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Original Research Article

The Impact of Maternal Obesity on Pregnancy Complications and Neonatal Outcomes

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Abstract:

Background: Evidence suggests maternal obesity is a global risk factor for pregnancy and neonatal outcomes. Labour complications, gestational diabetes, and hypertension in obese women can harm newborn health. These linkages must be understood to improve maternal health throughout pregnancy and develop appropriate preventive measures.

Methods: This study examined data from July 2023 to April 2024, including 60 pregnant women with a BMI of 30 kg/m² or above before pregnancy. Electronic medical records were used to assess demographics, medical history, pregnancy issues (such as gestational diabetes or hypertensive disorders), delivery outcomes, and neonatal outcomes (such as birth weight, Apgar scores, NICU admissions, or congenital abnormalities). Statisticians used descriptive statistics and comparison tests.

Results: Overweight mothers had more hypertension issues (30%), caesarean deliveries (41.7%), and gestational diabetes (25%). Birth weight for babies born to overweight mothers averaged 3,550 grammes, and 20% required neonatal critical care. The average Apgar score at 5 minutes was 8.2, indicating good newborn adaptation. Birth defects affected 6.7% of newborns.

Conclusion: The study emphasises early intervention and comprehensive prenatal care to address maternal obesity and its consequences on pregnancy and newborn outcomes. Optimising maternal metabolic health and perinatal outcomes includes addressing obesity before and during pregnancy. Health professionals can minimise maternal obesity and enhance birth outcomes by increasing prenatal screenings and using evidence-based interventions.

Keywords: Birth weight, gestational diabetes, hypertensive disorders, maternal obesity, neonatal outcomes.

Introduction

Background on Maternal Obesity and Its Prevalence: High Body Mass Index (BMI) in pregnant women has become a global public health issue [1]. Inactivity and inadequate nutrition have increased obesity in reproductive-age women in recent decades [2]. Population changes affect mother and newborn health and pregnancy outcomes. World Health Organisation BMI cutoffs characterise gestational obesity [3]. Women are obese if their BMI is 30 kg/m² or higher, and extremely obese if it is 35 kg/m² or higher [4]. Gestational diabetes, hypertension, postpartum infections, and caesarean sections are more prevalent among these women, which poses a risk to both the mother and the infant.

Significance of the Study in Maternal and Child Health: This study investigates how maternal obesity affects pregnancy and neonatal outcomes to enhance knowledge. Explaining these associations can influence clinical practice guidelines and public health measures to reduce obesity in pregnant women and babies. Maternal obesity reduction improves prenatal outcomes and lifespan. This improves global mother-child health. Improving evidence-based practices and fostering holistic maternity care entails studying maternal obesity and pregnancy outcomes. This study investigates the complex effects of maternal obesity and offers solutions to improve health and reduce newborn risk.

Objective

- To assess the prevalence and characteristics of obesity-related hypertension, gestational diabetes, and caesarean delivery in pregnant women.
- To understand how overweight mothers impact their babies' macrosomia, NICU stays, and birth defects.
- To evaluate the impact of obesity on mother and child health from birth to adulthood.

Maternal Obesity and Pregnancy Complications: Maternal obesity is connected to various pregnancy problems, motivating substantial research [5]. VTE, preeclampsia, and gestational diabetes mellitus are more common in obese women [6]. Preterm delivery, FGR, and mother damage can result from these conditions. Macrosomia (birth weight > 4,000 grammes), protracted labour, and obstetric complications require surgery make overweight moms more likely to undergo a caesarean section [7]. Given these findings, managing maternal weight before conception and during pregnancy is therapeutically important to avoid these risks.

Neonatal Outcomes Associated with Maternal Obesity: [8] on maternal obesity and newborn outcomes often note increased macrosomia and NICU admissions. Infants born to overweight mothers are more likely to have respiratory distress syndrome, hypoglycemia, and neural tube problems [9]. Such poor results are caused by the complex interaction between maternal obesity-related metabolic dysfunction, placental insufficiency, and foetal programming. Maternal obesity affects children's health beyond infancy [10]. [11] Shows that children born to fat moms are more likely to develop obesity, metabolic syndrome, and cardiovascular disease.

