



High-Risk Pregnancy and Its Outcome Among Antenatal Women in a Tertiary Care Hospital in Sikkim

1Tamanna Soni, 2Bikram Kharga, 3Latha V Kharka, 4Bhawana Singhal,

1Post Graduate Trainee, Dept Of Obgyn, Smims, Smu

2Professor And Consultant In Paediatric Surgery, Smu

3Associate Professor, Dept Of Obgyn, Smims, Smu

4Senior Resident, Dept Of Obgyn, Smims, Smu

Corresponding Author- Latha V Kharka

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ABSTRACT:

Background: High-risk pregnancies create problems for maternal and neonatal health, and are a major contributing factor to morbidity and mortality around the world. In places like Sikkim, where health awareness and access to health services may differ, patterns of high-risk pregnancy and their outcomes are invaluable to improving maternal and child health.

Objective: To determine the prevalence, maternal outcomes, along with fetal outcomes of high-risk pregnancies amongst antenatal women who were attending a tertiary care institution in Sikkim from December 2023 through July 2025.

Methods: It is a retrospective study conducted at a tertiary care institution in Sikkim, reviewed medical records involving the antenatal women who were diagnosed with high-risk pregnancy during the study period. Relevant details regarding demographics, maternal risk factors, and complications in pregnancy, mode of delivery, and maternal outcomes, were collected. Neonatal outcomes were like birth weight, prematurity, NICU admissions and perinatal mortality, were also analysed. Descriptive and inferential statistical analysis was applied for the study.

Key Findings: Majority of individuals with a high-risk pregnancy had advanced maternal age, anaemia, hypertensive disorders, gestational diabetes, and previous caesarean delivery. Maternal outcomes correlated with increased rates of caesarean deliveries, pre-eclampsia, and postpartum morbidities. Neonatal outcomes represented increased incidence of low birth weight, prematurity, and NICU admission in association with high-risk pregnancies. Maternal mortality was nil.

Conclusion: High-risk pregnancies continue to be a major contributor to adverse maternal and neonatal outcomes in Sikkim. Early identification, thorough antenatal screening, and timely referral to tertiary care centers could improve prognosis. Strengthening maternal health services and implementing targeted interventions designed for high-risk groups is important to reduce preventable complications.

Introduction

A high-risk pregnancy occurs when the mother, fetus, or both are jeopardized due to existing maternal conditions, obstetric events, or other external factors. According to the World Health Organization (WHO), about 260,000 women died in 2023 from preventable pregnancy and childbirth-related causes, primarily in low- and middle-income countries¹. In spite of the outcome of pregnancy and childbirth being uneventful, all pregnancies have

certain risks associated with it exposing women to risk of developing potentially life-threatening complications which may require skilled care with some requiring major intervention for survival. To accurately quantify the incidence of high risk illness in pregnancy is difficult. No concrete guidelines currently exist for distinguishing “high-risk” pregnancies from “low-risk” pregnancies.



Common issues of pregnancy complications include hypertensive disorders, anemia, gestational diabetes, IHCP and preterm labour, increased caesarean rate which are among the top contributors to maternal health complications. Advanced maternal age (>35 years), extreme young maternal age, high parity, and previous abortions are often mentioned as demographic/obstetric predictors of adverse outcomes.

Large-scale evidence and national surveys have established that a sizeable proportion of women will have one or more high-risk conditions during pregnancy in India. As per Journal of Global Health a recent article published by researchers from the ICMR's National Institute of Research on the topic of Reproductive and Child Health (NIRRCH) found out that 49.4% of pregnant women in our country India had high-risk pregnancies and among them approximately 33% these pregnant women had one high-risk factor, while 16% had multiple of high-risk factors⁽⁴⁾.

Neonate outcomes and complications commonly described in high-risk pregnancy include respiratory distress syndrome, sepsis, feeding difficulties, low birth weight and prematurity.

