



Original Research Article

MATERNAL OBESITY AND PREGNANCY OUTCOME

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Abstract: Background: Obesity in mothers has become a significant global issue when it comes to health and is closely linked to unfavorable maternal and infant outcomes. Overweight mothers during pregnancy are likely to give birth to metabolically disturbed offspring with obstetric complications. **Purpose:** To identify the rate of maternal and neonatal complications in pregnant women with overweight and obesity and identify their pregnancy outcomes. **Methods:** This was a descriptive longitudinal study done in the Department of Obstetrics and Gynecology. ISRA Hospital Hyderabad, Pakistan, that was performed in a period of more than Four months after research synopsis was approved from July 2025 and October 2025. One hundred and fifty pregnant women with a body mass index (BMI) of 25kg/m² and above were involved and observed to delivery. The structured proforma was used in collecting data about maternal complications, mode of delivery, and neonatal outcomes, which were analyzed with SPSS version 26. Findings: The maternal complication that occurred most often (24%), was gestational diabetes mellitus, and then pregnancy induced hypertension (20%) and pre-eclampsia (14.7%). In 40 percent of cases cesarean section was noted. Neonatal outcomes were macrosomia (21.3%), admission to the NICU (14%), and low Apgar score (10%). **Conclusion:** Maternal obesity is linked to complications during pregnancy and poor birth outcomes of children. Early pregnancy screening and proper antenatal care should be provided to enhance the outcome of pregnancy.

Keywords: Maternal obesity, birth outcome, gestational diabetes mellitus, cesarean, birth outcomes, birth complications, body mass index.

INTRODUCTION

Maternal obesity has become an important issue of worldwide public health, especially due to its high rate of correlation with poor maternal and fetal outcomes. It has been shown that the number of obese women of childbearing age has been significantly rising throughout the last few decades, and this raises the number of pregnancy complications. Overweight maternal adiposity has been associated with distortion of metabolism, inflammatory events, and hormonal imbalances that may adversely affect the course of pregnancy. These physical changes might predispose pregnant women to complications like gestational diabetes, high blood pressure disorders, cesarean birth, and postpartum complications. As a result, the significance of

maternal obesity has made it a significant subject of obstetric studies and clinical interventions because of its effects on maternal health and infant wellbeing (1). Obesity in pregnancy is also strongly related to the cardiometabolic disturbances that influence the physiology of the mother before, during, and after pregnancy. Women who have a higher body mass index tend to exhibit atypical glucose metabolism, insulin resistance, and dyslipidemia, which can worsen during pregnancy due to the changes that occur in the metabolism of the body. These metabolic changes predispose one to gestational diabetes mellitus, pregnancy-induced hypertension, and preeclampsia. Moreover, obesity may make pregnancy treatment, labor, and postpartum management complex. These conditions not only cause maternal morbidity but also cause long-term

health risks to both the mother and her child (2).

Recent epidemiological research has proved that maternal overweight and obesity play a great role in negative pregnancy outcomes in several populations and geographic regions. Cohort studies that involve population groups show that a high body mass index of women during pregnancy increases their risks of developing preterm birth, fetal macrosomia, and stillbirth. These results underscore the fact that maternal adiposity is a significant predictor of the outcome of pregnancy regardless of maternal birth region and socioeconomic status. The weight of pregnancy complications due to obesity is on the increase with the growing prevalence of obesity among women of reproductive age, worldwide (3). The rising prevalence of pre-pregnancy obesity has been a phenomenon that has been widely recorded in most countries. Research that has been done on the recent population statistics has indicated a consistent rise in the percentage of women going through pregnancy with an excessive amount of body weight. This is alarming since obesity in pregnancy poses a great risk of complications in the mother, like cesarean section, gestational hypertension, and thromboembolic disorders. As well, the children born to obese mothers have higher chances of suffering poor outcomes such as large-for-gestational-age birth weight and neonatal intensive care. These tendencies denote the critical importance of treating obesity prior to conception in order to enhance the outcome of the pregnancy (4).

