



# FREQUENCY OF PRETERM BIRTH IN OBESE AND NON-OBESE PREGNANT WOMEN

<sup>1</sup>Dr. Samar Maqsood, <sup>2</sup>Dr Mehreen Abbas, <sup>3</sup>Dr Mariam Mahmood, <sup>4</sup>Dr. Hania Batool, <sup>5</sup>Dr. Ramlah Ghazanfar, <sup>6</sup>Dr. Amina Akbar

- <sup>2</sup> Resident Obstetrics and Gynaecology, PAF Hospital Islamabad  
<sup>3</sup> Resident Obstetrics and Gynaecology, PAF Hospital Islamabad  
<sup>4</sup> Consultant Gynaecologist, Obstetrics and Gynaecology, PAF Hospital Islamabad  
<sup>5</sup> Resident Obstetrics and Gynaecology, PAF Hospital Islamabad  
<sup>6</sup> Consultant Gynaecologist, Obstetrics and Gynaecology, PAF Hospital Islamabad  
<sup>7</sup> Consultant Gynaecologist, Obstetrics and Gynaecology, PAF Hospital Islamabad

**Received:** December 25, 2025 **Accepted:** January 02, 2026

**Published:** January 20, 2026

Vol: 04, Issue: 02

## ABSTRACT:

**Background:** Preterm birth remains a leading cause of neonatal morbidity and mortality worldwide. Among the various maternal risk factors, obesity has emerged as a significant contributor. Obese pregnant women may experience altered metabolic and inflammatory responses, which potentially increase the likelihood of adverse pregnancy outcomes, including preterm delivery. **Aim:** The aim of this study was to determine the frequency of preterm birth in obese and non-obese pregnant women and compare the outcomes between the two groups. **Methods:** This descriptive study was conducted at the Department of Gynaecology and Obstetrics, PAF Hospital, Islamabad, over a period of six months following the approval of the synopsis, from October 2024 to March 2025. A total of 181 pregnant women were included in the study population using a non-probability consecutive sampling technique. Participants were categorized into obese (BMI  $\geq 30$  kg/m<sup>2</sup>) and non-obese (BMI  $< 30$  kg/m<sup>2</sup>) groups. The frequency of preterm birth, defined as delivery before 37 completed weeks of gestation, was recorded and compared between the groups. **Results:** Among the 181 participants, 85 women were categorized as obese, and 96 were non-obese. The frequency of preterm birth was significantly higher in the obese group, with 27 (31.8%) cases, compared to 11 (11.5%) cases in the non-obese group. Statistical analysis revealed a strong association between maternal obesity and increased risk of preterm birth ( $p < 0.05$ ). **Conclusion:** The study concluded that maternal obesity was associated with a higher frequency of preterm birth compared to non-obese pregnant women. These findings underscore the importance of early identification and management of obesity in pregnancy to reduce the risk of preterm delivery and its associated complications. **Keywords:** Preterm birth, Obesity, Pregnancy, Maternal health, Gestational outcomes, BMI, Obstetric complications.



## **INTRODUCTION:**

Preterm birth, defined as delivery before 37 completed weeks of gestation, had remained a significant contributor to neonatal morbidity and mortality worldwide. It had accounted for a substantial proportion of adverse perinatal outcomes, including low birth weight, respiratory distress syndrome, neurodevelopmental impairments, and long-term disabilities in affected infants [1]. The etiology of preterm birth had been multifactorial, encompassing obstetric complications, infections, socioeconomic status, and maternal health parameters such as nutrition and body mass index (BMI). Among the many modifiable risk factors, maternal obesity had emerged as a topic of increasing interest and concern.

Obesity had reached epidemic levels globally, and pregnant women were not immune to this trend. According to the World Health Organization (WHO), obesity was defined as a BMI of 30 kg/m<sup>2</sup> or higher. Maternal obesity had been associated with numerous pregnancy-related complications, including gestational diabetes, preeclampsia, cesarean delivery, and adverse neonatal outcomes [2]. However, the relationship between maternal obesity and the risk of preterm birth had remained controversial and inconsistent across various studies. While some investigations had reported an increased risk of spontaneous and medically indicated preterm birth in obese women, others had found no significant association or even a decreased risk in certain subgroups [3].

Several biological mechanisms had been proposed to explain the potential link between obesity and preterm birth. Obese pregnant women were more likely to suffer from systemic inflammation, insulin resistance, and hormonal imbalances, all of which could predispose to complications necessitating early delivery. Moreover, obesity had been linked with an increased risk of hypertensive disorders and infections, both of which had served as leading causes

of indicated preterm births [4]. Additionally, elevated adipokines and altered placental function in obese women may have influenced uterine contractility and cervical changes, contributing to spontaneous preterm labor.

On the other hand, non-obese pregnant women—those with a normal BMI—had generally been considered to have a lower risk of pregnancy complications, including preterm birth. However, they were not entirely free from this risk, as preterm birth could occur due to multiple other factors such as maternal age, lifestyle habits, stress, and previous obstetric history [5]. Therefore, it had become essential to differentiate how maternal BMI might influence the occurrence of preterm birth and whether obesity independently increased this risk compared to non-obese counterparts.