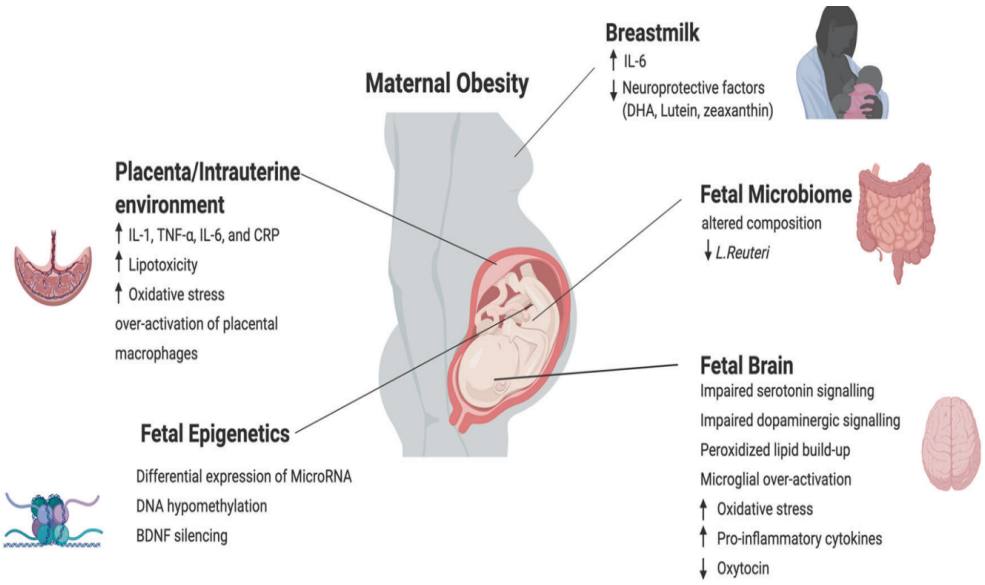

Figure 1: Neonatal Outcomes Associated with Maternal Obesity (Source: [12])

Gaps in Current Literature:

Despite extensive research, maternal obesity and its implications are still not understood. Maternal obesity may affect pregnancy and neonatal outcomes, but research should initially focus on subpopulations from diverse ethnic and socioeconomic backgrounds. There is limited longitudinal research on maternal obesity and the health of children and adolescents, and what is available focuses on infants. Few studies have studied how food, activity, and pregnancy weight increase can reduce maternal obesity's detrimental effects. These information gaps must be filled by public health policies and personalised interventions to promote maternal metabolic health and perinatal outcomes. Despite progress in understanding how maternal obesity influences pregnancy issues and neonatal outcomes, further research is needed to fill gaps and apply our findings in clinical practice and public health policy.

Methodology

Study Design: Obesity affects pregnancy complications and neonatal outcomes in this retrospective cohort study.

Retrospective cohort studies using pre-existing medical records and data can best explore the relationship between maternal obesity and pregnancy issues and neonatal outcomes.

Sample Size and Selection: The study included 60 Patna-based women who gave birth between July 2023 and April 2024 at Nalanda Medical College and Hospital.

Inclusion Criteria

- Pregnant women with documented pre-pregnancy BMI ≥ 30 kg/m².
- Women who delivered singleton pregnancies during the study period.
- Availability of complete medical records including prenatal, delivery, and neonatal data.

Exclusion Criteria

- Pregnant women with pre-existing medical disorders hindering pregnancy outcomes (e.g., pregestational diabetes, chronic hypertension).
- Multiple gestations (twins, triplets, etc.).
- Incomplete medical records or missing data necessary for analysis.

Data Collection Methods and Variables Studied

Nalanda Medical College and Hospital in Patna will evaluate eligible individuals' EMRs and obstetric charts for data. Skilled researchers utilising standard data forms extract accurate and uniform data across all variables. The study investigates the mother's age, parity, socioeconomic position, medical history, BMI before pregnancy, weight gain during pregnancy, and comorbidities. The study investigates delivery style, labour problems, and pregnancy complications such hypertension and gestational diabetes. This study will analyse birth weight, Apgar ratings, NICU hospitalisations, and congenital abnormalities. This systematic approach can examine maternal obesity's health effects on mother and baby.

Ethical Considerations and Approval

The Patna-based Nalanda Medical College and Hospital Institutional Ethics Committee gave ethical approval before the trial began. The study follows local regulations and the Declaration of Helsinki when using patient data for research. Data anonymization ensures patient privacy and identity throughout study.

