification, 28 (8.0%) belonged to the upper class (I), 64 (18.3%) to the upper middle class (II), 122 (34.9%) to the lower middle class (III), 104 (29.7%) to the upper lower class (IV), and 32 (9.1%) to the lower class (V).





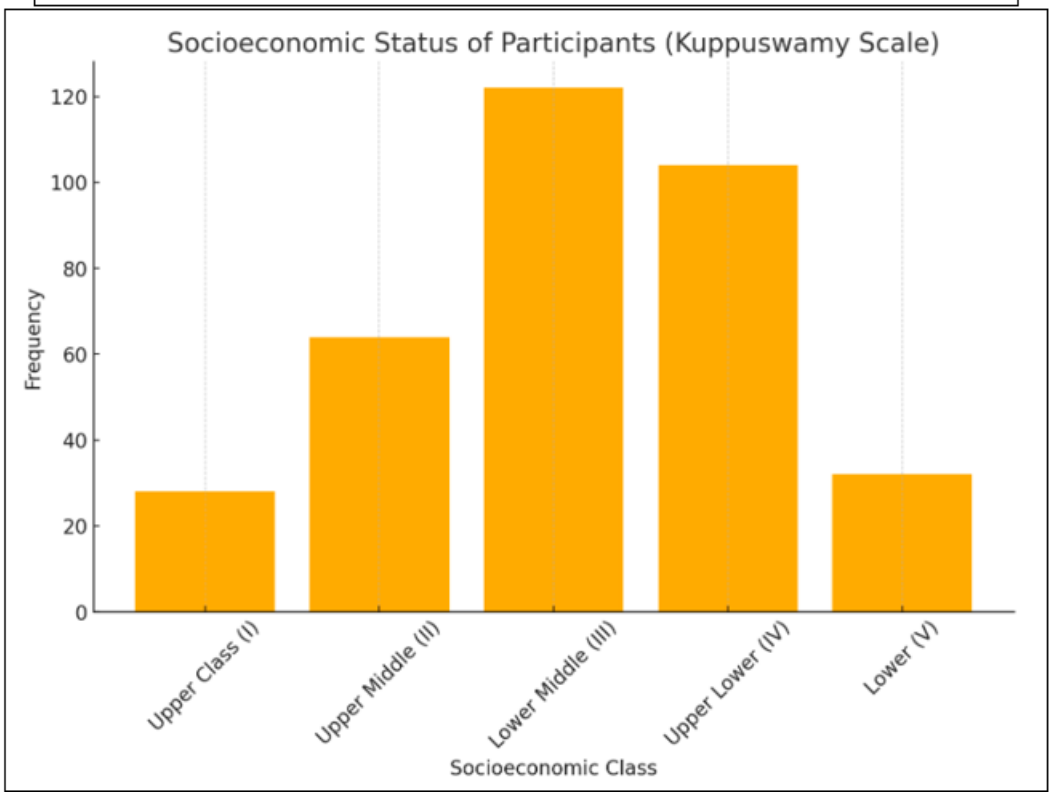


Table 2: Knowledge Levels About Antenatal Tests

Knowledge Category	Poor (<10/25)	Average (10–18/25)	Good (>18/25)	p - value
Overall Knowledge	112 (32.0%)	186 (53.1%)	52 (14.9%)	<0.001*
By Education				
- Illiterate	48 (82.8%)	10 (17.2%)	0 (0.0%)	<0.001*
- Graduate/Postgraduate	4 (5.6%)	38 (52.8%)	30 (41.7%)	
By Socioeconomic Status				
- Upper Class (I)	2 (7.1%)	10 (35.7%)	16 (57.1%)	<0.001*
- Lower (V)	28 (87.5%)	4 (12.5%)	0 (0.0%)	

The above table illustrates that out of total study participants, 112 (32.0%) had poor overall knowledge, 186 (53.1%) had average knowledge, and 52 (14.9%) demonstrated good knowledge, with a statistically significant p - value of <0.001. Among illiterate participants, 48 (82.8%) had poor knowledge, 10 (17.2%) had average knowledge, and none had good knowledge. Among those who were graduate or postgraduate, 4 (5.6%) had poor knowledge, 38 (52.8%) had average knowledge, and 30 (41.7%) had good knowledge. Regarding socioeconomic status, in the upper class (I), 2 (7.1%) had poor knowledge, 10 (35.7%) had average knowledge, and 16 (57.1%) had good knowledge. In the lower class (V), 28 (87.5%) had poor knowledge, 4 (12.5%) had average knowledge, and none had good knowledge, with the association being statistically significant (p<0.001).

