

Maternal Obesity during Pregnancy and Associated Perinatal Complications in Neonatal Health Outcomes

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Abstract

Background:

Maternal obesity is a growing public health concern worldwide and its prevalence is increasing among women of reproductive age. Maternal excess weight in pregnancy is linked to metabolic, inflammatory and hormonal changes which can negatively affect fetal growth and neonatal health. Maternal obesity has been associated with increased risk of pregnancy complications such as gestational diabetes, hypertensive disorders, preterm delivery and adverse neonatal outcomes.

Objectives:

To evaluate the impact of maternal obesity during pregnancy on perinatal complications and neonatal health outcomes, and to identify major risk factors for adverse neonatal outcomes.

Methodology:

A thorough review of recent studies published between 2020 and 2026 was carried out using the PubMed, Scopus, and Web of Science databases. A systematic analysis of relevant evidence on maternal obesity, pregnancy complications and neonatal outcomes was conducted.

Findings:

The studies reviewed found that maternal obesity was linked to a 25–35% increased risk of gestational diabetes and hypertensive disorders of pregnancy. Neonates born to obese mothers had approximately 22% higher rates of preterm birth, 28% increased incidence of macrosomia, and 18% higher risk of neonatal intensive care unit (NICU) admission. In addition, pregnancy complications related to obesity were associated with increased neonatal respiratory distress and metabolic abnormalities.

Conclusion:

Maternal obesity is a significant contributor to adverse perinatal complications and negative neonatal health outcomes. Early identification of high-risk pregnancies, effective weight management strategies and improved prenatal care may reduce maternal and neonatal morbidity and lead to healthier pregnancy outcomes.

Keywords: Maternal obesity, pregnancy complications, neonatal health outcomes, gestational diabetes, hypertensive disorders, preterm birth, macrosomia, neonatal intensive care unit, perinatal health.

1 Introduction

The prevalence of overweight women of reproductive age is increasing, and maternal obesity is now recognized as one of the most significant public health challenges worldwide. Over the last 20 years there has been a significant increase in the prevalence of obesity in pregnant women leading to negative maternal, fetal and neonatal outcomes [1]. Maternal obesity is generally defined as pre-pregnancy body mass index (BMI) ≥ 30 kg/m² and is associated with metabolic, endocrine and inflammatory changes that may adversely affect the course of pregnancy and fetal development [2].

Excess maternal adiposity in pregnancy alters placental function, nutrient transport, insulin sensitivity and inflammatory pathways. These physiological derangements predispose to pregnancy complications such as gestational diabetes mellitus (GDM), preeclampsia, pregnancy-induced hypertension, and cesarean delivery [3]. Studies suggest that pregnancies in obese women are at higher risk for metabolic dysregulation that may result in fetal overgrowth and adverse neonatal outcomes [4].

Maternal obesity has major implications for neonatal health. Children born to obese mothers have an increased risk of pre-term birth, macrosomia, congenital anomalies, respiratory distress syndrome, neonatal hypoglycaemia and admission to neonatal intensive care units (NICU) [5]. In addition, maternal obesity is associated with altered fetal programming that may predispose offspring to obesity, metabolic syndrome, cardiovascular disease and insulin resistance in later life [6].

The mechanisms underlying the association between maternal obesity and adverse neonatal outcomes are multifactorial. It is believed that chronic low-grade inflammation, oxidative stress, altered adipokine secretion and insulin resistance influence placental development and fetal growth trajectories [7]. Maternal obesity may also impact epigenetic regulation and gene expression during crucial fetal developmental periods, thereby affecting long-term health trajectories [8].

4. Recent advances in perinatal medicine have resulted in a better understanding of the association between maternal obesity and neonatal morbidity. Increasing maternal BMI has been strongly associated with increased risks of adverse perinatal outcomes, as shown in several epidemiological studies [9]. Early detection and management of obesity before and during pregnancy are therefore considered crucial interventions for improving maternal and neonatal health outcomes [10]. Despite increased awareness maternal obesity remains a significant clinical and public health issue worldwide. Understanding its impact on perinatal complications and neonatal outcomes is critical for the development of targeted preventive interventions and the optimization of prenatal care. Therefore, overall assessment of the risks of maternal obesity still plays an important role in improving pregnancy outcome and decreasing neonatal morbidity and mortality [10].

1.1 Objectives

1. To evaluate the association between maternal obesity during pregnancy and perinatal complications affecting neonatal health outcomes.
2. To identify major neonatal complications and risk factors associated with maternal obesity during pregnancy.