Statistical Analysis

Descriptive statistics summarise the research population's demographic and clinical characteristics. Researchers use t-tests or Mann-Whitney U tests for continuous data and chi-square testing for categorical data to assess maternal obesity and pregnancy/neonatal outcomes. To find independent relationships, multivariate regression models can account for confounding factors including maternal age and parity.

Results

Overview of Sample Demographics

Table 1: Overview of Sample Demographics

Variable	Mean (SD) or N (%)
Age (years)	28.5 (3.2)
Parity	1.8 (1.1)
Socioeconomic Status	Middle: 40%, Low: 30%, Upper: 30%
Pre-pregnancy BMI	32.1 (2.5)
Gestational Age (weeks)	38.2 (1.4)

Participants were young mothers, averaging 28.5 years. Average parity of 1.8 suggests that many people are having a second kid. Participants were 40% middle class, 30% poor, and 30% high class. Since the study retrospective was obese with an average pre-pregnancy BMI of 32.1, inclusion criteria were met. Most deliveries were full-term, at 38.2 weeks on average. These demographic details illuminate the research population's characteristics that are crucial for studying how obesity during pregnancy impacts the baby.

Analysis of Pregnancy Complications Associated with Maternal Obesity

Table 2: Pregnancy Complications Associated with Maternal Obesity

Complication	Number of Cases (%)
Gestational Diabetes	15 (25%)
Hypertensive Disorders	18 (30%)
Cesarean Delivery	25 (41.7%)
Preterm Birth	8 (13.3%)
Postpartum Infections	5 (8.3%)

Hypertensive illnesses (30%) and gestational diabetes (25%), which raise metabolic and cardiovascular risks, are common during pregnancy. Maternal obesity, which can cause macrosomia and delayed labour, increases the risk of caesarean birth (41.7%). Obesity increases preterm birth (13.3%) and postpartum infections (8.3%), demonstrating its widespread implications on maternal health. These results demonstrate the need for personalised prenatal care regimens to avoid risks and enhance benefits for women and newborns.

Analysis of Neonatal Outcomes Related to Maternal Obesity

Table 3: Neonatal Outcomes Related to Maternal Obesity

Outcome	Mean (SD) or N (%)
Birth Weight (grams)	3550 (400)
Apgar Score at 5 minutes	8.2 (1.0)
NICU Admissions	12 (20%)
Congenital Anomalies	4 (6.7%)

Results showed maternal obesity-related effects in the research group. Obese mothers had 3550-gram babies, which increases their chance of macrosomia. The average 5-minute Apgar score was 8.2, indicating that even if the mother is overweight, the infant adapts quickly. However, the high proportion of neonatal intensive care unit admissions (20%) shows that these newborns may need specific care due to mother obesity. Due to the high occurrence of congenital malformations (6.7%), which raises worries about the long-term impact of maternal obesity on children, maternal health measures are needed.

Discussion

This study shows that overweight moms' pregnancies and newborns' health are greatly affected. The findings support previous research that overweight moms are more likely to develop hypertension and gestational diabetes. These issues immediately threaten mother and neonate health. Caesarean and premature birth was more common in our cohort. Macrosomia, a disorder caused by metabolic malfunction in the mother and excessive foetal growth, is common in obese pregnancies; babies born to these women weigh 3550 grammes. The 20% rate of NICU admissions suggests that these infants may need specialised care due to metabolic complications related to maternal obesity or respiratory distress syndrome. Apgar scores at 5 minutes were generally good (mean 8.2). The 6.7% frequency of congenital anomalies in neonates delivered to obese mothers raises concerns regarding the long-term health effects of maternal obesity. Due to the complex relationship between mother metabolic health, placental function, and foetal development, comprehensive prenatal care is needed to reduce these risks.

