Knowledge of Antenatal Mothers Regarding Warning Signs of Pregnancy in a Tertiary Hospital in Delhi NCR: A Descriptive Study

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ABSTRACT

Background: Maternal mortality remains a critical global health concern, with WHO (2023) reporting approximately 287,000 maternal deaths annually. Recognition of obstetric warning signs such as severe vaginal bleeding, convulsions, severe headache, blurred vision, and reduced fetal movements is essential to reduce delays in seeking care. Despite programs like RMNCH+A and LaQshya, awareness in India remains suboptimal. **Objectives:** (1) To assess knowledge of antenatal mothers regarding warning signs of pregnancy; (2) To examine associations between knowledge and demographic factors.

Methods: A descriptive cross-sectional study was conducted among 120 antenatal mothers attending the antenatal OPD of a tertiary hospital in Delhi NCR. Purposive sampling was used. Data was collected via a structured interview schedule (25 knowledge items). Analysis included descriptive statistics and chi-square tests (SPSS 26.0). Ethical clearance and informed consent were obtained.

Results: Among 120 mothers, 20% demonstrated good knowledge, 61.7% average, and 18.3% poor. Recognition was high for abdominal pain and vaginal bleeding, but low for convulsions (24%) and blurred vision (29%). Education level was significantly associated with knowledge (χ^2=14.28, p=0.004).

Conclusion: Antenatal mothers showed average awareness overall, with gaps in

neurological and hypertensive danger signs. Structured health education during ANC visits and community IEC strategies are recommended.

Keywords: Knowledge, Antenatal mothers, Warning signs of pregnancy

INTRODUCTION

Maternal health is a cornerstone of global health and development. Despite progress, maternal mortality remains unacceptably high, with the Sustainable Development Goals (SDG 3.1) aiming to reduce the global maternal mortality ratio (MMR) to fewer than 70 per 100,000 live births by 2030. In India, the MMR has declined but continues to reflect inequities across regions and populations (Sample Registration System, 2023). Recognition of obstetric danger signs plays a pivotal role in reducing delays in care-seeking and ultimately improving maternal outcomes.

Warning signs include severe vaginal bleeding, convulsions, severe headache, blurred vision, and reduced fetal movement. Evidence suggests that while mothers often recognize bleeding and abdominal pain, they under-recognize neurological and hypertensive signs (Singh et al., 2021; Shrestha et al., 2020). This leads to preventable delays in seeking care. Programs like Janani Suraksha Yojana, LaQshya, and PMSMA have been initiated to address these issues, but knowledge gaps persist.

The present study was undertaken to assess knowledge of antenatal mothers regarding warning signs of pregnancy in a tertiary hospital in Delhi NCR and to examine associations with demographic factors. This research contributes to evidence-based strategies to strengthen maternal health education in India.

REVIEW OF LITERATURE

Section A: Global Burden and Conceptual Framework

Maternal mortality remains a global public health challenge. The World Health Organization (WHO, 2016; 2020; 2023) reports nearly 287,000 maternal deaths annually, most of which are preventable if danger signs are recognized early and timely care is sought. Obstetric warning signs such as severe vaginal bleeding, convulsions, severe headache with blurred vision, and reduced fetal movement are widely recognized as indicators of potential complications.

The Three-Delays model (Thaddeus & Maine, 1994) highlights delays in (i) deciding to seek care, (ii) reaching a health facility, and (iii) receiving adequate care. Among these, Delay-1 is strongly influenced by knowledge of danger signs. Mothers and families who fail to recognize convulsions or reduced fetal movement may delay seeking care, leading to adverse outcomes.

Globally, studies confirm this pattern. Kabakyenga et al. (2011) in Uganda surveyed 765 recently delivered mothers and found that only 52% identified three or more danger signs, with education as a strong predictor. Hailu et al. (2011) in Ethiopia (812 women) reported that vaginal bleeding was the most recognized sign (54%), while convulsions were recognized by only 6%. Bitew et al. (2016) studied 450 Ethiopian women and confirmed that while ANC counseling improved knowledge, item-level gaps persisted, particularly for neurological symptoms.