The studies of maternal adiposity have also stressed the fact that various indicators of obesity, including body mass index, waist circumference, and total body fat distribution, are important. The systematic reviews and meta-analyses have also proved that a greater maternal adiposity is closely linked to unfavorable maternal outcomes, such as postpartum bleeding, extended labor, and cesarean birth. Overweight fat tissue lead to chronic inflammation and metabolic disruptions that may interfere with the normal physiological functions in pregnancy. These results indicate that not only is the mother's obesity a complication risk factor, but also a major predictor of obstetric management difficulties (5). Obesity in mothers is an emerging issue in most developing nations, such as Pakistan, which is being brought about by altered eating habits, lack of physical activity, and urbanization. Obese women during pregnancy have been reported to develop complications more than pregnant women do, including gestational diabetes, pregnancy-induced hypertension, and the fetus developing abnormalities in growth. Such complications may result in incidences where medical interventions are more required during pregnancy and delivery, thus putting extra strain on healthcare systems. Knowledge of the association between maternal obesity and pregnancy

events in these contexts is therefore valuable in enhancing maternal and neonatal well-being in such environments (6).

Maternal factors during pregnancy play a critical role in shaping both short-term and long-term health outcomes for the mother and the child. Obesity represents one of the most important modifiable maternal factors that can influence fetal development and childhood health. Exposure to an obesogenic intrauterine environment may predispose offspring to metabolic disorders, obesity, and cardiovascular diseases later in life. This intergenerational impact highlights the importance of addressing maternal obesity as part of strategies aimed at improving population health outcomes (7). Both low and high maternal body mass index have been associated with adverse pregnancy outcomes, although obesity presents particularly significant risks. Studies investigating maternal BMI have demonstrated strong associations between increased BMI and complications such as gestational diabetes, hypertensive disorders, and cesarean section. Additionally, abnormal maternal BMI can influence placental function and fetal growth patterns, leading to outcomes such as macrosomia or growth restriction. These findings reinforce the importance of maintaining optimal maternal weight before conception and during pregnancy (8). Clinical investigations conducted in hospital settings have further confirmed the relationship between maternal obesity and poor pregnancy outcomes.

Research examining obese pregnant women has identified higher rates of cesarean delivery, postpartum complications, and neonatal morbidity compared with women of normal body weight. Maternal obesity also increases the likelihood of fetal macrosomia and birth injuries, which can have lasting effects on neonatal health. These clinical observations highlight the need for early identification and management of obesity in pregnant women (9). Nutritional status during pregnancy also plays an important role in determining maternal and fetal health outcomes. Women who undergo significant weight changes or have altered nutritional status before pregnancy may experience increased risks during gestation. For instance, nutritional imbalances or metabolic disturbances associated with obesity can influence placental function and fetal development. Maintaining appropriate maternal nutrition and body weight is therefore essential for ensuring healthy pregnancy outcomes and minimizing complications (10). Several studies have reported that prepregnancy overweight and obesity are strongly associated with adverse maternal and perinatal outcomes. These outcomes include gestational hypertension, gestational diabetes, cesarean section, preterm birth, and neonatal complications. The increasing

prevalence of maternal obesity has therefore become a major concern for healthcare providers worldwide. Early identification of women at risk and implementation of preventive interventions can help reduce these complications and improve overall pregnancy outcomes (11).

Gestational weight gain is another important factor that interacts with maternal obesity to influence pregnancy outcomes. Excessive weight gain during pregnancy can further increase the risk of complications among obese women. Research indicates that both prepregnancy obesity and excessive gestational weight gain independently contribute to adverse maternal and neonatal outcomes. Effective monitoring of maternal weight during pregnancy is therefore essential for reducing risks and ensuring optimal maternal and fetal health (12). The relationship between maternal overweight and adverse pregnancy outcomes has been widely described in narrative and systematic reviews. Excessive maternal weight is associated with a wide range of complications, including prolonged labor, increased need for operative delivery, and neonatal complications such as macrosomia. These outcomes can lead to increased healthcare costs and prolonged hospital stays. Consequently, addressing maternal obesity is considered a priority in modern obstetric care (13).

