

The Impact of Raised BMI On Maternal and Fetal Outcomes: A Prospective Observational Study from A Tertiary Care Centre in Pune, India

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Received: 28th Feb, 2026; Revised: 6th March 2026; Accepted: 7th April, 2026; Available Online: 20th April, 2026

ABSTRACT

Background: Maternal obesity has emerged as a major public health concern worldwide and is increasingly associated with adverse obstetric and neonatal outcomes. Raised body mass index (BMI) during pregnancy contributes significantly to maternal morbidity, operative delivery, and neonatal complications.

Aim: To evaluate the impact of raised maternal BMI on obstetric and neonatal outcomes among pregnant women attending a tertiary care centre.

Methods: This prospective observational study was conducted at the Department of Obstetrics and Gynecology, Dr. D. Y. Patil Medical College, Hospital and Research Centre, Pune. A total of 120 pregnant women with raised BMI (≥ 25 kg/m²) who fulfilled the inclusion criteria were enrolled and followed until delivery. Maternal demographic details, antenatal complications, intrapartum outcomes, postpartum complications, and neonatal outcomes were recorded and statistically analyzed.

Results: The mean maternal age was 27.69 ± 4.65 years. Most participants belonged to Obese Class I (57%), followed by Obese Class II (23%). Labour induction was required in 41.6% of women, and cesarean section was the predominant mode of delivery (69.1%). Fetal distress (22.4%) and previous lower segment cesarean section (20.4%) were the leading indications for cesarean delivery. Postpartum complications included urinary tract infection (15%), lactational failure (10%), postpartum hemorrhage (8.3%), wound infection (6.6%), and wound dehiscence (5.8%). Neonatal intensive care unit (NICU) admission was required in 24.2% of neonates, mainly due to low birth weight and respiratory distress. Prolonged hospital stay was observed in 18.3% of cases.

Conclusion: Raised maternal BMI is associated with increased maternal and neonatal morbidity, higher cesarean section rates, and greater healthcare utilization. Early identification, preconception counseling, lifestyle modification, and multidisciplinary antenatal care are essential to improve pregnancy outcomes in obese women.

Keywords: Maternal obesity; Body mass index; Cesarean section; Pregnancy outcomes; NICU admission; Maternal morbidity

How to cite this article: Rathod K, Kolate D. The Impact of Raised BMI on Maternal and Fetal Outcomes: A Prospective Observational Study from A Tertiary Care Centre in Pune, India. Int J Drug Deliv Technol. 2026;16(65s):85-88. DOI: 10.25258/ijddt.16.65s.11

Source of support: Nil.

Conflict of interest: None

INTRODUCTION

Pregnancy is generally considered a physiological event; however, pre-existing maternal morbidities and complications arising during pregnancy can convert a normal pregnancy into a high-risk gestation. Raised body mass index (BMI) is one of the most significant modifiable risk factors contributing to adverse maternal and fetal outcomes.

Over the past few decades, rapid urbanization, sedentary lifestyles, increased consumption of calorie-dense processed foods, and reduced physical activity have contributed to a global obesity epidemic. According to the National Family Health Survey (NFHS-5), the prevalence

of overweight and obesity among Indian women of reproductive age has risen steadily, especially in urban populations.

Maternal obesity is associated with multiple adverse outcomes including gestational diabetes mellitus (GDM), hypertensive disorders of pregnancy, labor dystocia, operative delivery, postpartum hemorrhage, wound complications, fetal macrosomia, preterm birth, and increased neonatal intensive care unit (NICU) admissions. Additionally, obesity imposes a significant burden on healthcare systems due to increased antenatal surveillance, operative interventions, and prolonged hospital stay.

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Despite routine antenatal weight monitoring, insufficient attention is often paid to BMI assessment and gestational weight management. Early identification of obesity and implementation of preconception counseling and lifestyle interventions may substantially reduce obesity-related maternal and neonatal complications.