A systematic review by Yunitasari et al. (2023) covering 35 LMIC studies revealed consistently low awareness of neurological danger signs and reduced fetal movement. Elhage et al. (2024) further noted that while fatigue (41.5%) and severe headache (23.3%) were reported as danger signs, sudden gush of fluid was mentioned by only 10.6% of women. Nyirenda et al. (2025) in Zambia (562 women) found that only 35% had adequate knowledge; prior stillbirth, prior institutional delivery, and shorter travel times were positively associated with awareness.

Together, these findings demonstrate that knowledge of obstetric danger signs remains suboptimal worldwide, particularly for hypertensive/neurological symptoms and reduced fetal movement.

Section B: Regional and Indian Evidence on Knowledge regarding warning signs of pregnancy

In South Asia, similar patterns are evident. Islam et al. (2018) in Bangladesh (1,200 women) found that 68% recognized vaginal bleeding, but only 12% identified reduced fetal movement. Shrestha et al. (2020) in Nepal (600 women) reported that despite 80% ANC coverage, less than 20% knew about eclampsia-related signs. Koovimon et al. (2023) in Thailand (415 women) showed that only a moderate percentage achieved “good knowledge” (>75% score), and higher education and ANC visits predicted better awareness.

In India, national and state data highlight persistent gaps. NFHS-5 (IIPS & ICF, 2021) reported that although 71% of mothers attended at least four ANC visits, many could not recall counseling on danger signs. Facility-based studies confirm this:

- Karkada et al. (2018) in Karnataka (300 women) found 60% had “average” knowledge, with <15% showing “good” knowledge.

- Sharma et al. (2019) in Rajasthan (250 women) reported that while bleeding was well recognized, only 18% identified convulsions and 21% blurred vision.
- Singh et al. (2021) in Uttar Pradesh (400 women) found only 22% recognized severe headache as a danger sign, and just 28% sought care for blurred vision.
- Jungari & Chauhan (2020), using NFHS-4 data, observed that only 14–18% of women recognized neurological warning signs.
- Kumar et al. (2022) in India (220 women) showed that 53% had adequate knowledge, with abdominal pain (81.9%) and heavy vaginal bleeding (77.3%) more frequently mentioned than postpartum hemorrhage (74.5%). Education and proximity to health facilities were significant predictors.
- Bhavana et al. (2024) in rural Gujarat found that knowledge was moderate, with bleeding and abdominal pain recognized but convulsions and reduced fetal movement poorly identified; sociocultural barriers and limited counseling time were key obstacles.

Overall, while ANC attendance and routine practices such as immunization are widely followed, the knowledge–practice gap persists. Many women delay care-seeking despite experiencing warning signs, reflecting inadequate counseling and weak family/community support.

Section C: Interventions and Strategies to Bridge the Gap

India has introduced several initiatives to address these gaps, including RMNCH+A (MoHFW, 2013), Pradhan Mantri Surakshit Matritva Abhiyan (2016), and LaQshya (2019). These programs emphasize structured danger-sign counseling at each ANC visit. However, NHSRC (2020) process documentation showed inconsistent fidelity of message delivery.

Recent evidence points to promising strategies. Kumar et al. (2022) demonstrated that teach-back with pictorial aids improved knowledge retention significantly compared to standard counseling. Gebrehiwot et al. (2015) in Ethiopia and Islam et al. (2018) in Bangladesh showed that involving husbands and mothers-in-law enhanced recognition and reduced delays in care-seeking. Alshaikh et al. (2023) in Saudi Arabia (400 women) found that knowledge was highest for vaginal bleeding (93.5%) and convulsions (76.8%), and that higher ANC attendance and prior counseling significantly improved awareness.

Digital approaches have also been evaluated. MoHFW (2019) and NHSRC (2020) highlighted the effectiveness of ASHA reinforcement, IEC materials, and mHealth reminders (SMS/WhatsApp) in improving recall. Globally, RCOG (2011/2021) and ACOG (2021) recommend standardized escalation protocols for reduced fetal movement and neurological symptoms, but Indian studies suggest these are rarely communicated to mothers.

