

Pregnancy-Related Complications and Outcomes: A Retrospective Analysis of Pregnancy-Related Complications, Such as Preeclampsia, Gestational Diabetes, and Preterm Labor

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Abstract

Background: Preeclampsia, gestational diabetes, and preterm delivery cause most maternal and neonatal morbidity worldwide. These issues must be identified early to improve pregnancy outcomes. Since these diseases vary by region, hospital-based evaluations are needed to identify local risk variables. This retrospective study assessed the frequency, aetiology, and effects of major pregnancy complications on S.K.M.C.H. patients and their babies.

Methods: From February 2025 to August 2025, S.K.M.C.H. observed 92 pregnant women who satisfied the requirements. Medical record data was extracted using a standardised form. Demographics, clinical characteristics, pregnancy complications, delivery method, and neonatal outcomes were evaluated. The statistical study compared group results using descriptive statistics, t-tests, and chi-square tests. Statistical significance was defined as $p < 0.05$.

Results: Preeclampsia impacted 18.4%, gestational diabetes 15.2%, and premature labour 20.6% of the 92 pregnant women investigated. Preeclampsia and GDM were associated with older maternal age (>30 years) ($p=0.03$) and higher BMI ($p=0.02$). Compared to pregnancies without issues, complications increased caesarean sections (58.7% vs. 38.1%). In neonatal outcomes, 29.3% had a birth weight <2.5 kg, 22.8% were admitted to the NICU, and 18.4% had an APGAR score <7 at 1 minute. Neonatal critical care unit admission was associated with premature labour ($p=0.01$). Postpartum haemorrhage and hypertensive crises are more likely in preeclamptic and gestational diabetic women.

Conclusion: Pregnant women who visit S.K.M.C.H. have a disproportionately greater risk of significant issues that affect both mother and child. Early screening, diagnosis, and risk-based prenatal therapy reduce the chance of poor outcomes. Increased awareness and standard prenatal practices can reduce preventable issues. Larger multicentric studies and prospective analyses can better determine risk trends and guide regional maternal health policy.

Keywords: Antenatal care, Complications, Maternal outcomes, Pregnancy, Risk factors.

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Introduction

Global and Regional Burden of Pregnancy-Related Complications: A global epidemic of maternal morbidity, perinatal death, and other bad health effects stems from pregnancy complications. Hypertensive disorders of pregnancy afflict 5-8% of pregnancies, most commonly preeclampsia [1]. These illnesses cause about 70,000 maternal and 500,000 foetal and neonatal deaths annually. Preeclampsia disrupts placental development,

limiting foetal growth, multi-organ dysfunction, and emergency interventions. Slow diagnosis, poor healthcare infrastructure, and inadequate prenatal care exacerbate outcomes, making low- and middle-income countries bear the brunt [2].

The global Gestational Diabetes Mellitus (GDM) epidemic is connected to obesity, bad diet, lack of activity, and older mothers [3]. One in six babies has GDM, straining global healthcare. GDM

patients are at risk for type 2 diabetes and preterm labour, which kills almost one million newborns annually [4]. Neurodevelopmental disability, chronic lung disease, hearing, and visual problems result. Though worldwide mother-child care efforts are improving, preterm births are rising in India, and pregnancy difficulties persist. In low-income communities with poor healthcare, maternal and newborn mortality is high in this country [5]. High-risk pregnancies are exacerbated by inadequate prenatal surveillance, nutritional deficits, anaemia, and delayed healthcare [6]. However, preeclampsia, gestational diabetes, and premature labour tax maternal health services. Effective targeted therapies require local patterns and prevalence.

Importance of Studying Preeclampsia, GDM, and Preterm Labor: Pregnancy problems affect the mother and child, making them crucial to study. Preeclampsia increases the risk of caesarean birth, HELLP syndrome, stroke, kidney failure, and eclampsia [7]. This syndrome increases stillbirth, placental insufficiency, and intrauterine growth limitation. GDM has serious consequences beyond pregnancy. GDM mothers are more likely to have macrosomia, shoulder dystocia, and obstructed labour, while newborns risk newborn hypoglycemia, respiratory distress, and metabolic issues later in life [8]. Additionally, gestational diabetes mellitus increases the risk of diabetes and cardiovascular disease. Due to its widespread effects, GDM research improves prenatal counselling, screening, and lifestyle treatments. Preterm labour is a major influence on infant survival. Preterm newborns had higher respiratory distress syndrome, feeding issues, infections, and neurodevelopmental issues [9]. Even moderately premature deliveries (32–36 weeks) require specialised care; understanding preterm labour causes and predictors helps reduce newborn issues and improve early intervention [10].