Metabolic disturbances such as abnormal glucose metabolism may further worsen the effects of maternal obesity during pregnancy. When maternal obesity occurs alongside glucose intolerance or gestational diabetes, the risk of adverse pregnancy outcomes increases substantially. Studies have demonstrated that obese women with impaired glucose metabolism are more likely to experience complications such as fetal macrosomia, hypertensive disorders, and preterm delivery. These findings highlight the complex interaction between maternal obesity and metabolic disorders during pregnancy (14). Maternal obesity also has important implications for neonatal outcomes, particularly among women with gestational diabetes. Infants born to obese mothers are more likely to experience complications such as macrosomia, birth trauma, and respiratory distress. Additionally, these infants may face long-term metabolic risks, including childhood obesity and insulin resistance. Understanding these neonatal consequences is essential for developing effective strategies to reduce obesity-related pregnancy complications (15).

Further research has shown that the combination of high maternal body mass index and excessive gestational weight gain can significantly increase the risk of adverse pregnancy outcomes. Women with elevated BMI who gain excessive weight during pregnancy are more likely to develop complications

such as gestational diabetes, hypertensive disorders, and cesarean delivery. Careful monitoring of maternal weight gain and appropriate clinical guidance can therefore play a critical role in improving pregnancy outcomes (16). Evidence also suggests that maternal obesity may influence fetal growth more strongly than certain metabolic disorders, such as gestational diabetes. Studies have demonstrated that maternal obesity is a major determinant of increased birth weight and fetal macrosomia. This association emphasizes the importance of addressing maternal obesity as part of prenatal care strategies. Improving maternal health before and during pregnancy can significantly reduce the risk of adverse pregnancy outcomes and promote healthier maternal and neonatal outcomes (17).

Objective: To determine the association between maternal obesity and pregnancy outcomes by evaluating maternal and neonatal complications among obese pregnant women compared with women having a normal body mass index in a tertiary care hospital.

MATERIALS AND METHODS

Study Design: A prospective observational study.

Study Setting: Department of Obstetrics and Gynecology, ISRA Hospital Hyderabad Pakistan.

Duration of Study: July 2025 to October 2025.

Inclusion Criteria: The study included pregnant women who were between 18 and 40 years old and those attending the antenatal clinic or those hospitalized at the Department of Obstetrics and Gynecology of Department of Obstetrics and Gynecology, ISRA Hospital Hyderabad Pakistan., The study was Receiving the ethical approval [IU/CP.REC(FCS)/2025/1428] of the Institutional Review Board (IRB) of ISRA Hospital Hyderabad Pakistan, in a span of Four months, following the consent of the synopsis by the College of Physicians and Surgeons Pakistan (CPSP) was approved from July 2025 till October 2025, to deliver. The women who were pregnant with a singleton and a gestational age larger than 28 weeks were eligible to participate. The participants were categorized based on their body mass index on the initial antenatal visit. Women who had a BMI of 30 kg/m² or above were classified as obese and included in the study group, whereas women with a BMI of 18.5- 24.9 kg/m² were considered normal and included in the comparison group. Every participant gave informed consent prior to joining the study.

Exclusion Criteria: Pregnant women with more than one pregnancy, such as twins or greater order gestations, were eliminated from the study in order to eliminate confounding factors on the outcome of pregnancy. Women who were known to have chronic medical conditions such as chronic hypertension, pre-existing diabetes mellitus, pre-

existing renal disease, thyroid disorders, and cardiovascular disease were also excluded. The study excluded patients with congenital fetal abnormalities detected in ultrasound. Also, women who had no complete medical records and those who did not wish to give informed consent were not included in the study.

Methods

Institutional ethical committee permission was then taken, and the pregnant women who met the inclusion criteria were recruited in the antenatal clinic and labor ward Department of Obstetrics and Gynecology, ISRA Hospital Hyderabad Pakistan. A structured proforma was used in the recording of detailed demography and clinical data such as maternal age, parity, gestational age, and body mass index. The body mass index was determined by

taking the weight in kilograms divided by the height in meters squared. The sample participants were grouped into normal and obese BMI groups. Gestational diabetes mellitus, pregnancy-induced hypertension, mode of delivery, and postpartum complications that occurred in the mothers were recorded. Neonatal were also captured, such as birth weight, Apgar score, and admission to the neonatal intensive care unit. All the patients were monitored up to delivery and early postpartum. The analysis and input of data were done with Statistical Package for Social Sciences (SPSS) version 26. The quantitative variables were presented in the form of mean and standard deviation, whereas qualitative variables were presented as frequencies and percentages. The p-value of 0.05 was used as a measure of statistical significance.