METHODOLOGY

Research Design: A descriptive cross-sectional design was adopted, as it is appropriate for assessing the existing level of knowledge of antenatal mothers at a single point in time without manipulating variables.

Setting: The study was conducted in the antenatal outpatient department (OPD) of a tertiary hospital in Delhi NCR.

Population: The target population comprised all antenatal mothers attending the antenatal OPD during the study period.

Sample and Sampling Technique: A sample of 120 antenatal mothers was selected using a purposive sampling technique, considering feasibility and accessibility. The sample size was deemed adequate to provide meaningful descriptive and inferential analysis for the study objectives.

Data Collection Tool: Data was collected using a structured interview schedule, which consisted of 25 items assessing knowledge of warning signs of pregnancy among antenatal mothers. The tool was developed after a review of literature and in alignment with WHO and MoHFW guidelines.

Scoring System:

- Good knowledge: ≥75% correct responses
- Average knowledge: 50–74% correct responses
- Poor knowledge: <50% correct responses

Validity and Reliability:

- Content validity of the tool was established by a panel of experts in obstetrics and community health nursing.
- Pilot testing was carried out on a sub-sample (10% of respondents) not included in the final study.

- Internal consistency reliability was assessed using Cronbach's alpha, which yielded a value of 0.82, indicating good reliability.

Data Collection Procedure: A structured interview schedule was used as the data collection tool. Although administered in an interview format to ensure participation of all antenatal mothers irrespective of literacy level, the tool consisted of close-ended items with pre-coded response categories. This ensured that the data collected were quantitative in nature.

Data Analysis: Data was entered and analyzed using SPSS. Descriptive statistics (frequency, percentage, mean, and standard deviation) were used to summarize socio-demographic variables and knowledge. Inferential statistics, including the chi-square test, was applied to examine associations between selected socio-demographic factors and knowledge levels. A p-value <0.05 was considered statistically significant.

Ethical Considerations: Ethical clearance was obtained from the Institutional Ethics Committee. Written informed consent was obtained from all participants. Anonymity and confidentiality were maintained, and participation was voluntary with the option to withdraw at any time.

RESULTS

Key findings are presented with tables and figures.

The mean age of respondents was 26.4 ± 4.2 years. The majority (42.5%) were in the 23–27 years age group, followed by 28–32 years (30%). Regarding education, 36.7% were educated up to secondary /senior secondary level, and 28.3% were graduates or above. Most respondents were homemakers (58.3%), residing in urban areas (60%) and belonging to nuclear families (62.5%). Nearly half of the mothers (48.3%) reported monthly household income of ₹15,000–30,000.

Variable	Frequency (n)	Percentage (%)
Age 23–27 years	51	42.5
Age 28–32 years	36	30.0
Secondary/Sr. Secondary education	44	36.7
Graduate and above	34	28.3
Homemakers	70	58.3

Urban residence	72	60.0
Nuclear family	75	62.5
Monthly income ₹15–30k	58	48.3
Primigravidae	54	45.0
29–34 weeks gestation	48	40.0
≥4 ANC visits	80	66.7
Previous complications	27	22.5
ASHA/ANM info source	42	35.0
Doctor/Nurse info source	40	33.0

Table 1. Demographic Profile of Antenatal Mothers (n = 120)

Obstetric history revealed that 45% were primigravidae, 32.5% multigravidae, and 22.5% had ≥3 pregnancies. The majority (40%) were between 29–34 weeks gestation. Two-thirds (66.7%) had ≥4 ANC visits, while 25% had 2–3 visits. Previous obstetric complications were reported by 22.5%. ASHAs/ANMs (35%) and doctors/nurses (33%) were the main sources of pregnancy information.