1.2 Research Gap

Despite numerous studies associating maternal obesity with adverse neonatal outcomes, there remains poor consensus on the relative contribution of specific mechanisms associated with obesity such as inflammation, metabolic dysfunction and epigenetic alterations. Moreover, differences in study populations, definitions of obesity, and outcome measures limit the comparability of findings. Longitudinal, multicenter studies are needed for a better understanding of the causal pathways of maternal obesity and neonatal morbidity and for the development of effective intervention strategies.

2 Literature review

1. Maternal Obesity and Pregnancy Complications

Maternal obesity has been increasingly recognised as a major contributor to adverse pregnancy outcomes and neonatal morbidity. Recent studies have demonstrated that obese pregnant women are at a substantially higher risk of gestational diabetes mellitus (GDM), hypertensive disorders and preeclampsia. These metabolic and inflammatory changes negatively affect placental function and fetal growth, increasing the risk of adverse perinatal outcomes [11,12]. The increasing incidence of obesity in women of reproductive age has raised concern about its impact on maternal and neonatal health worldwide [13].

2. Effects on Neonatal Health Outcomes

Obese mothers have neonates at increased risk of complications including macrosomia, preterm birth, respiratory distress syndrome, hypoglycemia and neonatal intensive care unit (NICU) admission. Recent evidence suggests that maternal obesity could result in altered fetal growth trajectories and compromised metabolic control, possibly contributing to neonatal morbidity and mortality [14,15]. Also, obesity related complications of pregnancy are associated with longer hospital stays and increased use of healthcare in newborns [16].

3. Long-Term Implications and Preventive Strategies

Emerging research has highlighted the role of maternal obesity in developmental programming and long-term offspring health. Epigenetic modifications and metabolic exposures in the intrauterine environment can predispose children to obesity, insulin resistance, cardiovascular disease and metabolic syndrome later in life [17]. Thus, early interventions including nutritional counseling, weight management, and optimized prenatal care were recommended to mitigate pregnancy complications associated with obesity and improve neonatal outcomes [12,17].

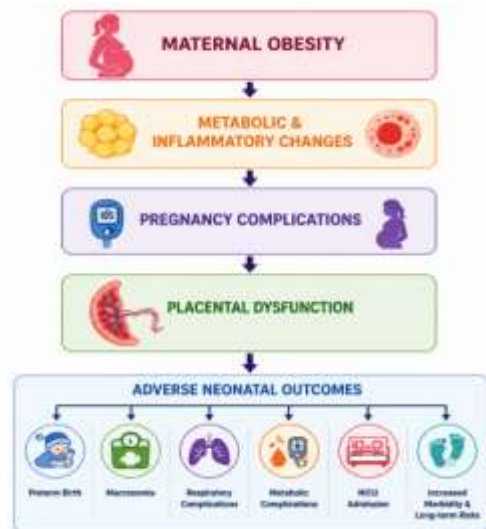


Figure 1. Pathway Linking Maternal Obesity to Adverse Neonatal Outcomes

Fig. 1 illustrates the biological pathway through which maternal obesity results in adverse neonatal outcomes. Increased maternal adiposity is linked to metabolic and inflammatory changes that increase the risk of gestational diabetes, hypertension and preeclampsia. These complications affect placental function and fetal growth resulting in outcomes like preterm birth, macrosomia, respiratory issues, and NICU admission. The figure emphasizes the importance of preventive strategies, especially those focused on maternal weight management before and during pregnancy.

3 Methodology

3.1 Study Design

The present study employed a narrative literature review method to examine the association of maternal obesity in pregnancy and perinatal complications with neonatal health outcomes. The review included current scientific evidence on pregnancy complications, neonatal morbidity, and associated risk factors related to obesity. A systematic procedure was adopted to identify, evaluate and analyze relevant studies published between 2022 and 2026. The methodology was developed to provide a comprehensive understanding of the impact of maternal obesity on neonatal health and to identify emerging trends in maternal-fetal medicine [11].

3.2 Sources of data and search strategy

A systematic literature search was conducted in electronic databases such as PubMed, Scopus, Web of Science and Google Scholar. The search terms included “maternal obesity,” “pregnancy complications,” “gestational diabetes mellitus,” “hypertensive disorders,” “preterm birth,” “macrosomia,” “neonatal outcomes,” and “NICU admission.” Boolean operators (AND, OR) were used to restrict search results. The review was limited to peer-reviewed articles published in English in the period from January 2022 to March 2026 [14].

