



PREVALENCE OF HIGH-RISK PREGNANCY AND ITS DETERMINANTS IN ANTENATAL WOMEN AT A TERTIARY CARE CENTRE IN RAJASTHAN.

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ABSTRACT

Background: High-risk pregnancy (HRP) is a major contributor to maternal and perinatal morbidity and mortality, particularly in low- and middle-income countries. Early identification of high-risk pregnancies during antenatal care is essential for preventing adverse outcomes. Data on the prevalence and determinants of HRP from tertiary care settings in Rajasthan remain limited.

Objectives: To assess the prevalence of high-risk pregnancy and identify its socio-demographic and obstetric determinants among antenatal women attending a tertiary care centre in Rajasthan.

Methods: A hospital-based cross-sectional observational study was conducted over six months (September 2024 to February 2025) among antenatal women attending the antenatal clinic of a tertiary care hospital in Rajasthan. A total of 182 pregnant women were included using convenience sampling. Data were collected using a pre-designed, semi-structured proforma covering socio-demographic characteristics, obstetric history, and medical and pregnancy-related risk factors. High-risk pregnancy was defined as the presence of one or more medical, obstetric, or socio-demographic risk factors. Data were analysed using SPSS version 26. Descriptive statistics were used, and associations were assessed using the Chi-square test, with $p < 0.05$ considered statistically significant.

Results: The prevalence of high-risk pregnancy was 30.8%. Anaemia was the most common high-risk condition (42.9%), followed by hypertensive disorders of pregnancy (32.1%) and gestational diabetes mellitus (17.9%). A statistically significant association was observed between high-risk pregnancy and maternal age ($p = 0.017$), with higher risk at extremes of age, and parity ($p = 0.042$), with increased risk among multiparous women. Although a higher proportion of high-risk pregnancies was observed among rural women, the association was not statistically significant ($p = 0.054$).

Conclusion: High-risk pregnancy remains a significant public health concern among antenatal women attending tertiary care centres in Rajasthan. Early identification of risk factors, particularly

anaemia and hypertensive disorders, through strengthened antenatal care services is crucial. Focused interventions targeting high-risk groups can help improve maternal and perinatal outcomes.

Keywords: High-risk pregnancy; Antenatal care; Maternal risk factors; Anaemia in pregnancy; Hypertensive disorders of pregnancy; Tertiary care centre; Rajasthan

INTRODUCTION

High-risk pregnancy (HRP) remains a major contributor to maternal and perinatal morbidity and mortality worldwide, particularly in low- and middle-income countries. A pregnancy is considered high risk when the life or health of the mother or fetus is jeopardized due to the presence of medical, obstetric, or socio-demographic factors [1]. Early identification and appropriate management of high-risk pregnancies are essential to improve maternal and neonatal outcomes.

Globally, it is estimated that nearly 20–30% of pregnancies are categorized as high risk, accounting for a disproportionately large share of adverse maternal and perinatal outcomes [2]. Despite advances in obstetric care, complications arising from high-risk pregnancies continue to pose a significant public health challenge. The World Health Organization has emphasized the importance of risk-based antenatal care and timely referral systems to reduce preventable maternal deaths [3].

India accounts for a substantial proportion of global maternal and neonatal mortality. Although the Maternal Mortality Ratio (MMR) has declined significantly over the past decades, high-risk pregnancies continue to contribute to adverse outcomes such as preterm birth, low birth weight, stillbirth, and maternal complications [4]. The Sample Registration System (SRS) reports highlight that a considerable proportion of maternal deaths in India are associated with preventable or manageable high-risk conditions such as anemia, hypertensive disorders of pregnancy, hemorrhage, and infections [5].

High-risk pregnancy is influenced by a wide range of determinants, including maternal age, parity, nutritional status, pre-existing medical conditions, and obstetric complications. Extremes of maternal age, high parity, anemia, hypertension, diabetes mellitus, previous caesarean section, and history of adverse pregnancy outcomes are well-established risk factors [6]. Socio-economic factors such as low education, rural residence, poor access to healthcare services, and delayed antenatal registration further exacerbate pregnancy-related risks [7].

