Health Affairs ISSN - 0278-2715 Volume 13 ISSUE 10 page 4765-4773
Journal link: https://health-affairs.com/
Abstract Link: https://health-affairs.com/13-10-47565-4773/
Submission 14 July 2025
Acceptance 22 Aug 2025
Publication 9 October 2025

FREQUENCY OF PRETERM BIRTHS IN OVERWEIGHT AND OBESE PREGNANT WOMEN

[1]Dr. Nighat Ismail, [2]Dr. Shighraf Iftikhar, [3]Dr. Hira Gul, [4]Dr. Haleema Yasmin

[1]Jinnah Postgraduate Medical Centre, Postgraduate Trainee, MBBS
[2]Jinnah Postgraduate Medical Centre, Senior Registrar, MBBS, FCPS
[3]Jinnah Postgraduate Medical Centre, Postgraduate trainee, MBBS
[4]Jinnah Postgraduate Medical Centre, Head of Department, MBBS, MCPS, FCPS

ABSTRACT

OBJECTIVE

To determine and compare the frequency of preterm birth among overweight and obese pregnant women attending JPMC, Karachi.

METHODOLOGY

A cross-sectional study was conducted from December 2024 to June 2025 in the Department of Obstetrics and Gynaecology, JPMC, Karachi. It included 188 pregnant women aged 18–40 years, between 22–37 weeks of gestation, with BMI ≥ 23.0 kg/m². Based on Asia-Pacific criteria, participants were classified as overweight (BMI 23.0–24.9 kg/m²) or obese (BMI ≥ 25.0 kg/m²). Data were analysed in SPSS version 26 using descriptive and inferential statistics, applying the Chi-square test ($p < 0.05$).

RESULTS

Among 188 pregnant women (mean age 28.9±3.7 years; mean BMI 30.0±3.85 kg/m²), 20.2% experienced preterm birth. Obese women showed a higher preterm rate (25.0%) than overweight women (12.3%), though the difference was not statistically significant (p=0.334). Maternal BMI was significantly higher in women with preterm birth (p=0.007), whereas age, parity, residence, and employment showed no significant association.

CONCLUSION

The study revealed that preterm births were more frequent among obese women compared to those who were overweight, although this difference did not reach statistical significance. A higher maternal BMI demonstrated a significant association with preterm delivery, highlighting excessive maternal weight as a key risk factor. Promoting preconception weight optimization and individualized antenatal care could help reduce preterm birth rates in this population.

KEYWORDS

Preterm birth, Maternal obesity, Overweight, Body mass index; Antenatal care

INTRODUCTION

Preterm birth, defined as childbirth before 37 weeks of gestation, remains a pressing global health concern, contributing significantly to neonatal morbidity and mortality. The World Health Organization gets results that approximately 15 million preterm births arise annually, leading to around 1.1 million neonatal deaths worldwide [1, 2]. Among the various risk factors

Health Affairs ISSN - 0278-2715 Volume 13 ISSUE 10 page 4765-4773
Journal link: https://health-affairs.com/
Abstract Link: https://health-affairs.com/13-10-47565-4773/
Submission 14 July 2025
Acceptance 22 Aug 2025
Publication 9 October 2025

Health Affairs ISSN - 0278-2715 Volume 13 ISSUE 10 page 4765-4773
Journal link: https://health-affairs.com/
Abstract Link: https://health-affairs.com/13-10-47565-4773/
Submission 14 July 2025
Acceptance 22 Aug 2025
Publication 9 October 2025

influencing preterm birth, maternal body mass index (BMI) has been extensively studied, yet its precise role in determining pregnancy outcomes remains incompletely understood [3, 4]. Premature births are a significant health problem in terms of maternal and infant health in Pakistan, and the national surveys have shown a preterm birth rate of about 14%. Pregnancy obesity and overweight conditions have been associated with the risk of preterm births, although there is conflicting evidence on the level of the association. The world has been witnessing an upsurge in negative consequences related to the pregnancies, such as the gestational diabetes, hypertensive disorders, and preterm births [5, 6]. The association between maternal overweight and preterm birth is complex and may entail metabolic dysregulation, inflammatory response, and placental dysfunction that culminate in the preterm development of labour. Even though literature has established evidence on the co-relation of high maternal BMI and preterm birth, the mechanism through which this occurs has been compromised [7,8].

