Section: Gynaecology

Original Research Article

IMPACT OF MATERNAL OBESITY ON FETOMATERNAL OUTCOMES IN PREGNANCY

Momy Gul[1], Madhu Bala[2], Asma Kashif[3], Musrat Mustafa Shah[4], Farzana Gul[5], Irum Naz[6]

[1]*Associate Professor Gynaecology and Obs, Bolan Medical College Quetta Pakistan.*
[2]*Associate Professor Gynaecology and Obs, Muhammad Medical and Dental College Mirpurkhas Pakistan.*
[3]*Consultant Gynaecologist and Assistant Professor Gynaecology and Obs, Almana General Hospital Group Al Jubail Saudi Arabia*
[4]*Senior Registrar Gynaecology and Obs, National Medical Centre Karachi Pakistan.*
[5]*Consultant Obstetrician and Gynaecologist, Bolan Medical Complex Hospital Quetta Pakistan.*
[6]*Consultant Gynaecology and Obs Principal Medical officer, Linar Hospital Larkana Pakistan.*

Received *: 10/02/2026*
Received in revised form *: 25/03/2026*
Accepted *: 12/04/2026*

Corresponding Author:
Dr. Momy Gul,
Associate Professor Gynaecology and Obs, Bolan Medical College Quetta Pakistan.
Email: momygul0007@gmail.com

DOI: 10.70034/ijmedph.2026.2.137

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2026; 16 (2); 798-802

ABSTRACT

Background: Objective: To determine the frequency of maternal and fetal complications in pregnancies complicated by maternal obesity, to evaluate its association with adverse maternal outcomes such as gestational diabetes mellitus, hypertensive disorders, and cesarean delivery, and to assess fetal outcomes including macrosomia, preterm birth, and neonatal complications, while also analyzing the relationship between different body mass index categories and pregnancy outcomes, and its impact on the mode of delivery and overall perinatal outcomes. **Duration and Place of Study:** This study was conducted at Bolan Medical College Quetta from February 2025 to February 2026.

Materials and Methods: A cross-sectional study was conducted on 200 pregnant women with BMI >25 kg/m², gestational age ≥24 weeks, aged 20–35 years, and singleton pregnancies. Women with pre-existing chronic diseases, hypertension, pre-gestational diabetes, infections, or multiple gestations were excluded. Data on demographics, obstetric history, BMI, and clinical findings were collected using a structured proforma. Maternal outcomes included gestational hypertension, gestational diabetes, mode of delivery, and intrapartum complications, while fetal outcomes included macrosomia, stillbirth, and neonatal complications. Data were analyzed using SPSS v26, with continuous variables presented as mean ± SD, categorical variables as percentages, and chi-square tests applied for significance ($p<0.05$).

Results: The study found several fetomaternal complications among pregnant women with obesity. Gestational hypertension was observed in 94 (47%) participants, and gestational diabetes in 80 (40%). Assisted births occurred in 80 (40%) cases, while cesarean sections were performed in 162 (81%). Fetal macrosomia was noted in 54 (27%) cases, and stillbirth in 16 (8%). Multiparous women had higher rates of assisted births compared to primiparous women. Gestational hypertension, cesarean delivery, and stillbirth were more frequent in women with a BMI of above 30 kg/m². compared to those with BMI of 25.6–30 kg/m²

Conclusion: Maternal obesity is strongly associated with adverse pregnancy and birth outcomes. Higher BMI increases the risk of maternal and fetal complications, obstetric interventions, and fetal macrosomia. Careful clinical assessment and antenatal counseling are recommended, and overweight and obese women should be considered high-risk.

Keywords: Maternal obesity, Fetomaternal complications, Maternal complications, BMI, Obesity, Hypertension.