Antenatal care (ANC) plays a crucial role in the early detection and management of high-risk pregnancies. Regular ANC visits facilitate timely screening, diagnosis, and intervention for maternal conditions that may adversely affect pregnancy outcomes [8]. Government initiatives in India, including Janani Suraksha Yojana (JSY), Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA), and LaQshya program, aim to strengthen maternal health services and promote early identification of high-risk pregnancies [9]. However, despite these initiatives, gaps persist in the timely recognition and management of high-risk pregnancies, particularly in resource-limited settings.

Rajasthan, one of the largest states in India, faces unique challenges in maternal healthcare delivery. Early marriage, high fertility rates, nutritional deficiencies, anemia, and disparities in healthcare access contribute to a higher burden of high-risk pregnancies [10]. Rural and tribal populations in the state often experience delayed antenatal registration and inadequate utilization of maternal health services, increasing the likelihood of complications during pregnancy and childbirth.

Tertiary care centres serve as referral points for complicated and high-risk pregnancies and provide comprehensive obstetric services, including specialist care and advanced diagnostic facilities. Studies conducted in tertiary care settings offer valuable insights into the prevalence and pattern of high-risk pregnancies, as well as the determinants contributing to these conditions [11]. Such hospital-based data are essential for understanding the local epidemiology of high-risk pregnancies and for planning targeted interventions.

Several studies from different regions of India have reported varying prevalence of high-risk pregnancies, ranging from 15% to 35%, depending on study setting and population characteristics [12]. Differences in socio-demographic profiles, referral patterns, and availability of healthcare services influence the observed prevalence and determinants. However, there is limited recent data

from tertiary care centres in Rajasthan assessing the prevalence and determinants of high-risk pregnancy using a comprehensive approach.

Identifying the determinants of high-risk pregnancy is critical for strengthening antenatal care services and reducing preventable maternal and perinatal complications. Understanding these factors can help healthcare providers prioritize care, improve referral systems, and optimize resource allocation at both facility and community levels.

Therefore, the present study was conducted over a period of four months from September 2024 to February 2025 among antenatal women attending a tertiary care centre in Rajasthan. The study aims to assess the prevalence of high-risk pregnancy and identify its determinants, thereby contributing evidence for improving maternal health services and pregnancy outcomes in the region.

MATERIALS AND METHODS

Study Design & Setting: This was a hospital-based cross-sectional observational study. The study was conducted in the Antenatal Clinic (ANC) of a tertiary care teaching hospital in Rajasthan, India.

Study Period: The study was carried out over a period of four months, from September 2024 to February 2025.

Study Population: The study population comprised pregnant women attending the antenatal clinic of the tertiary care centre during the study period.

Inclusion Criteria

- Pregnant women attending the ANC during the study period
- Women willing to participate and providing written informed consent

Exclusion Criteria

- Pregnant women who were critically ill and unable to respond
- Women unwilling to participate in the study

Sample Size Calculation: The sample size was calculated using the formula for estimating a proportion in a cross-sectional study: $n = \frac{Z^2 \times p \times (1-p)}{d^2}$. Based on previous Indian studies, the prevalence of high-risk pregnancy among antenatal women was assumed to be 30% ($p = 0.30$) and taking d at 7% and CI of 95%, the calculated sample size comes 165. After adding 10% to account for non-response or incomplete data, the final sample size was rounded off to 182 participants.

Sampling Technique: Participants were selected using convenience sampling until the required sample size was achieved.

Operational Definition

- High-risk pregnancy: Any pregnancy associated with one or more medical, obstetric, or socio-demographic risk factors that increase the likelihood of adverse maternal or fetal outcomes, as identified through clinical examination and antenatal records.

Data Collection Tools: Data were collected using a pre-designed, pre-tested, semi-structured proforma which included;

- Socio-demographic details: age, residence, education
- Obstetric history: parity, gestational age, previous obstetric outcomes
- Medical conditions: anemia, hypertension, diabetes, thyroid disorders
- Current pregnancy-related risk factors: hypertensive disorders of pregnancy, gestational diabetes, anemia, malpresentation, multiple pregnancy, previous caesarean section

Data Collection Procedure: Eligible antenatal women were enrolled after obtaining written informed consent. Information was collected through face-to-face interviews and review of antenatal records. Clinical findings and relevant investigation reports were recorded from case files.