Even with advances in healthcare services complications of high-risk pregnancy continue to exert an immense pressure on the healthcare system². In Sikkim, regional issues in access to health services, geographic distance from appropriate tertiary health facilities, and sociocultural factors complicate care for maternal health. To devise targeted interventions, it is vital to understand the spectrum of high-risk pregnancy and its associated outcomes. The literature pertaining to Sikkim is limited, and this study aims to provide the useful relevant and contextual information on prevalence, risk profiles and outcomes in high-risk pregnancy. This will help in forming clinic protocols and expanding public health programming in our region.

Aims and Objective

To study the prevalence, demographic and obstetric characteristics of antenatal women of high-risk pregnancies who present to a tertiary care centre in Sikkim, and thereafter to study the maternal and neonatal outcomes of high-risk pregnancies

Methodology

It is a retrospective hospital-based observational study conducted in a tertiary care hospital in Sikkim which serves as a referral hospital for antenatal women from various districts of the state. Data were collected from the hospital records between December 2020 to July 2022. All antenatal women diagnosed with high-risk pregnancy who attended the tertiary care hospital or delivered during the study period were included in the study population. Pregnant women deemed high risk as per hospital protocol, Indian Council of Medical Research (ICMR) guidelines, or WHO criteria (if any of the following apply: advanced maternal age, teenage pregnancy, anemia, hypertension, diabetes, history of abortions, hypothyroidism, cardiac illness, renal disorders, IHCP, previous caesarean section and other previous complications in obstetrics). A structured proforma/checklist was utilized to systematically capture all relevant information.

Inclusion and exclusion criteria

All the admitted antenatal women in our antenatal ward who full-fill the above mentioned parameters of high-risk pregnancy irrespective of their gestational age were included in the study. Normal antenatal cases without any risk factor were excluded.

Data Analysis - Data were entered into Microsoft Excel for analysis using SPSS (version XX).

Outcome variables

Maternal Outcomes

Mode of delivery (vaginal, instrumental, caesarean section). Antenatal, intra-partum, or postpartum complications, Maternal ICU admission. Maternal deaths.

Fetal/Neonatal Outcomes

Birth weight, Gestation age at delivery (term, preterm, post-term). Neonatal complications (birth asphyxia, respiratory distress syndrome, neonatal sepsis, hypoglycaemia). NICU admission (yes/no). Perinatal mortality (stillbirths, early neonatal deaths <7 days old).



Results

Table 1: Socio-demographic and Obstetric Characteristics of Study Participants

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	≤19	45	10.8
	20–34	310	74.3
	≥35	62	14.9
Parity	Primigravida	180	43.2
	Multigravida	237	56.8
Previous Abortions	None	320	76.7
	≥1	97	23.3
Previous Term Deliveries	Yes	210	50.4
	No	207	49.6
History of Preterm Birth	Yes	55	13.2

Table 2: Distribution of Co-morbidities among High-Risk Pregnancies

Co-morbidity	Frequency (n)	Percentage (%)
Hypertensive disorders (PIH, pre-eclampsia, eclampsia)	104	20.59
Gestational diabetes/Diabetes mellitus	138	27.32
Anaemia	5	0.99
IHCP	89	17.62
Hypothyroidism	159	31.48
Cardiac disease	2	0.39

Other (e.g., asthma, epilepsy)	8	1.58
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Table 3: Maternal Outcomes in High-Risk Pregnancies

Maternal Outcome	Frequency (n)	Percentage (%)
Mode of Delivery		
– Vaginal	150	36
– Instrumental (forceps/vacuum)	25	6
– Caesarean section	242	58
Complications		
– Postpartum haemorrhage (PPH)	35	8.39
– Eclampsia	2	2.16
– Sepsis	10	2.39
– Uterine rupture	0	0
– Obstructed labour	14	3.36
ICU Admissions	4	0.9
Maternal Mortality	0	0

Table 4: Neonatal Outcomes of High-Risk Pregnancies

Neonatal Outcome	Frequency (n)	Percentage (%)
Birth Weight		
– Low birth weight (<2.5 kg)	160	38.4
– Normal (2.5–3.9 kg)	245	58.8
– Macrosomia (≥4 kg)	12	2.8