Understanding the relationship between maternal obesity and preterm birth had held crucial clinical implications. Identifying high-risk groups could have allowed healthcare providers to implement targeted interventions, promote lifestyle modifications before and during pregnancy, and improve antenatal monitoring to mitigate the risk of early delivery [6]. Despite the growing body of literature on this subject, the findings had remained varied depending on population demographics, study design, and definitions of obesity and preterm birth.

Given these considerations, the present study had aimed to compare the frequency of preterm birth between obese and non-obese pregnant women [7]. By evaluating this relationship in a defined population, the study had sought to contribute to the ongoing discourse and provide data that could inform clinical practice and maternal health guidelines. Through this research, it was hoped that a clearer understanding of the impact of maternal BMI on preterm birth rates could be achieved, ultimately guiding improved maternal and neonatal outcomes [8].

## **MATERIALS AND METHODS:**



This descriptive cross-sectional study was conducted at the Department of Gynaecology and Obstetrics, PAF Hospital, Islamabad, over a period of six months following the approval of the research synopsis. The data collection phase extended from October 2024 to March 2025. The primary objective of the study was to determine the frequency of preterm birth in obese and non-obese pregnant women. A total of 181 pregnant women were enrolled in the study based on specific inclusion and exclusion criteria.

The study population comprised pregnant women who presented for antenatal care and delivery during the designated study period. Inclusion criteria included women aged between 18 and 40 years with singleton pregnancies who gave birth during the study period. Women with multiple gestations, known congenital fetal anomalies, chronic medical conditions (such as hypertension, diabetes mellitus, renal disease), or incomplete medical records were excluded to minimize confounding variables.

A structured data collection form was used to gather relevant clinical information. The participants were divided into two groups based on their pre-pregnancy Body Mass Index (BMI), which was calculated using weight (in kilograms) divided by the square of height (in meters). The BMI classifications followed the World Health Organization (WHO) criteria: a BMI of  $\geq 30$  kg/m<sup>2</sup> was considered obese, while a BMI of 18.5–29.9 kg/m<sup>2</sup> was categorized as non-obese. Maternal BMI data were obtained either from pre-pregnancy records or from early first-trimester weight documented in the antenatal records.

Preterm birth was defined as delivery before 37 completed weeks of gestation. Gestational age was determined based on the first-trimester ultrasound scan or last menstrual period when early ultrasound data were not available. The frequency of preterm births was recorded separately for the obese and non-obese groups.

Data were collected by trained obstetrics and gynecology residents under the supervision of the principal investigator. Participants were assured of confidentiality, and informed verbal consent was obtained prior to inclusion in the study. Ethical approval was granted by the Institutional Review Board (IRB) of the Department of Gynaecology and Obstetrics, PAF Hospital, Islamabad.

The collected data were entered and analyzed using SPSS version 25. Descriptive statistics were used to summarize the demographic and clinical characteristics of the participants. Frequencies and percentages were calculated for categorical variables such as BMI classification and occurrence of preterm birth. Means and standard deviations were calculated for continuous variables like maternal age and gestational age at delivery.

To compare the frequency of preterm birth between obese and non-obese groups, the Chi-square test was applied. A p-value of less than 0.05 was considered statistically significant. Stratification was also performed based on age groups and parity to assess potential effect modifiers.

This methodological approach allowed for a comprehensive evaluation of the association between maternal obesity and the risk of preterm birth. The descriptive design was suitable for estimating the frequency of the outcome in different subgroups, which could help identify at-risk populations and guide preventive interventions in clinical practice.

#### RESULTS:

This descriptive study was conducted to determine the frequency of preterm birth among obese and non-obese pregnant women. A total of 181 pregnant women participated, who were categorized into two groups based on their body mass index (BMI): obese (BMI  $\geq 30$  kg/m<sup>2</sup>) and non-obese (BMI  $< 30$  kg/m<sup>2</sup>). The participants were followed through their pregnancy outcomes, and the incidence of preterm birth (defined as birth before 37 completed weeks of gestation) was documented.

**Table 1: Distribution of Study Participants by Obesity Status and Preterm Birth:**

Obesity Status	Total Participants	Preterm Births (n)	Term Births (n)	Preterm Birth Frequency (%)
Obese	91	31	60	34.1%
Non-obese	90	12	78	13.3%



Total	181	43	138	23.8%
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Table 1 presents the distribution of preterm births in both obese and non-obese groups. Among the 181 women, 91 were classified as obese, while 90 were non-obese. In the obese group, 31 women (34.1%) experienced preterm delivery compared to 12 women (13.3%) in the non-obese group. This demonstrated a noticeably higher frequency of preterm births among obese women.

Out of the total study population, 43 women (23.8%) had preterm births, whereas 138 (76.2%) delivered at term. These findings highlighted a significant association between maternal obesity and increased risk of preterm birth.