Impact on Maternal and Neonatal Outcomes: Problems can affect maternal and neonatal outcomes short and long term. Mothers with preeclampsia or gestational diabetes type 2 are at risk of hypertensive crises, organ damage, postpartum haemorrhage, and surgery [11]. These difficulties can lead to cardiovascular disease, metabolic diseases, and pregnancies with complications. Child growth and development problems or respiratory distress, low birth weight, and neonatal critical care may occur [12]. Early treatment, prenatal monitoring, and identification improve results and reduce unnecessary complications.

Rationale for Retrospective Analysis: Retrospective studies may uncover clinical tendencies in low-resource settings. Long-term follow-up is unnecessary if researchers find patterns, risk factors, and results in medical data.

This technique works well at S.K.M.C.H. since patient demographics and clinical procedures provide maternal health information.

Study Objectives

- To study the prevalence of preeclampsia, gestational diabetes mellitus, and premature labour in pregnant women who visited S.K.M.C.H.
- To evaluate the implications of these issues on the mother and newborn, including delivery technique, birth weight, and neonatal critical care unit admission.
- To discover demographic and clinical risk factors that cause these issues to improve screening and early intervention techniques.

Materials and Methods

Study Design: In this retrospective observational study, pregnancy-related worries and their effects on women admitted to hospitals for prenatal care and delivery were examined. A retrospective strategy was used to analyse medical data and identify clinical trends during the investigation.

Study Site: Regional tertiary care teaching hospital S.K.M.C.H. hosted the research. The hospital's substantial obstetric services make it suited for studying pregnancy problems and their impact.

Study Duration: Data was collected from February 2025 to August 2025 to capture all events that fit the criterion.

Sample Size: The study comprised 92 pregnant women with preeclampsia, gestational diabetes, or early delivery. Access to detailed medical data throughout the inquiry determined the sample size.

Inclusion Criteria

- Pregnant women admitted to S.K.M.C.H. during the study period.
- Documented diagnosis of preeclampsia, GDM, or preterm labor.
- Availability of complete clinical, biochemical, and obstetric outcome data.

Exclusion Criteria

- Women with incomplete or missing medical records.
- Pregnancies with known congenital anomalies.
- Patients referred after major obstetric interventions performed elsewhere.

Data Sources and Data Collection: Standard forms were used to analyse hospital records. Birth weight, APGAR scores, clinical diagnoses, laboratory findings, birth mode, maternal issues, maternal age, parity, gestational age, and hospitalisations to the newborn critical care unit were collected.

Statistical Analysis: Analyses were completed using normal statistical methods. Continuous data were analysed using mean \pm standard deviation, whereas categorical variables were analysed using frequencies and percentages. Chi-square was employed for categorical variables and Student's t-test for continuous data. P-values \leq 0.05 were significant.

Results

Demographic Characteristics: Preeclampsia, gestational diabetes, and early labor were examined in 92 pregnant women. Demographics are in Table 1.

Table 1: Demographic Characteristics of the Study Population (N = 92)

Variable	Mean \pm SD / n (%)
Maternal age (years)	27.8 \pm 4.9
Age groups	
18–24 years	28 (30.4%)
25–30 years	42 (45.7%)
>30 years	22 (23.9%)
Parity	
Primigravida	39 (42.4%)
Multigravida	53 (57.6%)
Residence	
Rural	61 (66.3%)
Urban	31 (33.7%)

Most women were between 25–30 years, consistent with peak reproductive age in the region. A majority (66.3%) belonged to rural communities, highlighting the hospital's role as a referral center

for underserved populations. Multigravidas were slightly more represented, indicating possible recurrence of pregnancy-related complications.

Prevalence of Pregnancy-Related Complications

Table 2: Distribution of Major Complications

Complication	Frequency (n)	Percentage (%)
Preeclampsia	34	36.9%
Gestational Diabetes Mellitus (GDM)	28	30.4%
Preterm Labor	30	32.6%

Preterm labour (32.6%) and preeclampsia (36.7%) were the most common complications. One-third had GDM. Since prevalence is balanced, the

community may have multiple overlapping risk factors.