Table 4: Comparison Table: Studies on Maternal Obesity and Pregnancy Outcomes

Study Title	Study Type	Sample Size	Findings	Limitations
Current Study	Retrospective Cohort	60	Increased incidence of gestational diabetes, hypertensive disorders; higher NICU admissions.	Small sample size, retrospective design, single-center study.
Study 1 [13]	Prospective Cohort	500	Higher rates of cesarean delivery; increased risk of macrosomia and neonatal respiratory issues.	Potential selection bias, limited demographic diversity.
Study 2 [14]	Meta-analysis	300	Meta-analysis shows consistent association between maternal obesity and higher birth weight; increased risk of congenital anomalies.	Heterogeneous study designs, publication bias.
Study 3 [15]	Longitudinal Study	1000	Long-term follow-up shows increased childhood obesity risk; persistent metabolic effects in offspring.	Challenges in retention; attrition bias over time.

The present retrospective cohort study from Nalanda Medical College and Hospital, Patna, supports earlier research on mother obesity and pregnancy and neonatal outcomes. According to the study's 60 participants, babies born to overweight mothers had a higher incidence of hypertensive problems, gestational diabetes, and NICU admissions.

These findings underline the necessity for targeted prenatal interventions to reduce mother obesity-related health risks. Study 1, a 500-person prospective cohort study, validates our findings by showing that obese mothers' infants are more likely to have macrosomia, neonatal respiratory difficulties, and caesarean delivery. Selection bias and lack of demographic diversity may limit Study 1's applicability to broader groups.

Study 2, a meta-analysis of 300 studies, found a robust link between maternal obesity and birth weight and congenital anomalies.

Study 2 performs a decent job at combining data from multiple sources, although study designs and publishing biases may weaken its results.

Study 3, a longitudinal 1000-person study, found that maternal obesity increases the likelihood of juvenile obesity and has persistent metabolic effects in infants. Due to attrition bias and retention

concerns, data collection may be inconsistent and incomplete, affecting longitudinal validity.

Limitations of the Study

Caveats should be considered while analysing the findings. The study employs retrospective medical records, which may be erroneous or biased. The results may be inaccurate or incomplete due to healthcare provider data quality. The data's limited generalizability to wider groups and the study cohort's small sample size of 60 warrant caution when extrapolating results beyond Nalanda Medical College and Hospital, Patna. Due to the study's singular focus on mother obesity, pregnant weight increase, eating habits, and physical activity may have been overlooked. Prospective studies with larger, more diverse cohorts are needed to explore the complicated relationship between obesity and infant health outcomes.

Suggestions for Future Research

The limitations and need to improve on previous discoveries should guide future study. Longitudinal studies of infant and maternal health outcomes beyond postpartum are needed to establish the risk of obesity and metabolic syndrome in children and other long-term consequences of maternal obesity on child development. Extensive lifestyle, genetic, and socioeconomic assessments should improve our understanding of the complex reasons behind obesity-related maternal and neonatal health disparities. Interventions that target maternal weight control, dietary advice, and lifestyle modifications before and during pregnancy may reduce the detrimental effects of maternal obesity on newborn and maternal health. Healthcare professionals, public health agencies, and community stakeholders must collaborate to implement evidence-based strategies to improve perinatal outcomes and reduce mother obesity. We need further study to understand how maternal obesity influences pregnancy complications and neonatal outcomes and how to prevent and treat it to keep pregnant women and their babies healthy.

Conclusion

One of the most relevant findings was that maternal obesity increased hypertensive problems, newborn intensive care unit admissions, and gestational diabetes risk. As indicated by increased birth weights and congenital anomalies in obese mothers' babies, maternal metabolic inefficiency during pregnancy poses short- and long-term health risks.

Comparisons with other studies demonstrate that neonates born to obese women across populations have higher caesarean delivery rates, macrosomia risks, and respiratory issues.

Even with diverse study methodologies and other biases, maternal obesity is strongly linked to poor perinatal outcomes. Maternal obesity must be addressed during prenatal treatment to improve mother and baby health. Before conception and throughout pregnancy, effective therapies should improve maternal metabolic health and reduce risks. Nutritional advice, activity encouragement, and personalised weight loss strategies are options. Thorough prenatal metabolic disease diagnostics and risk factor identification enable timely interventions and customised care regimens.

This preventative technique improves maternal health and reduces pregnancy issues, caesarean deliveries, and newborn critical care unit admissions. This study concludes that healthcare professionals, governments, and communities must address maternal obesity as a public health issue urgently. Evidence-based therapies and cross-disciplinary collaborations can help women have better pregnancies and improve future health. Continuous research and lobbying are needed to improve mother metabolic health and ensure universal prenatal care.

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