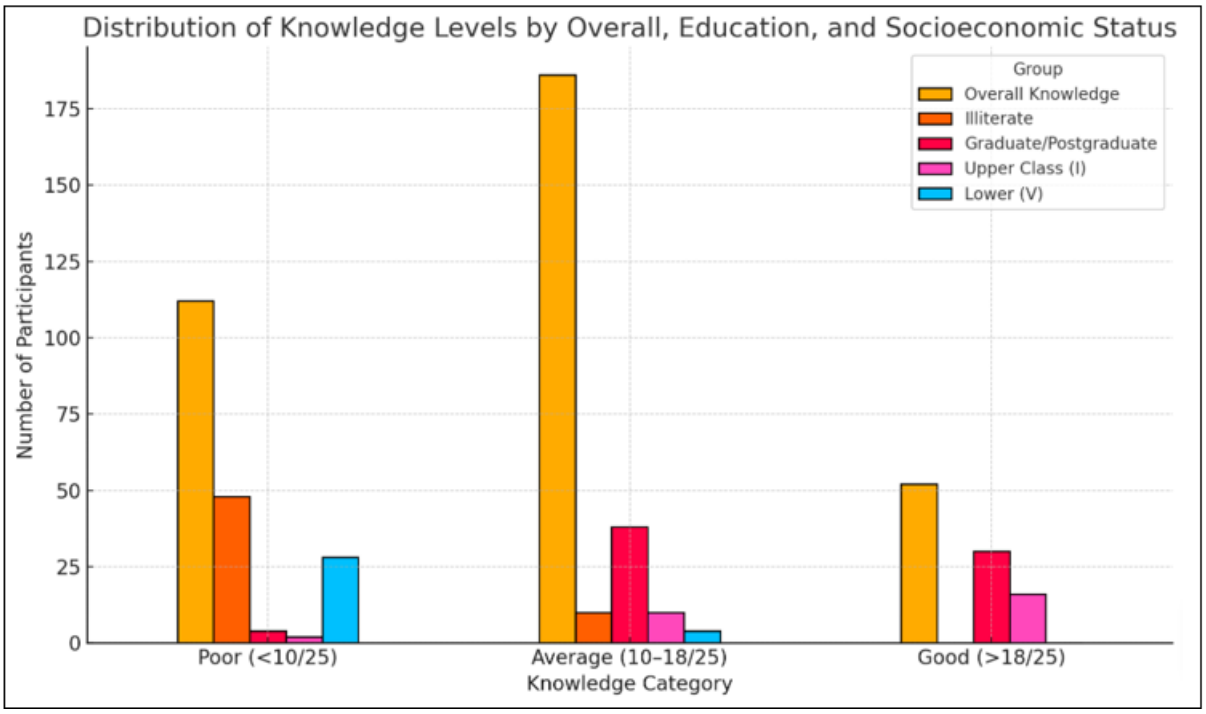


Table 3: Association Between ANC Visits and Knowledge Scores

ANC Visits	Mean Knowledge Score (Mean ± SD)	p - value
1–3 visits	9.2 ± 3.8	0.003*
4–6 visits	14.1 ± 4.2	
≥7 visits	18.6 ± 3.5	

The above table illustrates that out of total study participants, those who had 1–3 antenatal care visits had a mean knowledge score of 9.2 ± 3.8, those with 4–6 visits had a mean score of 14.1 ± 4.2, and participants with ≥7 visits had the highest mean knowledge score of 18.6 ± 3.5. The p - value was 0.003*, indicating a statistically significant difference.