Associated Risk Factors

Table 3: Risk Factors Associated with Complications

Risk Factor	Present (n, %)	Absent (n, %)
Age > 30 years	22 (23.9%)	70 (76.1%)
BMI > 25 kg/m ²	41 (44.6%)	51 (55.4%)
Family history of HTN/DM	29 (31.5%)	63 (68.5%)
Previous obstetric complications	18 (19.6%)	74 (80.4%)
Anemia (Hb < 11 g/dL)	37 (40.2%)	55 (59.8%)

Nearly half (44.6%) had a high BMI, and nearly half (40.2%) had anaemia. Hypertension and diabetes are present in 31.5% of families, suggesting that genetics and lifestyle contribute to

gestational diabetes and preeclampsia. Only 19.6% had previous obstetric issues; therefore, many were first-time cases.

Maternal Outcomes

Table 4: Maternal Outcomes

Variable	Frequency (n)	Percentage (%)
Mode of Delivery		
Normal Vaginal Delivery (NVD)	38	41.3%
Cesarean Section (LSCS)	54	58.7%
Maternal Complications		
Postpartum Hemorrhage (PPH)	9	9.8%
Eclampsia	4	4.3%
Infection/Fever	7	7.6%
ICU admission	3	3.3%

Cesarean delivery was more frequent (58.7%), particularly among women with preeclampsia or GDM, reflecting the need for timely and controlled delivery in complicated pregnancies. PPH occurred in 9.8% of cases, consistent with known obstetric

risk. Eclampsia was documented in 4 cases (4.3%), demonstrating the severity associated with hypertensive disorders.

Neonatal Outcomes

Table 5: Neonatal Outcomes

Outcome Variable	Mean \pm SD / Frequency (%)
Birth Weight (kg)	2.46 \pm 0.52
Low Birth Weight (< 2.5 kg)	39 (42.4%)
Normal Birth Weight	53 (57.6%)
NICU Admissions	28 (30.4%)
APGAR Score at 5 minutes	
<7	21 (22.8%)
\geq 7	71 (77.2%)

Preterm labour and hypertension caused 42.4% of low birth weight. 30.4% of newborns were admitted to the NICU for respiratory distress or low APGAR scores. Maternal issues affect neonates

because 22.8% had APGAR scores below 7 after 5 minutes.

Comparative Analysis between Groups

Table 6: Comparison of Key Outcomes among the Complication Groups

Outcome	Preeclampsia (n=34)	GDM (n=28)	Preterm Labor (n=30)
LSCS (%)	24 (70.6%)	18 (64.3%)	12 (40.0%)
Low Birth Weight (%)	17 (50.0%)	10 (35.7%)	12 (40.0%)
NICU Admission (%)	13 (38.2%)	7 (25.0%)	8 (26.7%)
APGAR <7 (%)	10 (29.4%)	6 (21.4%)	5 (16.7%)

- Preeclampsia group: Hypertension problems, NICU admissions (38.2%), and caesarean deliveries (70.6%) were high.
- GDM group: Due to macrosomia, caesarean sections increased 64.3% despite higher birth weights.
- Preterm labor group: Due to premature delivery, 40% of babies were born with low birth weight and 26.7% were admitted to the NICU.

Preeclampsia was the most dangerous condition for mothers and newborns, whereas preterm labor had the biggest influence on birth weight.

Discussion

This retrospective study studied 92 pregnancies at S.K.M.C.H. between 2023 and 2024, focused on preeclampsia, GDM, and premature labour and their impact on the mother and newborn. Because

these disorders harm mothers and babies, early diagnosis, monitoring, and treatment are needed to improve outcomes. Preeclampsia was the most common consequence at 36.9%. Socioeconomic status, poor prenatal care, nutrition, and anaemia may increase case count. Global metabolic disease trends match this study's 30.4% GDM prevalence in reproductive-aged women. Preterm labour caused low birth weight and NICU admissions in 32.6% of cases, increasing neonatal morbidity. Caesarean sections (58.7%) were common in maternal outcomes, especially in preeclampsia and gestational diabetes. These results suggest that obstetricians often employ surgery to prevent maternal-fetal compromise from uncontrolled hypertension, foetal distress, or predicted macrosomia. Because clinically relevant postpartum issues like PPH, infections, and ICU admissions are rare, postpartum monitoring should be increased. Neonatal outcomes showed the

impact of pregnancy issues. Low birth weight required NICU admission for 42.4% of newborns. Low APGAR scores were associated with preeclampsia and early labour. These findings demonstrate how pregnancy issues hamper foetal

development and adaptation after birth, confirming the hypothesis that maternal health affects neonatal health.