This study was undertaken to assess the impact of raised BMI on maternal and fetal outcomes among pregnant women attending a tertiary care center in Pune, India.

MATERIALS AND METHODS

Study Design and Setting

A prospective observational study was conducted in the Department of Obstetrics and Gynecology at Dr. D. Y. Patil Medical College, Hospital and Research Centre, Pimpri, Pune.

Study Population

Pregnant women attending the outpatient department and labor room who satisfied the inclusion criteria were recruited for the study.

Initially, 132 women with raised BMI were enrolled. Of these, 120 participants completed follow-up and were included in the final analysis.

Inclusion Criteria

- Pregnant women with BMI ≥ 25 kg/m²
- Singleton or twin pregnancy
- Willingness to participate in the study

Exclusion Criteria

- Women unwilling to participate
- Incomplete follow-up

Data Collection

Detailed history including menstrual, obstetric, medical, family, and personal history was recorded. General physical examination and obstetric examination were performed.

Gestational age was determined using the last menstrual period and confirmed by early ultrasonography.

BMI Measurement

BMI was calculated during the first antenatal visit using the formula:

$$[BMI = \frac{\text{Weight (kg)}}{\text{Height (m)}^2}]$$

Weight was measured using a calibrated digital weighing scale, and height was measured using a stadiometer following standard protocols.

Outcome Measures

Maternal Outcomes

- Gestational weight gain
- Hypertensive disorders

- Gestational diabetes mellitus
- PROM/PPROM
- Mode of delivery
- Postpartum hemorrhage
- Wound complications
- Lactational failure

Neonatal Outcomes

- Birth weight
- APGAR score
- NICU admission
- Respiratory distress
- Meconium-stained liquor
- Low birth weight
- Macrosomia

Statistical Analysis

Data were entered into a datasheet and statistically analyzed using appropriate tests. Chi-square test and Student's t-test were applied. A p-value < 0.05 was considered statistically significant.

Ethical Consideration

Ethical committee approval was obtained prior to commencement of the study. Written informed consent was obtained from all participants.

RESULTS

Maternal Demographic Characteristics

The majority of women belonged to the 26–30 years age group (37.8%), followed by 21–25 years (28.3%). The mean maternal age was 27.69 ± 4.65 years.

BMI Distribution

Most participants belonged to:

- Obese Class I: 57%
- Obese Class II: 23%
- Overweight: 18%
- Obese Class III: 2%

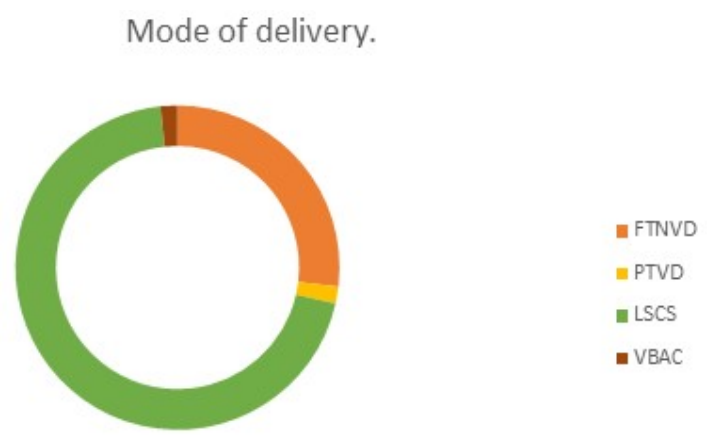
The mean BMI at booking was 32.9 ± 3.24 kg/m², increasing to 35.8 ± 5.08 kg/m² at delivery.

Labour Induction

Labour induction was required in 41.6% of women. Among induced women, 66% underwent cesarean section.

No statistically significant association was found between BMI category and induction of labor ($p=0.415$).