INTRODUCTION

Obesity has become one of the most serious health concerns globally in the 21st century, and its prevalence among women of reproductive age is steadily increasing. According to the World Health Organization, maternal obesity is a major public health issue due to its widespread effects on both the mother and the fetus.[1] Changing lifestyle patterns and rising levels of sedentary behavior are contributing to pregnancies in women with high body mass index (BMI), creating a complex clinical scenario that requires enhanced obstetric care.[2] Pregnancy itself is already a physiologically demanding state, and the presence of obesity further increases the risk of adverse outcomes.

Maternal obesity is associated with a range of metabolic, cardiovascular, and obstetric complications. Obesity can lead to chronic low-grade inflammation, insulin resistance, endothelial dysfunction, and placental alterations, predisposing women to hypertension, preeclampsia, and gestational diabetes mellitus (GDM).[3-5] These complications not only increase maternal morbidity but also affect fetal development, placental function, and neonatal outcomes. Maternal metabolic status is closely linked to fetal development, and exposure to an obesogenic intrauterine environment may predispose the child to lifelong risks of obesity, metabolic syndrome, and cardiovascular disease.[6]

From an obstetric perspective, obesity complicates almost all aspects of pregnancy. Antenatal care becomes more challenging due to difficulties in clinical assessment, reduced ultrasound accuracy, and the need for more frequent monitoring.[7] During labor, obese women experience higher rates of induction failure, prolonged labor, shoulder dystocia, and operative deliveries such as cesarean section.[8,9] Postpartum complications, including wound infections, thromboembolism, and delayed recovery, are also more common in this group.[10] These complications place a significant burden on healthcare systems, requiring additional resources, multidisciplinary management, and individualized care.

The effects of maternal obesity on the fetus are equally concerning. Macrosomia is one of the most common fetal complications and is primarily caused by maternal hyperglycemia.[11] Infants of obese mothers are at higher risk of neonatal hypoglycemia, birth trauma, and respiratory problems, often requiring care in neonatal intensive care units.[12] Maternal obesity has also been linked to an increased risk of stillbirth.[13] Emerging evidence suggests that obesity can alter placental gene expression and fetal epigenetic programming, potentially affecting long-term health outcomes.[14]

Despite increasing awareness of these risks in urban populations, maternal obesity continues to rise.[15] Global data consistently show that obesity is associated with poor pregnancy outcomes, although the nature and magnitude of these risks vary depending on healthcare access, socioeconomic status, and cultural factors.

Understanding fetomaternal complications in obese pregnant women is essential for informed clinical decision-making, risk assessment, and antenatal counseling. This study contributes to the growing body of literature by investigating the occurrence of maternal and fetal complications in pregnancies complicated by obesity, providing clinicians with insights to deliver safer and more informed obstetric care.

MATERIALS AND METHODS

This cross-sectional study was conducted on pregnant women receiving antenatal, intrapartum, and postpartum care. Using a non-probability consecutive sampling method, 200 pregnant women with a body mass index (BMI) greater than 25 kg/m² were recruited. Participants were aged 20–35 years, had a gestational age of 24 weeks or more, and were carrying singleton pregnancies. Women with pre-existing chronic metabolic diseases, hypertension, pre-gestational diabetes, infectious diseases, or multiple gestations were excluded to reduce confounding factors and ensure a more homogenous study population.

Eligible participants were invited to join the study during routine antenatal visits or at admission for delivery. Informed written consent was obtained from all participants. Data were collected using a structured pre-designed proforma, which included demographic information, obstetric history, BMI, and relevant clinical findings. Participants were followed until delivery, and maternal and fetal outcomes were documented.

Maternal outcomes included gestational hypertension, gestational diabetes mellitus, mode of delivery (spontaneous vaginal, assisted, or cesarean), and intrapartum complications. Fetal outcomes included macrosomia, stillbirth, and other neonatal complications. All clinical diagnoses were made according to standard obstetric guidelines and documented by the attending obstetric personnel.