Table 2. Knowledge Levels of Antenatal Mothers (n = 120)

Knowledge Category	Frequency (n)	Percentage (%)
Good (≥75%)	38	31.7
Average (50–74%)	56	46.7
Poor (<50%)	26	21.6

Overall, the mean knowledge score was 16.8 ± 4.5 (out of 25). About one-third of mothers (31.7%) demonstrated good knowledge, nearly half (46.7%) had average knowledge, and 21.6% had poor knowledge. Item analysis revealed that vaginal bleeding (82.5%), convulsions (71.7%), and prolonged labour (68.3%) were most frequently identified, while reduced fetal movement (38.3%), blurred vision with headache (35.8%), and severe epigastric pain (28.3%) were least recognized.

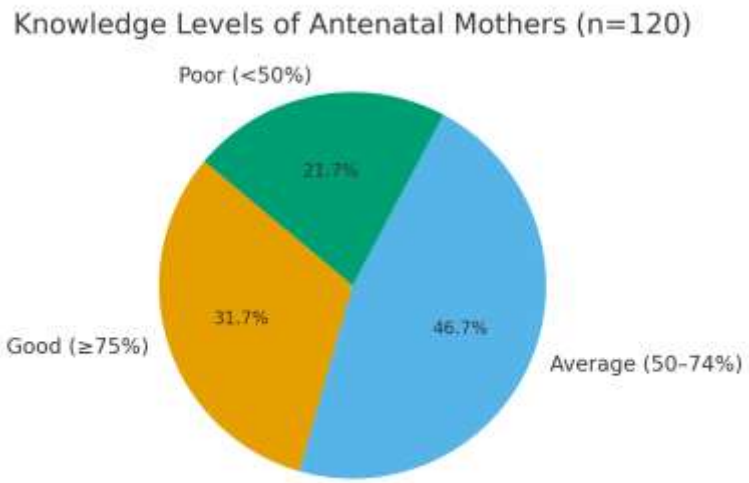

Figure 1. Knowledge Levels of Antenatal Mothers

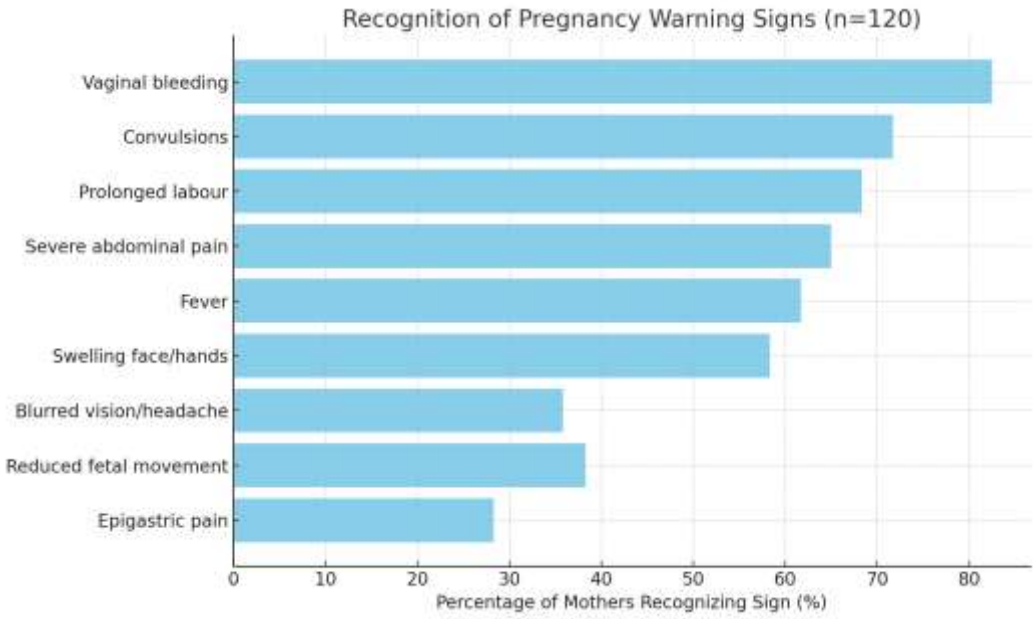

Figure 2. Recognition of Pregnancy Warning Signs

Item-wise analysis demonstrated high awareness of bleeding and convulsions, but critical danger signs related to hypertensive disorders and fetal compromise were poorly recognized. Only 38.3% of mothers identified reduced fetal movement as a danger sign,

and 35.8% recognized blurred vision with severe headache. This indicates a selective awareness pattern, where dramatic symptoms were recalled but subtle neurological/fetal signs were under-recognized.