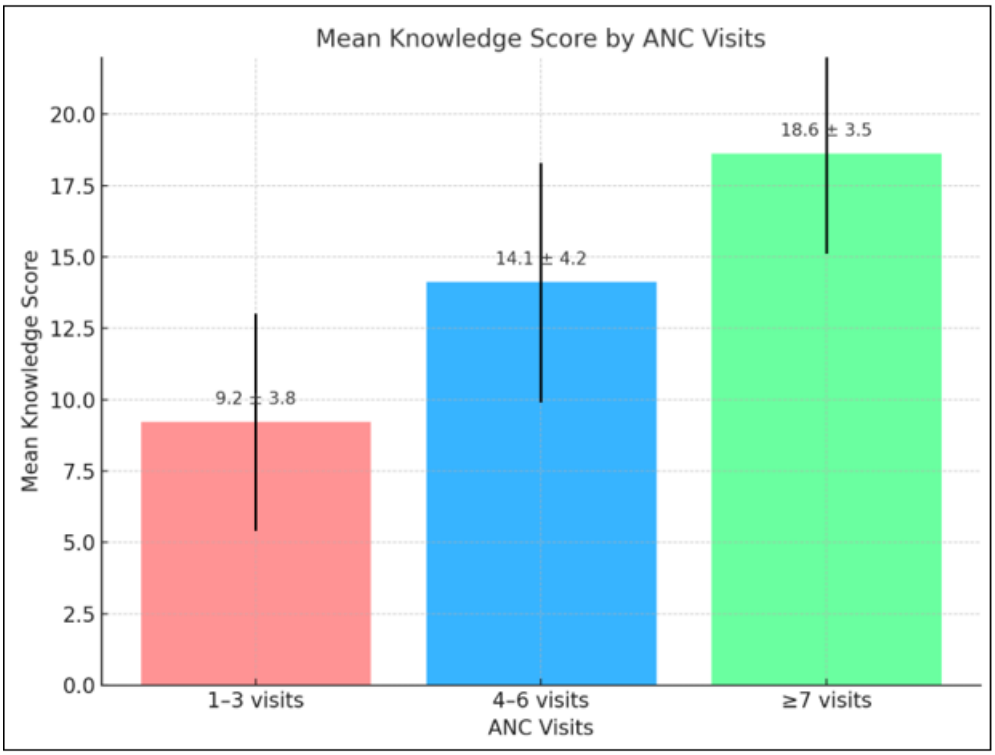


Table 4: Awareness of Specific Antenatal Tests

Test	Aware of Purpose (%)	Correct Timing (%)	p – value
Hemoglobin (Hb)	286 (81.7%)	248 (70.9%)	0.012*
HIV Screening	204 (58.3%)	162 (46.3%)	<0.001*
Blood Group & Rh	178 (50.9%)	132 (37.7%)	0.021*
Oral Glucose Tolerance	64 (18.3%)	38 (10.9%)	0.045*

The above table illustrates that out of total study participants, 286 (81.7%) were aware of the purpose of the Hemoglobin (Hb) test and 248 (70.9%) knew the correct timing, with a p - value of 0.012. For HIV screening, 204 (58.3%) were aware of its purpose and 162 (46.3%) knew the correct timing, with a p - value of <0.001. In the case of the Blood Group & Rh test, 178 (50.9%) participants were aware of its purpose while 132 (37.7%) were aware of the correct timing, with a p - value of 0.021. Regarding the Oral Glucose Tolerance test, 64 (18.3%) were aware of its purpose and 38 (10.9%) were aware of the correct timing, with a p - value of 0.045.