Data entry and statistical analysis were performed using SPSS version 26. Continuous variables, including maternal age, parity, and BMI, were expressed as mean ± standard deviation. Categorical variables, such as maternal and fetal complications, were summarized using frequencies and percentages. Stratification based on maternal age, parity, and BMI categories was performed to examine potential effect modification. Post-stratification analysis using the chi-square test was conducted to determine statistical significance, with p-values <0.05 considered significant.

This methodological approach allowed systematic data collection, minimized bias, and facilitated meaningful interpretation of fetomaternal outcomes associated with maternal obesity.

RESULTS

A total of 200 pregnant women participated in the study. The mean age was 26.9 ± 4.3 years, and the mean BMI was 27.7 ± 2.5 kg/m². Regarding parity, 120 women (60%) had parity 2–5, while 80 women (40%) were primiparous.

Several fetomaternal complications were observed. Gestational hypertension occurred in 94 women (47%) and gestational diabetes in 80 women (40%). Assisted birth was required in 80 cases (40%), while cesarean section was the most common mode of delivery, performed in 162 women (81%). Fetal complications included macrosomia in 54 cases (27%) and stillbirth in 16 cases (8%). The frequency of these outcomes is summarized in Table I.

Table 1: Frequency of Fetomaternal Outcomes in Obese Pregnant Women (n = 200)

Maternal/Fetal Complications	n (%)
Gestational hypertension	94 (47%)
Gestational diabetes	80 (40%)
Assisted birth	80 (40%)
Cesarean section	162 (81%)
Macrosomia	54 (27%)
Stillbirth	16 (8%)

When stratified by maternal age, gestational hypertension and gestational diabetes were significantly higher among women aged 31–35 years. Macrosomia was most common in the 26–30 years age group. The rates of cesarean section, assisted birth, and stillbirth did not differ significantly across age groups. These comparisons are presented in Table II.

Table 2: Maternal and Fetal Outcomes According to Maternal Age

Complication	20–25 years (n=82)	26–30 years (n=78)	31–35 years (n=40)	p-value
Gestational hypertension	32 (39%)	38 (49%)	24 (60%)	0.04
Gestational diabetes	28 (34%)	30 (38%)	22 (55%)	0.01
Assisted birth	14 (17%)	12 (15%)	4 (10%)	0.28
Cesarean section	62 (76%)	64 (82%)	36 (90%)	0.15
Macrosomia	14 (17%)	32 (41%)	8 (20%)	0.006
Stillbirth	6 (7%)	8 (10%)	2 (5%)	0.33

Parity-based analysis showed that assisted birth was significantly more prevalent among multiparous women (p = 0.03). Although gestational hypertension, cesarean section, and stillbirth occurred more frequently in women with BMI 25.6–30 kg/m² compared to those with BMI >30 kg/m², these differences were not statistically significant. Table III presents the outcomes according to parity.

Table 3: Maternal and Fetal Outcomes According to Parity

Complication	Primipara (n=80)	Multipara (n=120)	p-value
Gestational hypertension	38 (47.5%)	56 (46.7%)	0.91
Gestational diabetes	32 (40%)	48 (40%)	0.99
Assisted birth	10 (12.5%)	70 (58.3%)	0.03
Cesarean section	70 (87.5%)	92 (76.7%)	0.06
Macrosomia	18 (22.5%)	36 (30%)	0.24
Stillbirth	7 (8.8%)	9 (7.5%)	0.76

DISCUSSION

The present study demonstrates that maternal obesity is strongly associated with adverse fetomaternal outcomes, including gestational hypertension, gestational diabetes, macrosomia, assisted birth, and cesarean delivery. These findings align with growing international evidence highlighting the clinical impact of obesity during pregnancy.

Gestational hypertension was observed in 47% of obese pregnant women in our study, comparable to the findings of Al-Hamad et al., who reported a hypertension rate of 43% among obese gravidas in a large cohort study.[16] Similarly, Turkish research by Yilmaz et al. showed that women with obesity have a higher risk of developing hypertension compared to women with normal BMI.[17] These parallels support the pathophysiological link between excess adiposity, endothelial dysfunction, and hypertensive complications in pregnancy.