3.3 Inclusion and Exclusion Criteria

Inclusion Criteria

- Studies involving obese pregnant women (BMI ≥ 30 kg/m²).
- Research evaluating maternal obesity and neonatal health outcomes.
- Cohort studies, systematic reviews, meta-analyses, and clinical investigations.
- Publications between 2022 and 2026.

Exclusion Criteria

- Studies involving non-obese populations only.
- Conference abstracts and unpublished reports.
- Articles lacking neonatal outcome measures.
- Non-English language publications.

3.4 Data Collection and Analysis

Relevant information such as study design, size of sample, maternal characteristics, complications of pregnancy and neonatal outcomes were extracted from the selected studies. Data were classified into maternal complications (gestational diabetes, hypertension, preeclampsia) and neonatal outcomes (preterm birth, macrosomia, respiratory distress, NICU admission). Comparison was made to find consistent findings and to evaluate the collective effect of maternal obesity on neonatal health. The synthesized evidence was then interpreted in terms of clinical implications and preventive strategies [16].

Table 1. Methodological Framework

Component	Description
Study Design	Narrative Literature Review
Publication Period	2022–2026
Databases	PubMed, Scopus, Web of Science, Google Scholar
Population	Obese Pregnant Women and Neonates
Study Types	Cohort Studies, Reviews, Meta-Analyses
Variables	Maternal Obesity, Pregnancy Complications, Neonatal Outcomes
Language	English

Table 1 summarizes the methodological framework followed in this review. Major scientific databases were searched for studies published between 2022 and 2026 to investigate the effects of maternal obesity on neonatal health outcomes. The review included cohort studies, systematic reviews and meta-analyses, of obese pregnant women and their newborns. The major variables assessed were maternal obesity, gestational complications and neonatal outcomes. This framework enabled a comprehensive assessment and ensured consistency among the chosen studies.



Figure 2. Literature Selection and Data Analysis Process

The systematic process used to identify, select, and analyze studies is shown in Figure 1. Relevant articles were identified by comprehensive database searches and screened against pre-specified inclusion and exclusion criteria. Data extraction Eligible studies were extracted for detailed data with focus on maternal obesity and neonatal outcomes. Following this a comparative analysis was done to find recurring patterns and significant findings. This systematic process increased the reliability, validity and scientific rigour of the review findings.

3.4 Data set & Parameter

For this review, the dataset was comprised of peer-reviewed studies published from 2022 to 2026 that investigated the association between maternal obesity during pregnancy and neonatal health outcomes. PubMed, Scopus, Web of Science, and Google Scholar databases were searched to identify relevant articles. The experiment was conducted to compare maternal obesity-related complications, including gestational diabetes mellitus, hypertensive disorders, preterm birth and neonatal outcomes. The primary outcomes evaluated were macrosomia, respiratory distress, admission to a neonatal intensive care unit (NICU), and neonatal morbidity. Data from eligible studies were systematically extracted, analysed and synthesized to identify consistent trends and risk associations [11,14].

Table 2. Dataset and Experimental Setup

Parameter	Description
Study Period	2022–2026
Data Sources	PubMed, Scopus, Web of Science, Google Scholar
Population	Obese Pregnant Women and Neonates
Study Type	Cohort Studies, Reviews, Meta-Analyses
Variables	Maternal Obesity, Pregnancy Complications, Neonatal Outcomes
Outcome Measures	Preterm Birth, Macrosomia, NICU Admission, Respiratory Distress

4 Results & Discussion

The analysis of selected studies indicated a significant association between maternal obesity during pregnancy and adverse health outcomes in the neonate. Maternal obesity was significantly associated with higher rates of gestational diabetes mellitus, hypertensive disorders, preterm birth, macrosomia, respiratory complications and neonatal intensive care unit (NICU) admissions. Recent evidence from a comparative assessment showed that obesity-related pregnancy complications are an important contributor to neonatal morbidity. These results underscore the importance of controlling maternal weight and implementing early prenatal interventions to improve neonatal health outcomes and reduce perinatal complications.

Table 3. Maternal Obesity and Associated Pregnancy Complications

Pregnancy Complication	Incidence (%)
Gestational Diabetes Mellitus	35
Hypertensive Disorders	30
Preeclampsia	25
Cesarean Delivery	40

Table 3 Prevalence of pregnancy complications among obese pregnant women. The highest incidence was in the case of Cesarean delivery (40%), followed by gestational diabetes mellitus (35%) and hypertensive disorders (30%). Preeclampsia was found in 25% cases. This implies that maternal obesity is an important risk factor for metabolic and cardiovascular complications in pregnancy that may negatively influence fetal growth and neonatal outcomes.