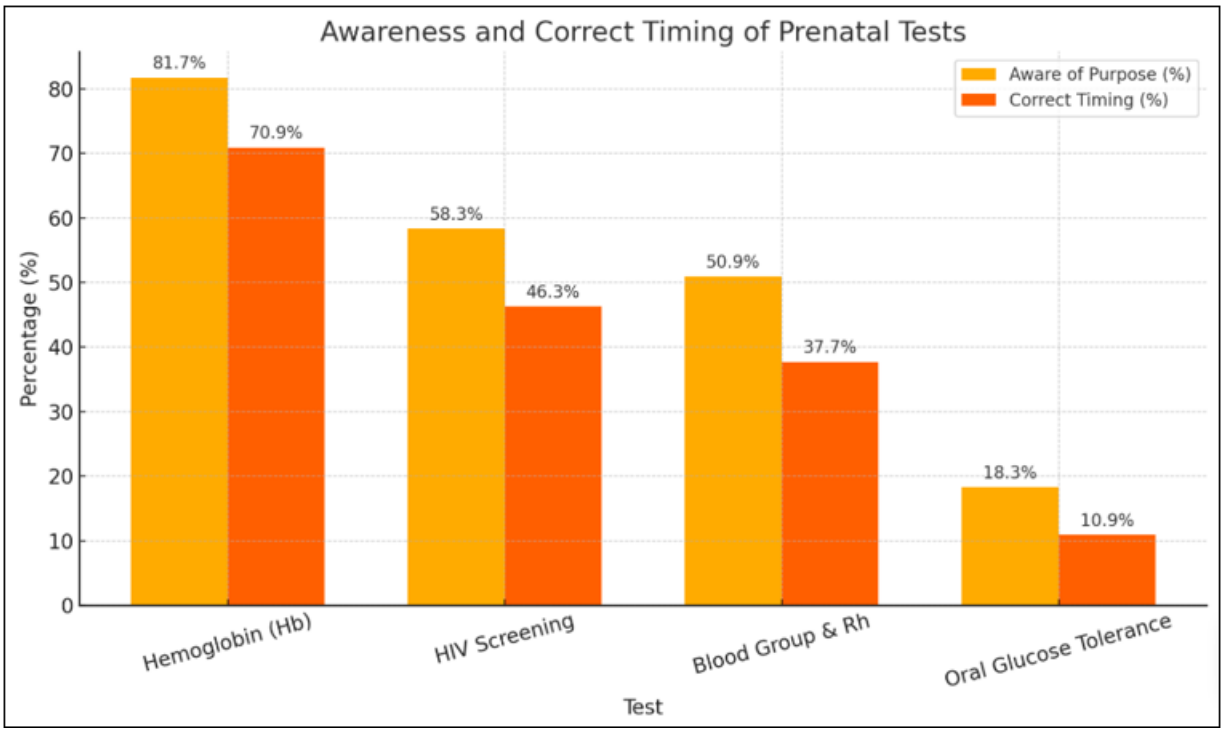


Table 5: Logistic Regression for Factors Associated with Good Knowledge

Variable	Adjusted OR (95% CI)	p - value
Graduate Education	4.8 (2.1–10.9)	<0.001*
≥4 ANC Visits	3.2 (1.6–6.4)	0.001*
Upper SES (Kuppuswamy I/II)	5.1 (2.3–11.2)	<0.001*
Urban Residence	2.4 (1.1–5.3)	0.028*

The above table illustrates that out of total study participants, those with graduate education had an adjusted odds ratio of 4.8 (95% CI: 2.1–10.9) with a p - value of <0.001. Participants who had ≥4 ANC visits showed an adjusted odds ratio of 3.2 (95% CI: 1.6–6.4) with a p - value of 0.001. Those belonging to the upper socioeconomic status (Kuppuswamy Class I/II) had an adjusted odds ratio of 5.1 (95% CI: 2.3–11.2) with a p - value of <0.001. Urban residence was associated with an adjusted odds ratio of 2.4 (95% CI: 1.1–5.3) with a p - value of 0.028.

5. Discussion

In our study, the average age of participants was 26.4 ± 4.2 years, with the highest proportion (48.0%) in the 25–30 age group, followed by 40.6% aged 18–24 years. Only 11.4% were above 30 years. In terms of education, 36.6% had completed secondary school, while 26.3% had primary education. A smaller proportion (20.6%) were graduates or postgraduates, and 16.6% were illiterate. Socioeconomic status, assessed using the Kuppuswamy scale, showed that 34.9% belonged to the lower middle class, 29.7% to the upper lower class, and only 8.0% were from the upper class. These findings highlight the demographic diversity of the participants. Bashir S et al., [8] concluded that the mean age of the 400 pregnant women was 25 years (±4.52), with the majority (72.25%) aged between 21–30 years, followed by 15.75% under 20 years and 12% in the 31–40 age group. Educational status showed that 30% had completed high school, 20.5% studied up to middle school, and 9.75% were graduates or postgraduates. A smaller proportion (0.75%) had professional education, while 9.25% were illiterate. Socioeconomic distribution revealed that nearly half of the participants (49.25%) belonged to the upper lower class, followed by 35% in the lower middle class, and only 2% in the upper class.