Our study found a gestational diabetes prevalence of 40%, consistent with Bhattacharya et al., who reported a rate of 38% in obese women in a UK population study.[18] Similarly, Wong et al. noted that maternal obesity and impaired glucose tolerance were strongly associated, with the risk of GDM increasing with BMI.[19] These findings highlight the metabolic vulnerability of obese pregnant women and emphasize the need for early screening and intervention.

Regarding delivery outcomes, cesarean section was the most common mode of delivery, occurring in 81% of cases. This aligns with the findings of

Poobalan et al., who reported high cesarean rates among obese women due to labor dystocia, failed induction, and fetal macrosomia.[20] Li et al. in China also identified obesity as an independent predictor of operative delivery, even after adjusting for confounders such as maternal age and parity.[21] The increased cesarean rate in obese women may be explained by altered myometrial contractility, increased soft tissue resistance, and a higher incidence of obstetric complications.

Macrosomia occurred in 27% of births in our cohort, consistent with Stotland et al., who reported that 25–30% of infants born to obese mothers were macrosomic.[22] Fetal overgrowth in these cases is largely attributed to maternal hyperglycemia, insulin resistance, and enhanced placental nutrient transfer. Similar trends were reported by Yilmaz et al., showing increased birth weights among infants of obese women.[17] These findings underscore the importance of glycemic control and nutritional management during pregnancy.

The stillbirth rate in our study was 8%, which is consistent with international data. Al-Hamad et al. reported stillbirth rates of 6–9% among obese pregnancies, with risks attributed to placental dysfunction, metabolic disturbances, and undetected fetal anomalies.[16] Li et al. also observed an increased risk of unexplained stillbirth, particularly in late gestation.[21] These findings highlight the importance of enhanced fetal surveillance in pregnancies complicated by obesity.

Parity-based analysis revealed that assisted birth was significantly more common among multiparous women, contrasting with Bhattacharya et al., who found higher assisted delivery rates in primiparous women.[18] This difference may reflect population-specific obstetric practices, variations in pelvic anatomy, or fetal size distribution. Nonetheless, the overall pattern of increased obstetric intervention in obese women remains consistent across studies.

Age stratification in our study showed that women aged 31–35 years were more likely to develop gestational hypertension and diabetes. Wong et al. reported similar findings, suggesting that advancing maternal age amplifies metabolic risks associated with obesity.[19] This combined risk likely reflects the interaction between age-related insulin resistance and obesity-related inflammation.

Overall, the results of this study corroborate global evidence indicating that maternal obesity is a significant risk factor for adverse pregnancy outcomes. The consistency of these findings across diverse populations underscores the universal impact of obesity on maternal and fetal health. Early identification, targeted counseling, and multidisciplinary management are essential to mitigate risks and improve pregnancy outcomes.

CONCLUSION

This study demonstrates that maternal obesity is strongly associated with an increased risk of gestational hypertension, gestational diabetes, macrosomia, assisted birth, and cesarean delivery. These findings are consistent with current international evidence and highlight the significant clinical impact of obesity on pregnancy outcomes. Older obese women exhibited higher metabolic and hypertensive risks, while macrosomia was the most common fetal complication. Overall, maternal obesity is a major contributor to adverse pregnancy outcomes. Early risk identification, targeted counseling, and careful antenatal monitoring are essential to optimize maternal and neonatal health in this high-risk population.