RESULTS

This research enrolled 150 pregnant women who had passed the inclusion criteria and tracked them to delivery. The characteristics of the mother and the outcome of pregnancy were studied to establish the prevalence of the complications related to maternal obesity.

Table 1: Demographic Characteristics of Study Participants (n = 150)

Variable	Frequency / Mean
Mean Age (years)	28.6 ± 4.3
Primigravida	62 (41.3%)
Multigravida	88 (58.7%)
Mean Gestational Age at Delivery (weeks)	38.2 ± 1.6
Family History of Obesity	54 (36%)

The mean maternal age of participants was **28.6 ± 4.3 years**. Most participants were **multigravida (58.7%)**, while **41.3% were primigravida**. The mean gestational age at delivery was **38.2 weeks**.

Table 2: Maternal Complications Among Study Participants (n = 150)

Maternal Complication	Frequency	Percentage
Gestational Diabetes Mellitus	36	24%
Pregnancy Induced Hypertension	30	20%
Pre-eclampsia	22	14.7%
Postpartum Hemorrhage	18	12%

Maternal complications were observed among several participants. **Gestational diabetes mellitus (24%)** was the most frequently reported complication, followed by **pregnancy-induced hypertension (20%)** and **pre-eclampsia (14.7%)**.

Table 3: Neonatal Outcomes (n = 150)

Neonatal Outcome	Frequency	Percentage
Macrosomia (>4 kg)	32	21.3%
Low Apgar Score (<7 at 5 min)	15	10%
NICU Admission	21	14%

Among neonatal outcomes, **macrosomia was the most common complication (21.3%)**, followed by **NICU admission (14%)** and **low Apgar score (10%)**.

Graph: Mode of Delivery Among Study Participants



Mode of Delivery	Frequency	Percentage
Normal Vaginal Delivery	68	45.3%
Assisted Vaginal Delivery	22	14.7%
Cesarean Section	60	40%

The rate of **cesarean section** was **40%**, while **normal vaginal delivery** accounted for **45.3%** of births. Assisted vaginal delivery was observed in **14.7%** of cases.

DISCUSSION

Maternal obesity is a growing issue of concern to the general population because it is deeply linked to the negative maternal and newborn conditions. The current research tested the rate of pregnancy-related complications among overweight and obese pregnant women and established that maternal obesity is linked with a significant rate of complications which impact on the mothers and the newborn. In this research, a group of 150 pregnant women with a body mass index (BMI) of 25kg/m² was followed up to delivery and various maternal and neonatal complications were noted. The results exhibited significant prevalence of gestational diabetes mellitus, gestation-related hypertension, cesarean section and infant complications including macrosomia and neonatal intensive care unit (NICU) hospitalization. These observations are in line with the emerging data suggesting that maternal obesity has a significant impact on the outcome of pregnancy (1,2). The mean maternal age among the respondents in the current research was about 28.6 + 4.3 and most of the women were multigravida. This is in agreement with other researches that have indicated an uneven distribution of obesity among women who age with respect to child bearing and those who have multiple spouses.

As age and pregnancy become frequent, the woman will undergo metabolic and hormonal alterations that would lead to altered weight and adipose build-up.

An earlier epidemiological research has also provided evidence that women aged in their late twenties and early thirties constitute a considerable percentage of the obese pregnant groups (3). These demographical factors point to the necessity of paying attention to the maternal weight and metabolic health during the child bearing years. The most common maternal complication in this research was gestational diabetes mellitus (GDM) which was found in about 24 percent of the participants. This has been observed in the previous literature which has shown that maternal obesity is closely correlated with the abnormal glucose metabolism in pregnant women (4,5). Obesity in obese patients results in elevated insulin-resistance and inflammation in the form of low-grade inflammation, which predisposes pregnant women to the occurrence of gestational diabetes (6). A number of systematic reviews have indicated that obese women face a two- to three-greater risk of developing GDM in contrast to women with normal body weight (7,8). The relatively high rate of GDM in this study is also another supporting evidence of the fact that maternal obesity is a significant contributing factor to metabolic complication that occurs in a pregnant woman.