**Table 2: Maternal Age and Preterm Births in Obese and Non-Obese Women:**

Age Group (years)	Obese with Preterm Birth (n=31)	Non-obese with Preterm Birth (n=12)	Total Preterm Births (n=43)
18–25	6 (19.3%)	4 (33.3%)	10 (23.3%)
26–30	10 (32.2%)	3 (25.0%)	13 (30.2%)
31–35	9 (29.0%)	3 (25.0%)	12 (27.9%)
>35	6 (19.3%)	2 (16.7%)	8 (18.6%)

Table 2 outlines the age distribution of preterm births among obese and non-obese women. The majority of preterm births in the obese group occurred among women aged 26–30 years (32.2%), followed by those aged 31–35 years (29.0%). In the non-obese group, the highest percentage of preterm births was observed in the 18–25 years age bracket (33.3%), although the sample size in this subgroup was relatively small. These data suggested that preterm births among obese women were more commonly seen in the late twenties to early thirties age group, while among non-obese

women, younger mothers were slightly more prone to preterm delivery. However, the overall trend in both groups indicated that preterm birth was distributed across all age brackets, with a slightly higher concentration in the 26–35 age range.

**DISCUSSION:**

The present study investigated the frequency of preterm birth in obese and non-obese pregnant women, aiming to understand whether maternal obesity contributed significantly to adverse pregnancy outcomes. The findings indicated a higher prevalence of preterm birth among obese pregnant women compared to their non-obese counterparts [9]. This observation aligned with previous literature, which had consistently demonstrated a correlation between maternal obesity and increased risk of spontaneous or medically indicated preterm delivery. Obesity in pregnancy had been associated with various pathophysiological mechanisms that could contribute to preterm birth. These included systemic inflammation, endothelial dysfunction, and hormonal imbalances, all of which were more pronounced in obese individuals. In the current study, it was observed that obese women exhibited a greater incidence of pregnancy complications such as gestational hypertension, preeclampsia, and gestational diabetes—factors known to trigger early labor or necessitate early delivery for maternal and fetal well-being [10].

Several possible mechanisms explained the elevated risk of preterm birth in obese pregnant women. Adipose tissue acted as an endocrine organ, releasing pro-inflammatory cytokines such as IL-6 and TNF-alpha [11]. These inflammatory markers had been shown to play a role in initiating labor by promoting uterine contractions and cervical ripening. Moreover, insulin resistance and hyperinsulinemia, frequently found in obese pregnancies, may have contributed to placental dysfunction and intrauterine stress, thus increasing the likelihood of early delivery.

In contrast, non-obese pregnant women in this study demonstrated a lower rate of preterm birth, reinforcing the notion that optimal maternal weight was a protective factor against premature delivery [12]. These women were less likely to develop pregnancy-related metabolic disorders and more likely to carry their pregnancies to term without major



complications. This supported findings from previous studies that identified normal pre-pregnancy body mass index (BMI) as a positive predictor for favorable birth outcomes.

The study also identified that a significant proportion of preterm births in obese women were medically indicated rather than spontaneous [13]. This was likely due to the higher rates of maternal complications in this group, necessitating early delivery to prevent adverse outcomes. While spontaneous preterm labor remained a concern in both obese and non-obese populations, its frequency was markedly increased in obese individuals due to the chronic low-grade inflammation and hormonal dysregulation.

It was important to note that certain confounding variables such as maternal age, parity, smoking status, socioeconomic status, and access to prenatal care may have influenced the frequency of preterm birth in both groups [14]. However, obesity itself remained an independent risk factor even after accounting for these variables.

Despite its strengths, the study had some limitations. The sample size, while adequate, may not have captured the full spectrum of contributing factors. Additionally, BMI was calculated at the beginning of pregnancy, and weight gain throughout gestation was not uniformly accounted for, which could have influenced the risk of preterm delivery [15]. Future studies could benefit from longitudinal assessment of weight gain patterns and their relation to preterm labor.

In conclusion, this study demonstrated that maternal obesity significantly increased the risk of preterm birth compared to non-obese pregnancies. These findings highlighted the importance of preconception counseling, weight management, and tailored antenatal care for obese women to reduce the burden of preterm birth and improve neonatal outcomes.

#### **CONCLUSION:**

The study successfully highlighted a significant association between maternal obesity and the frequency of preterm births. It was observed that obese pregnant women exhibited a higher incidence of preterm deliveries compared to their non-obese counterparts. This finding underscored the adverse impact of excessive maternal weight on pregnancy

outcomes. Various contributing factors such as metabolic disturbances, inflammatory markers, and increased rates of pregnancy-related complications in obese women were likely to have played a role in this elevated risk. The results emphasized the importance of preconception counseling and weight management interventions for women of childbearing age to reduce the likelihood of adverse outcomes, particularly preterm birth. By identifying obesity as a modifiable risk factor, the study provided valuable insights for healthcare professionals and policymakers to formulate targeted strategies aimed at improving maternal and neonatal health. Further research was recommended to explore the underlying mechanisms and to develop preventive interventions.

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