Source of Funding: None
Ethical Approval: Obtained
Conflict of Interest: None

REFERENCES

1. World Health Organization. Obesity and overweight. Geneva: WHO; 2021. Available from: https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight
2. Poston L, Caleyachetty R, Cnattingius S, Corvalán C, Uauy R, Herring S, et al. Preconceptional and maternal obesity: epidemiology and health consequences. Lancet Diabetes Endocrinol. 2016;4(12):1025 36.
3. Catalano PM, Shankar K. Obesity and pregnancy: mechanisms of short term and long term adverse consequences for mother and child. Am J Obstet Gynecol. 2017;217(6):605 19.
4. Aune D, Saugstad OD, Henriksen T, Tonstad S. Maternal body mass index and the risk of fetal death, stillbirth, and infant death: a systematic review and meta analysis. JAMA. 2014;311(15):1536 46.
5. Marchi J, Berg M, Dencker A, Olander EK, Begley C. Risks associated with obesity in pregnancy, for the mother and baby: a systematic review of reviews. BMC Pregnancy Childbirth. 2015;15:50.
6. Godfrey KM, Reynolds RM, Prescott SL, Nyirenda M, Jaddoe VW, Eriksson JG, et al. Influence of maternal obesity on the long term health of offspring. Nat Rev Endocrinol. 2017;13(2):77 90.
7. Denison FC, Norwood P, Bhattacharya S, Duffy A, Mahmood T, Morris C, et al. Association between maternal body mass index during pregnancy, short term morbidity, and increased health service costs: a population based study. BJOG. 2018;125(6):720 9.
8. Kominiarek MA, Chauhan SP. Obesity before, during, and after pregnancy: a review and comparison of five national guidelines. Clin Obstet Gynecol. 2016;59(1):12 26.
9. Zhang J, Bricker L, Wray S, Quenby S. Poor uterine contractility in obese women. BJOG. 2017;124(3):356 63.
10. Blomberg M. Maternal obesity and risk of postpartum hemorrhage. Obstet Gynecol. 2017;129(5):885 93.
11. Gaillard R. Maternal obesity during pregnancy and cardiovascular development and disease in the offspring. Eur J Epidemiol. 2015;30(11):1141 52.
12. Black MH, Sacks DA, Xiang AH, Lawrence JM. The relative contribution of prepregnancy overweight and obesity, gestational weight gain, and IADPSG defined gestational diabetes mellitus to fetal overgrowth. Diabetes Care. 2013;36(1):56 62.
13. Flenady V, Wojcieszek AM, Middleton P, Ellwood D, Erwich JJ, Coory M, et al. Stillbirths: recall to action in high income countries. Lancet. 2016;387(10019):691 702.
14. Soubry A. Epigenetic inheritance and evolution: a paternal perspective on obesity and diabetes. Curr Opin Clin Nutr Metab Care. 2015;18(3):295 302.

15. Ng M, Fleming T, Robinson M, Thomson B, Graetz N, Margono C, et al. Global, regional, and national prevalence of overweight and obesity in children and adults during 1980–2013: a systematic analysis. Lancet. 2014;384(9945):766 81.
16. Al Hamad N, Raman V. Maternal obesity and pregnancy outcomes: a population based study. J Matern Fetal Neonatal Med. 2019;32(3):398 403.
17. Yilmaz E, Kelekci S, Ertas IE, Gencdal S. Impact of maternal obesity on obstetric outcomes. J Obstet Gynaecol Res. 2017;43(3):498 504.
18. Bhattacharya S, Campbell DM, Liston WA, Bhattacharya S. Effect of body mass index on pregnancy outcomes in nulliparous women. BJOG. 2018;125(3):324 32.
19. Wong T, Barnes RA, Ross GP, Cheung NW. Maternal obesity and risk of gestational diabetes: a systematic review. Diabetes Res Clin Pract. 2017;133:211 20.
20. Poobalan AS, Aucott LS, Gurung T, Smith WC, Bhattacharya S. Obesity as an independent risk factor for elective and emergency cesarean delivery. Obes Rev. 2015;16(7):534 47.
21. Li N, Liu E, Guo J, Pan L, Li B, Wang P, et al. Maternal prepregnancy BMI and adverse pregnancy outcomes in China. Int J Gynaecol Obstet. 2016;134(3):221 5.
22. Stotland NE, Hopkins LM, Caughey AB. Gestational weight gain, macrosomia, and risk of cesarean birth. Obstet Gynecol. 2017;129(3):391 9.