Gestational Age at Delivery		
– Term	300	72
– Preterm	110	26.4
– Post-term	7	1.6
Neonatal Complications		
– Birth asphyxia	18	4.32
– Respiratory distress	15	3.59
– Neonatal sepsis	25	5.99
– Hypoglycaemia	10	2.4
NICU Admissions	44	10.55
Perinatal Mortality	4	0.96

Table 5: Associations between Maternal Risk Factors and Neonatal Outcomes

Maternal Risk Factor	Associated Outcome	Statistical Significance (Chi-square, $p < 0.05$)
Age ≥ 35 years	Higher caesarean rate, preterm births	Significant
Primigravida	Higher incidence of caesarean section	Significant
Previous abortion	Increased risk of preterm birth, LBW	Significant
Hypertension	Strongly associated with preterm and LBW	Significant
Diabetes	Associated with macrosomia, NICU admission	Significant
Anaemia	Associated with LBW, NICU admission	Significant

Interpretation:

Maternal co-morbidities, such as hypertension, diabetes, and anaemia, showed significant associations with adverse neonatal outcomes, including low birth weight, preterm birth, NICU admission, and macrosomia. Higher rates of maternal advanced age and primigravida status were associated with higher caesarean rates. These associations highlight the need for early identification and multidisciplinary management of high-risk pregnancies.

Discussion

This study shows that high-risk pregnancies remain a significant contributor to adverse maternal and neonatal outcomes within Sikkim. Hypothyroidism (31.48%), Diabetic patients (27.32%) and Hypertensive disorders (20.59%), were the most common risk factors. These findings match national and international studies, that have also identified hypertensive disorders and anaemia as prominent contributors to maternal morbidity and adverse perinatal outcomes (WHO, 2020; SRS 2020–22)(10). With respect to the maternal variables, our study reported the prevalence of caesarean delivery (58%) at rates higher than the national average, that reflect clinical indications as well as regional practices of transfer and higher referral to tertiary care centers. Neonatal variables were consistent with this population, the low birth weight was 38.4% for infants and preterm births were 26.4%. Though the NICU admission rate (10.55%) and perinatal mortality (0.96%) rates were on the lower side.

Notably, the most unusual aspect regarding Sikkim is the relatively nil maternal mortality rates for the study period. However, continuing preventable risk factors and late referrals represent significant impediments in achieving best obstetric care and possible preventable potential obstetric complications and maternal mortality. Furthermore, geographic challenges, constrained primary-level obstetric services, and sociocultural delays in seeking care, may contribute to adverse pregnancy outcomes.

8. Conclusion

This retrospective study found that high-risk pregnancies were primarily associated with hypertensive disorders, anaemia, IHCP and gestational diabetes in Sikkim. Associated adverse outcomes in pregnant women



included high rates of caesarean section births, , low birth weight, and preterm births.

The study highlights the clinical and public health importance of timely identification and referral of antenatal high-risk pregnancies. To further enable the reduction of preventable maternal and neonatal morbidity, the maternal health systems in Sikkim will require strengthening.to ensure comprehensive quality of obstetric care for every pregnant women .

The Government of India launched a programme called Pradhan mantri surakshit matritiva abhyian (PSMA)in 2016, following the same if we focus on antenatal care and screening,early recognition of high risk factors and timely interventions. Also expansion of existing maternal health programs in order to make them regional and address transport needs for timely referral for obstetric emergencies is extremely important

10. Limitations

The present study is not without limitations. Being retrospective in nature, it is reliant on the quality and completion of the medical records and may therefore be subject to bias. Conducting the study at a single tertiary centre means that the findings may not be completely generalizable to the Sikkim population or Northeast India. Missing or incomplete data sets may have inhibited capturing prevalence for risk factors and complications in some cases.

It is recommended that future studies be performed in a multicentric, prospective design to develop evidence and to inform maternal health policy at the state level.

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