In the present study, knowledge regarding antenatal tests varied significantly among participants. Out of 350 participants, 32.0% had poor knowledge (scores <10), 53.1% had average knowledge (scores between 10–18), and only 14.9% demonstrated good knowledge (scores >18), with the association being statistically significant ($p < 0.001$). Education level showed a clear influence—among illiterate women, 82.8% had poor knowledge, while none had good knowledge. In contrast, among graduates or postgraduates, 41.7% had good knowledge, and only 5.6% had poor knowledge, suggesting that higher education substantially improves awareness of antenatal care. Socioeconomic status was another important factor; 57.1% of women in the upper class had good knowledge compared to none in the lower class, where 87.5% had poor knowledge. These findings highlight the role of both education and economic status in shaping health literacy. Furthermore, the frequency of antenatal care (ANC) visits was positively associated with knowledge scores. Women who had only 1–3 ANC visits had a mean score of 9.2 ± 3.8, while those with ≥7 visits had a much higher mean score of 18.6 ± 3.5 ($p = 0.003$). This indicates that increased contact with healthcare services enhances understanding and awareness of essential antenatal tests. We did not find any relevant studies which relates to Knowledge Levels About Antenatal Tests and Association Between ANC Visits and Knowledge Scores.

The findings of this study reveal important gaps in awareness regarding essential antenatal tests among pregnant women. Hemoglobin (Hb) testing was the most commonly recognized, with 81.7% of participants aware of its purpose and 70.9% knowing the correct timing. In contrast, awareness dropped notably for other tests. HIV screening was understood by 58.3% of participants, but only 46.3% knew when it should be done. Awareness of Blood Group and Rh factor testing was reported by 50.9%, and just 37.7% were aware of its appropriate timing. Alarmingly, the Oral Glucose Tolerance Test had the lowest levels of knowledge—only 18.3% knew its purpose, and just 10.9% identified its timing correctly. All associations were statistically significant, with p - values ranging from <0.001 to 0.045, indicating a real disparity in test - specific knowledge. Further analysis using logistic regression identified significant predictors of good knowledge. Graduate - level education had the strongest association, with an adjusted odds ratio (AOR) of 4.8. Upper socioeconomic status (AOR: 5.1), having four or more antenatal visits (AOR: 3.2), and urban residence (AOR: 2.4) also significantly increased the likelihood of better knowledge. These findings emphasize the importance of education, frequent ANC visits, and socioeconomic status in enhancing maternal awareness of essential antenatal care practices. We did not find any relevant studies which relates to Awareness of Specific Antenatal Tests and Logistic Regression for Factors Associated with Good Knowledge.

6. Conclusion

The study findings show that the majority of participants were aged between 25–30 years, with a mean age of 26.4 ± 4.2 years. Most had secondary education (36.6%), while 20.6% were graduates or postgraduates. Socioeconomically, a large portion belonged to the lower middle (34.9%) and upper lower (29.7%) classes. Regarding knowledge levels about antenatal tests, 32.0% had poor knowledge, 53.1% had average knowledge, and only 14.9% had good knowledge. Among illiterate participants, 82.8% had poor knowledge and none had good knowledge, while 41.7% of those with graduate or postgraduate education had good knowledge. In terms of socioeconomic status, 57.1% of participants from the upper class had good knowledge, compared to 87.5% of those from the lower class who had poor knowledge. Mean knowledge scores increased with ANC visits: 9.2 for 1–3 visits, 14.1 for 4–6 visits, and 18.6 for ≥7 visits ($p = 0.003$). Awareness was highest for hemoglobin testing (81.7%), followed by HIV screening (58.3%), Blood Group & Rh (50.9%), and Oral Glucose Tolerance (18.3%). Logistic regression revealed that graduate education (AOR = 4.8), ≥4 ANC visits (AOR = 3.2), upper socioeconomic status (AOR = 5.1), and urban residence (AOR = 2.4) were significantly associated with good knowledge.

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