Ethical Considerations: Confidentiality of participants was maintained, and no personal identifiers were recorded. Participation was voluntary, and participants were free to withdraw at any time.

Statistical Analysis: Data were entered into Microsoft Excel and analysed using Statistical Package for the Social Sciences (SPSS) version 26. Descriptive statistics were expressed as frequencies and percentages. The Chi-square test was used to assess associations between high-risk pregnancy and selected determinants. A p value < 0.05 was considered statistically significant.

RESULTS

A total of 182 antenatal women attending the antenatal clinic during the study period were included in the study. The prevalence of high-risk pregnancy and its association with selected socio-demographic and obstetric factors were analysed. Most antenatal women belonged to the 20–29 years age group, were rural residents, and were multiparous, reflecting the typical ANC population of a tertiary care centre.(Table 1)

Table 1: Socio-Demographic Profile of Antenatal Women (n = 182)			
Variable	Category	Frequency	Percentage (%)
Age (years)	<20	18	9.9
	20–29	104	57.1
	≥30	60	33.0
Residence	Rural	112	61.5
	Urban	70	38.5
Parity	Primi	74	40.7
	Multi (≥2)	108	59.3

Nearly one-third (30.8%) of antenatal women were classified as having high-risk pregnancy, which is comparable to findings reported in other hospital-based Indian studies.(Table 2)

Table 2: Prevalence of High-Risk Pregnancy Among Antenatal Women (n = 182)		
Pregnancy Risk Status	Frequency	Percentage (%)
High-risk pregnancy	56	30.8
Low-risk pregnancy	126	69.2

Anaemia was the most common high-risk condition, followed by hypertensive disorders of pregnancy, highlighting preventable and manageable contributors to maternal risk. Table 3 shows the distribution of high-risk conditions among high-risk pregnancies.

Table 3: Distribution of High-Risk Conditions Among High-Risk Pregnancies (n = 56*)		
High-Risk Condition	Frequency	Percentage (%)
Anaemia	24	42.9
Hypertensive disorders of pregnancy	18	32.1
Gestational diabetes mellitus	10	17.9
Previous caesarean section	14	25.0

Table 3: Distribution of High-Risk Conditions Among High-Risk Pregnancies (n = 56*)

Bad obstetric history	9	16.1
Multiple pregnancy	5	8.9

*Multiple responses allowed

A statistically significant association was observed between maternal age and high-risk pregnancy ($p = 0.017$), with higher risk noted at extremes of maternal age. Table 4 shows the association between maternal age and high-risk pregnancy.

Table 4: Association Between Maternal Age and High-Risk Pregnancy (n = 182)

Age group	High-risk n (%)	Low-risk n (%)	χ^2 value	p value
<20 years (n=18)	8 (44.4)	10 (55.6)	8.12	0.017
20–29 years (n=104)	25 (24.0)	79 (76.0)		
≥30 years (n=60)	23 (38.3)	37 (61.7)		

High-risk pregnancy was significantly more common among multiparous women compared to primigravidae ($p = 0.042$). Table 5 shows the association between parity and high-risk pregnancy.

Table 5: Association Between Parity and High-Risk Pregnancy (n = 182)

Parity	High-risk n (%)	Low-risk n (%)	χ^2 value	p value
Primi (n=74)	17 (23.0)	57 (77.0)	4.12	0.042
Multi (≥2) (n=108)	39 (36.1)	69 (63.9)		

A higher proportion of high-risk pregnancies was observed among rural women, though the association did not reach statistical significance ($p = 0.054$). Table 6 shows the association between residence and high-risk pregnancy.

Table 6: Association Between Residence and High-Risk Pregnancy (n = 182)

Residence	High-risk n (%)	Low-risk n (%)	χ^2 value	p value
Rural (n=112)	40 (35.7)	72 (64.3)	3.72	0.054
Urban (n=70)	16 (22.9)	54 (77.1)		

DISCUSSION

The present hospital-based cross-sectional study assessed the prevalence of high-risk pregnancy and its determinants among antenatal women attending a tertiary care centre in Rajasthan. The study found that nearly one-third (30.8%) of antenatal women were categorized as high-risk pregnancies, highlighting the substantial burden of maternal risk in routine antenatal populations.