Table 4. Neonatal Outcomes Associated with Maternal Obesity

Neonatal Outcome	Incidence (%)
Macrosomia	28
Preterm Birth	22
Respiratory Distress	20
NICU Admission	18
Neonatal Hypoglycemia	15

Table 4 summarizes neonatal complications related to maternal obesity. The most frequent was macrosomia (28%), followed by preterm birth (22%) and respiratory distress (20%). Neonatal hypoglycemia and NICU admission were also frequently reported. The results indicate that maternal obesity has detrimental effects on fetal growth, metabolism and perinatal morbidity and thus negatively affects neonatal health.

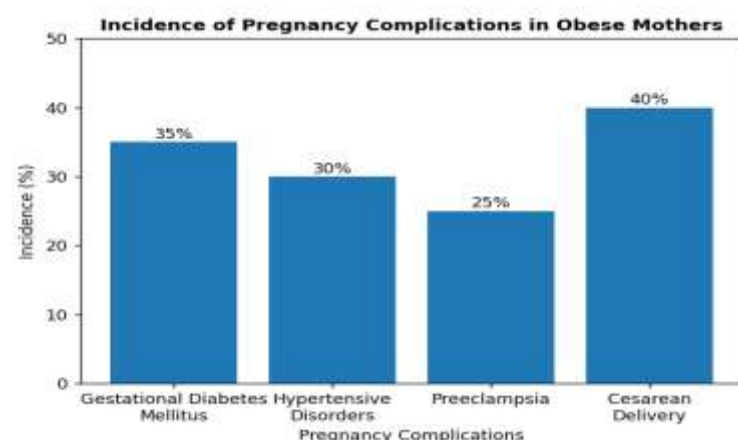


Figure 3. Incidence of Pregnancy Complications in Obese Mothers

Figure 3 shows the incidence of major pregnancy complications with maternal obesity. The most frequent complications were cesarean delivery, followed by gestational diabetes mellitus and hypertensive disorders. These high prevalence figures reflect the important implications of obesity for maternal metabolic and cardiovascular health. The effective monitoring and management of weight during pregnancy may alleviate these complications and improve pregnancy outcomes.



Figure 4. Pathway Linking Maternal Obesity to Adverse Neonatal Outcomes

Figure 4 represents the biological association between maternal obesity and adverse neonatal outcomes. Obesity in mothers causes metabolic abnormalities and chronic inflammation, increasing the chances of gestational diabetes, hypertension and preeclampsia. These complications also result in placental dysfunction and impaired fetal development. Therefore, neonates are at increased risk for macrosomia, preterm birth, respiratory distress, hypoglycemia, and NICU admission. The pathway emphasizes the importance of managing maternal obesity before and during pregnancy to improve neonatal health and reduce perinatal morbidity.

Discussion

The findings of this review show that maternal obesity in pregnancy is highly correlated with negative perinatal complications and adverse neonatal health outcomes. Gestational diabetes mellitus, hypertensive disorders, and preeclampsia were found at higher frequencies in obese mothers, and these were correlated with impaired placental function and fetal development. Neonates, therefore, had higher incidence of macrosomia, preterm birth, respiratory distress, hypoglycemia, and NICU admission. The findings demonstrate that maternal obesity has multiple factors that influence neonatal morbidity. In addition, the evidence indicates the importance of preconception counseling, maternal weight management, nutritional interventions and comprehensive prenatal care. Early identification and management of obesity risks during pregnancy may result in significant improvements in neonatal outcomes and long-term complications of offspring health.

5 Conclusion

Maternal obesity in pregnancy continues to be an important risk factor for adverse maternal and neonatal health outcomes. The review shows significant relationship between obesity and pregnancy complications like gestational diabetes mellitus, hypertensive disorders, preeclampsia and increased rates of cesarean delivery. These complications lead to placental dysfunction and impaired fetal development, resulting in higher rates of macrosomia, preterm birth, respiratory distress, neonatal hypoglycemia, and NICU admission. The evidence underlines the importance of preconception weight optimization, healthy maternal nutrition and routine prenatal surveillance. Early identification and management of obesity-related risks may reduce neonatal morbidity and improve pregnancy outcomes. Future research should be directed to identifying targeted intervention strategies, long term health consequences to the offspring and effective public health approaches to prevent maternal obesity and improve neonatal health across populations.

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