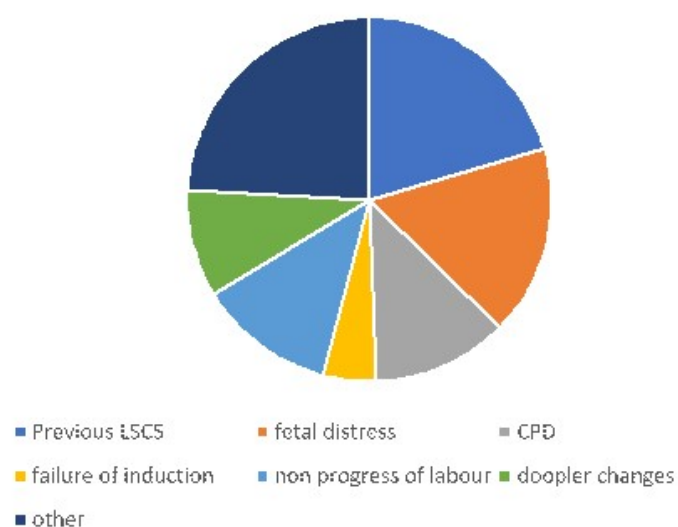
MODE OF DELIVERY



Mode of Delivery

Cesarean section was the most common mode of delivery (69.1%), while vaginal delivery occurred in 30.7% of women.

INDICATIONS FOR CESEREAN DELIVERY



Fetal distress (22.4%) was the leading indication for cesarean section, followed by:

- Previous LSCS: 20.4%
- Failure of induction: 16.5%
- Doppler changes: 9.4%
- Cephalopelvic disproportion: 8.2%

Postpartum Complications

Postpartum complications included:

- Urinary tract infection: 15%
- Lactational failure: 10%
- Postpartum hemorrhage: 8.3%
- Wound infection: 6.6%
- Wound dehiscence: 5.8%

The association between obesity and postpartum complications was statistically significant ($p < 0.001$).

Neonatal Outcomes

Most neonates had birth weights between 2.5–3.0 kg (37.5%). Low birth weight (< 2.5 kg) was observed in 36.6% of neonates.

NICU admission was required in 24.2% of cases.

Major indications included:

- Low birth weight: 8.3%
- Respiratory distress: 5%
- Meconium-stained liquor: 4.1%
- Macrosomia: 3.3%

Hospital Stay

Prolonged hospital stay occurred in 18.3% of cases and was mainly associated with cesarean-related complications and neonatal NICU admission.

DISCUSSION

The present study demonstrates that raised maternal BMI is associated with increased maternal and neonatal morbidity. The majority of participants were in the optimal reproductive age group, indicating that obesity-related complications are increasingly affecting younger women.

The cesarean section rate in this study was markedly high (69.1%), comparable to findings reported by Sebire et al. and Weiss et al., who documented increased operative delivery rates among obese women. Failure of induction and fetal distress were major contributors to cesarean delivery.

Postpartum complications, particularly urinary tract infection and wound-related morbidity, were common. Obesity-associated impaired tissue perfusion, altered immune response, and delayed wound healing may explain these findings.

Although macrosomia is frequently associated with maternal obesity, a substantial proportion of neonates in the present study had low birth weight, suggesting the complex interaction between maternal obesity, hypertensive disorders, and placental dysfunction.

NICU admission rates were increased, primarily due to low birth weight and respiratory distress. These findings support existing evidence that maternal obesity contributes to adverse neonatal outcomes and increased healthcare utilization.

The findings of this study emphasize the importance of preconception counseling, lifestyle modification, weight optimization, and close antenatal surveillance in obese pregnant women.

CONCLUSION

Raised maternal BMI significantly influences maternal and fetal outcomes by increasing the risk of operative delivery, postpartum complications, neonatal morbidity, and prolonged hospitalization.

Obesity during pregnancy should be recognized as a high-risk condition requiring multidisciplinary management.

Early identification of women with raised BMI, implementation of preconception counseling, promotion of healthy lifestyle practices, and structured antenatal care are essential strategies to reduce obesity-related complications and improve maternal and neonatal outcomes.

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