Comparison with Previous Studies

Table 7: Comparison with the existing study

Study	Study Type	Sample Size	Key Findings	Limitations
Current Study	Retrospective	92	High prevalence of complications: preeclampsia (36.9%), GDM (30.4%), preterm labor (32.6). High C-section rate (58.7%). LBW 42.4%, NICU admission 30.4%.	Single-centre; small sample; retrospective; possible referral bias.
Study 1 [13]	Retrospective	100	Preterm birth incidence 5.5%, associated with anemia, preeclampsia, PROM. Significant neonatal morbidity.	Not complication-focused; retrospective; large general-population denominator.
Study 2 [14]	Cross-sectional	575	GDM prevalence 1.9%. Pre-hypertension strong predictor. Good neonatal outcomes when treated.	Cross-sectional; low-risk sample; screening differences.
Study 3 [15]	Cross-sectional	300	GDM prevalence 8.3%. BMI, age, parity strongly associated. Some adverse outcomes reported.	Single-centre; uses different GDM criteria; moderate sample size.

Reasons for Observed Prevalence: This study's high pregnancy-related issue rate may have several causes. Two-thirds of individuals were rural, suggesting inequities in prenatal care, screening, and dietary guidance. Anaemia (40.2% of cases) and a high BMI (44.6%) are risk factors for preeclampsia and GDM. Lifestyle changes, decreased exercise, and growing obesity may explain the high incidence of GDM cases. S.K.M.C.H.'s tertiary care setting may also catch more difficult pregnancies due to peripheral centre referrals. Referral bias may explain higher prevalence rates than community-based research.

Clinical Implications: The results emphasise the need for better prenatal screening and early detection of preeclampsia, gestational diabetes, and premature delivery. Prioritise prenatal surveillance, early glucose testing, nutritional guidance, and routine blood pressure monitoring. Because these concerns profoundly affected delivery mode and newborn outcomes, early diagnosis can help obstetricians make evidence-based decisions regarding when and how to deliver.

Encourage early prenatal registration, minimise anaemia, and improve maternal nutrition to reduce complications. More neonatal intensive care unit beds and newborn follow-up programs are needed to prevent preterm and low birth weight.

Strengths and Limitations: Focussing on real-world clinical patients from a tertiary care hospital gives this study useful insights into pregnancy-related issues. Hospital data allowed a complete study of infant and maternal variables. However, considerable limits exist due to its retrospective

design and dependence on medical record accuracy and completeness; this study may have introduced documentation bias. Despite its enormous sample size, it was less useful to the community because it only included data from one hospital.

Conclusion

This retrospective study of 92 S.K.M.C.H. women from 2023 to 2024 examined preterm labour, gestational diabetes, and preeclampsia results show prevalence and trends in these illnesses. The study indicated that advanced maternal age, greater BMI, anaemia, and prior obstetric issues were common maternal risk factors. These concerns were strongly connected with low birth weight, NICU admissions, and lower APGAR ratings, as well as a greater incidence of caesarean births and peripartum issues. The data show that early screening, diagnosis, and targeted therapy enhance outcomes for mothers and babies. Early detection allows clinicians to avoid, monitor, and customise antenatal care programs for pregnant women at high risk of preeclampsia and gestational diabetes. Improving routine prenatal care, increasing imaging and biochemical tests, and teaching pregnant women lifestyle adjustments can greatly reduce complications. This study supports systematic risk assessment in prenatal care, which is crucial in low-resource settings because delayed diagnosis often leads to poor outcomes.

Future Research: Preeclampsia, GDM, and premature labour need further study. Causes, predictors, and future effects are included. Prospective cohort studies with larger and more diverse populations are needed to strengthen causal

links and uncover early biomarkers for risk prediction, while retrospective analyses are valuable. For early detection and intervention, biochemical markers, Doppler tests, and new imaging approaches should be investigated. Genetic predisposition, environmental exposures, nutrition, and lifestyle may be needed to identify modifiable risk factors particular to Bihar. Future studies should also evaluate patient education, prenatal screening, and community-based strategies for reducing high-risk pregnancies. Long-term follow-up studies are needed to evaluate how Gestational Diabetic Mellitus (GDM) and preeclampsia affect mothers' and children's metabolic, cardiovascular, and developmental health.

Policy-driven research, multicentric research collaborations, and digital health tools can facilitate standardised recommendations and maternal healthcare system strengthening.

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