The prevalence of high-risk pregnancy observed in the present study is comparable to findings reported in other hospital-based Indian studies. Gomindes et al. (2022) reported a prevalence of 32.4% among antenatal women in a tertiary care hospital, while Kuppaswamy et al. (2023) observed high-risk pregnancies in 28.6% of women attending antenatal clinics [13,14]. The higher prevalence reported in tertiary care settings is often attributed to referral bias, as complicated and high-risk cases are more likely to seek care at higher centres.

Maternal age was found to be a significant determinant of high-risk pregnancy in the present study. Higher proportions of high-risk pregnancies were observed at the extremes of reproductive age, particularly among women aged below 20 years and those aged 30 years and above. Similar findings have been documented by Dahiya et al. (2020) and Tiwari et al. (2021), who reported a significantly higher risk of obstetric complications among adolescent and advanced maternal age groups [15,16]. Biological immaturity in younger women and increased prevalence of medical disorders in older women may explain this association.

Parity also showed a statistically significant association with high-risk pregnancy, with multiparous women experiencing higher risk compared to primigravidae. This observation is consistent with studies conducted by Doke et al. (2021) and Ka M et al. (2023), which reported that multiparity is associated with conditions such as anemia, hypertensive disorders, and previous caesarean section [17,18]. Repeated pregnancies, nutritional depletion, and short inter-pregnancy intervals are known contributors to increased maternal risk among multiparous women.

Anaemia emerged as the most common high-risk condition in the present study. This finding aligns with national data and previous studies conducted in India. According to NFHS-5, more than half of pregnant women in India are anaemic [7]. Hospital-based studies by Balcha et al. (2023) and Ashrita et al. (2020) similarly identified anaemia as the leading contributor to high-risk pregnancy [19,20]. The persistently high burden of anaemia reflects nutritional deficiencies, poor dietary intake, and delayed antenatal registration, especially in rural populations.

Hypertensive disorders of pregnancy were the second most common high-risk condition identified in the present study. Comparable findings have been reported by Shruthi et al. (2019), who emphasized hypertensive disorders as a major cause of maternal and perinatal morbidity and mortality in India [21]. Regular blood pressure monitoring and early identification during antenatal visits remain critical for preventing adverse outcomes.

Gestational diabetes mellitus and previous caesarean section were also important contributors to high-risk pregnancy in the present study. The increasing prevalence of gestational diabetes has been widely reported in recent years due to lifestyle changes and improved screening practices. Studies by Seshiah et al. (2004) and Sweeting et al. (2022) highlighted the growing significance of gestational diabetes as a determinant of maternal and fetal risk [12,22].

Although a higher proportion of high-risk pregnancies was observed among rural women in the present study, the association did not reach statistical significance. However, similar trends have been documented by Chate et al. (2022), who attributed increased rural risk to delayed antenatal registration, poor accessibility to healthcare services, and lower awareness regarding maternal health [23].

Overall, the present study demonstrates that high-risk pregnancy remains a significant public health concern. The observed associations with maternal age, parity, and preventable conditions such as anaemia highlight the importance of early antenatal registration, regular screening, and timely referral. Strengthening risk-based antenatal care services, particularly in resource-limited and rural settings, is essential for improving maternal and perinatal outcomes.

CONCLUSION

The present study highlights that nearly one-third of antenatal women attending a tertiary care centre in Rajasthan were categorized as having high-risk pregnancies, underscoring the substantial burden of maternal risk even in routine antenatal populations. Maternal age extremes and multiparity were found to be significant determinants of high-risk pregnancy. Anaemia emerged as the most common high-risk condition, followed by hypertensive disorders of pregnancy and gestational diabetes

mellitus, reflecting the predominance of preventable and manageable factors contributing to maternal risk. Although rural residence showed a higher proportion of high-risk pregnancies, the association was not statistically significant, suggesting the need for further exploration in larger community-based studies. The findings emphasize the importance of early antenatal registration, regular screening, and risk-based antenatal care to identify high-risk pregnancies at the earliest. Strengthening existing maternal health programmes, improving nutritional interventions, and ensuring timely referral and comprehensive care can substantially reduce preventable maternal and perinatal complications, particularly in resource-limited settings like Rajasthan.

Declarations

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