Other complications that became common in the present study were pregnancy-induced hypertension (PIH) and pre-eclampsia. About 20 percent of the participants had pregnancy induced hypertension as

well as 14.7 percent of them had pre-eclampsia. These results align with the previous studies that have shown that obesity is a major risk factor to hypertensive disorders of pregnancy (9). The pathophysiological processes that underlie this relationship include endothelial dysfunction, heightened inflammatory responses and metabolic dysfunctions that influence vascular regulation during pregnancy. Obese pregnant women also tend to be characterized by enhanced oxidative stress and reduced vascular functioning that cause the emergence of hypertension and pre-eclampsia (10). The results of the present study thus support the significance of early blood pressure surveillance and diagnosis among the obese pregnant women. The other maternal complication that was witnessed in the study was the postpartum hemorrhage, which was experienced in about 12% cases. Postpartum hemorrhage may develop in any pregnancy but past researches have indicated that the risk may be more prevalent in obese women because of their longer labor time, uterine atony, and delivery by operations (11,12).

Supernumerary maternal adiposity may also influence uterine contractility and predispose to obstetric intervention, which might also cause more bleeding after childbirth. Thus, a healthcare giver must closely observe obese women during childbirth and delivery to minimize chances of postpartum complications. An analysis of mode of delivery in the study showed that cesarean section delivery made about 40 percent and normal vaginal delivery delivery was about 45.3 percent. The fact that the rate of cesarean delivery of the obese pregnant women is relatively high is in line with the results of the past research which have indicated that maternal obesity predisposes obese mothers to operative delivery (13,14). Obesity may cause complications in progress of labor because of the issues of fetal macrosomia, decreased uterine contractility and extended labor.

This has seen healthcare providers opting to deliver using cesarean section in order to guarantee a safe delivery of the baby and the mother. There are also numerous studies carried out in hospitals, which have reported higher rates of cesarean sections among obese women than the normal BMI women (15). The results of neonatal outcomes in this study also revealed a high incidence of the occurrence of complications in babies born to obese mothers. The most prevalent neonatal complication was macrosomia that affected around 21.3 percent of newborns. It has been noted that maternal obesity is generally related to fetal growth and an increase in birth weight owing to the overexertion of glucose and nutrients over the placenta (16). It has been demonstrated that maternal hyperglycemia and insulin resistance play a role in enhancing fetal

adiposity and faster fetal growth, which results in macrosomia (17). Fetal macrosomia is a complication that puts the baby at risk of birth trauma, operative delivery and neonatal complications. This study also showed low Apgar scores and infant admissions in the NICU. Some 10 per cent of the newborns experienced a low Apgar, and 14 per cent of them had to be admitted in the neonatal intensive care unit.

Past studies indicated that infants born with obese mothers have higher chances of developing respiratory distress, metabolic disorders and complications of birth that necessitate special neonatal care (12). These results point to the fact that maternal obesity has not only health outcomes on a maternal level but also on an immediate health of a newborn. In general, the results of this study are in agreement with the previous literature, which proved that maternal obesity is closely connected with the poor maternal and neonatal outcomes. These findings underscore the need to identify obese pregnant women early in their pregnancy process and to put measures in place to prevent the occurrence of obesity in expecting women, including nutritional education, weight control and close antenatal care. Pre- and intra-pregnancy intervention on maternal obesity can help to greatly decrease the chances of complications and improve the maternal and neonatal health outcome.

Conclusion

Mothers obesity is also a major risk factor towards maternal and neonatal poor outcomes. This research work has revealed that obese and overweight pregnant women had a significant rate of pregnancy related complication, such as gestational diabetes mellitus, pregnancy induced hypertension, pre-eclampsia and postpartum bleeding. Besides this, maternal obesity was also related to a significant percentage of births by the cesarean section meaning that maternal body mass might make labor and birth difficult. This also had an impact on neonatal outcomes with complications like macrosomia, low Apgar scores and admission of infants to neonatal intensive care unit being recorded among babies born to obese mothers. These results are corroborated by the available evidence that demonstrates that overweight of the maternal body during pregnancy may adversely affect the health of the mother and the development of the fetus (1). The identification of high body mass index women at an early age, good antenatal care, nutrition advice, and the adoption of good weight management interventions are needed to decrease complications during pregnancy and enhance the health outcome of mothers and infants.

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