Inferential Analysis

Chi-square tests revealed that education level was significantly associated with knowledge category (χ^2=14.62, p=0.002), with graduates more likely to score 'good'. Similarly, ANC visit frequency was associated with knowledge (p=0.01). No significant association was found with age, family type, or income.

DISCUSSION

The present study assessed knowledge of antenatal mothers regarding warning signs of pregnancy in a tertiary hospital in Delhi NCR. Results showed that most mothers (46.7%) had *average knowledge*, with only 31.7% demonstrating good knowledge. The most striking gaps were in recognition of neurological and hypertensive danger signs (severe headache, blurred vision, convulsions) and reduced fetal movement, despite high awareness of bleeding and prolonged labour. These findings suggest that while mothers are sensitized to overt and dramatic symptoms, more subtle but equally life-threatening warning signs remain under-recognized.

Comparison with Previous Studies

The findings are consistent with Singh et al. (2021) in Uttar Pradesh, who also reported strong awareness of vaginal bleeding but poor recognition of neurological symptoms. Similarly, Shrestha et al. (2020) in Nepal observed that less than 20% of mothers identified eclampsia-related signs, despite 80% ANC coverage. Our findings also align with Karkada et al. (2018) in Karnataka and Jungari & Chauhan (2020) using NFHS-4 data, both of which highlighted persistent gaps in knowledge of hypertensive disorders during pregnancy. Internationally, studies in Bangladesh (Islam et al., 2018) and Ethiopia (Bitew et al., 2016; Hailu et al., 2011) similarly demonstrate high recognition of bleeding but low awareness of reduced fetal movement and convulsions. Collectively, these results highlight a universal pattern of selective knowledge, regardless of ANC coverage.

Implications for Practice

These findings emphasize the importance of structured danger-sign counseling during ANC visits. Nurses and midwives, being the frontline providers, must ensure that education

is not restricted to nutrition and immunization but consistently includes teachable, repeated messages on all obstetric warning signs. The integration of *teach-back methods, pictorial IEC materials, and family-inclusive counseling* can bridge the knowledge–practice gap.

Implications for Education

The results underscore the need for strengthening maternal and child health content in nursing curriculum. Student nurses should receive systematic training in identifying danger signs and counseling pregnant women effectively. Incorporating simulation-based modules and OSCEs on maternal danger-sign recognition can improve confidence and competence among future health professionals.

Implications for Policy

From a policy perspective, findings call for stronger implementation of RMNCH+A, PMSMA, and LaQshya guidelines, which mandate repeated counseling on pregnancy complications. IEC strategies should be intensified through ASHA-led reinforcement, mobile health reminders, and community mobilization. National programs should ensure fidelity of message delivery by monitoring counseling quality, not just ANC coverage.

CONCLUSION AND RECOMMENDATIONS

This study revealed that antenatal mothers had predominantly average awareness regarding pregnancy warning signs, with significant deficits in recognition of neurological symptoms and reduced fetal movement.

Recommendations include:

1. Structured health education on obstetric warning signs during every ANC visit using standardized protocols.
2. Family-inclusive counseling, engaging husbands and mothers-in-law to reduce Delay-1 in the three-delays framework.
3. Capacity-building of nurses and midwives in communication and health education skills.
4. Strengthening IEC strategies under RMNCH+A and LaQshya, with emphasis on danger signs beyond bleeding.
5. Leveraging digital tools (SMS/WhatsApp reminders) to reinforce maternal health messages.

LIMITATIONS

- The study was conducted in a single tertiary hospital with purposive sampling, which may limit generalizability to other populations.
- The sample size (n=120), though adequate for descriptive analysis, may not capture wider variability across regions.

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