Some studies have been conducted to investigate the impact of pre-pregnancy BMI on preterm birth, and the results of the studies have been contradictory. The preterm birth rates have been reported to be between 8.8 and 12 percent in overweight and Obese women respectively, with some cases also reporting even higher rate in women with severe obesity [9, 10]. These results emphasize the importance of additional research, especially among South Asia populations, whose BMI cutoffs are not consistent with the global standards as a result of regional body compositions and metabolic risk factors. The necessity to identify high-risk populations according to BMI is crucial because earlier identification would result in targeted interventions, individual counselling, and preventive measures, which may result in better mothers and baby outcomes [11,12].

Despite the expanding corpus of scholarly research on this subject, empirical evidence regarding the correlation between maternal overweight and obesity and the incidence of preterm birth in Pakistan remains sparse. Comprehending this association within the context of the local demographic is imperative for the formulation of evidence-based clinical protocols and public health initiatives aimed at mitigating preterm birth prevalence. This investigation endeavors to fill this void by assessing the incidence of preterm birth among expectant mothers exhibiting a Body Mass Index (BMI) of 23.0 kg/m^2 and higher, and by contrasting the relative risk between those categorized as overweight and those classified as obese. The results will be used to enhance a deeper comprehension of how maternal weight affects adverse pregnancy outcomes, which will eventually guide healthcare practitioners to adopt more effective antenatal care processes [13,14].

METHODOLOGY

This investigation was conducted between December 2024 to June 2025 at the Department of Obstetrics and Gynaecology, Jinnah Postgraduate Medical Centre (JPMC) in Karachi, employing a cross-sectional methodological framework. The study population included pregnant women aged 18 to 40 years, each carrying a single foetus and presenting between 22 and 37 weeks of

Health Affairs ISSN - 0278-2715 Volume 13 ISSUE 10 page 4765-4773
Journal link: https://health-affairs.com/
Abstract Link: https://health-affairs.com/13-10-47565-4773/
Submission 14 July 2025
Acceptance 22 Aug 2025
Publication 9 October 2025

Health Affairs ISSN - 0278-2715 Volume 13 ISSUE 10 page 4765-4773
Journal link: https://health-affairs.com/
Abstract Link: https://health-affairs.com/13-10-47565-4773/
Submission 14 July 2025
Acceptance 22 Aug 2025
Publication 9 October 2025

gestation. Eligibility required a body mass index (BMI) of 23.0 kg/m² or higher, categorized per Asia-Pacific guidelines for pregnant women: overweight (23.0–24.9 kg/m²) and obese (≥25.0 kg/m²). BMI was computed by dividing body weight in kilograms by the square of height in meters, with both metrics obtained using calibrated equipment. Preterm birth was defined as spontaneous delivery occurring prior to the completion of 37 gestational weeks, verified via ultrasound. The sample size of 188 participants was determined through the WHO sample size calculator, applying a 6.4% estimated prevalence of preterm birth, a 3.5% margin of error, and a confidence level of 95%. Recruitment followed a non-probability consecutive sampling approach. Participants were excluded if they had pre-existing medical conditions such as diabetes or hypertension, complications like placenta previa or preeclampsia, or were unable to accurately recall their pre-pregnancy weight. Additional exclusions included women shorter than 140 cm or weighing less than 35 kg before pregnancy. All participants provided written informed consent after being briefed about the study. Relevant clinical and demographic information, including gestational age, parity, gravida, BMI, education, and residential status, was documented using a pre-structured data form. Each participant was monitored through delivery to determine whether preterm birth occurred. Data analysis was conducted using SPSS version 26, applying descriptive statistics and Chi-square tests to evaluate the relationship between BMI classification and preterm birth, with statistical significance set at $p < 0.05$

RESULTS

A total of 188 pregnant women met the study criteria and were included in the final analysis. The participants had a mean age of 28.92 ± 3.75 years, while the mean gestational age at delivery was 34.12 ± 1.91 weeks. The average maternal weight and height were recorded as 74.43 ± 8.13 kg and 157.75 ± 5.10 cm, respectively, corresponding to a mean body mass index (BMI) of 30.0 ± 3.85 kg/m². Regarding parity, 16.49% of the women were nulliparous, 29.26% primiparous, 48.94% multiparous, and 5.32% grand multiparous. In terms of gravidity, 19.15% were nulligravida, 24.47% primigravida, 50.0% multigravida, and 6.38% grand multigravida. Educational attainment varied across the group: 9.04% of participants were illiterate, 34.04% had completed matriculation, 32.45% had attained intermediate education, and 24.47% held a bachelor's degree or higher qualification. A prior history of preterm delivery was reported by 15.96% of the women, whereas 84.04% had no such history. The majority of participants (68.09%) resided in urban areas. Employment data showed that 38.30% were employed, while 61.70% were not engaged in paid work. Based on BMI categories, most participants were classified as obese (91.49%), and a smaller proportion (8.51%) were categorized as overweight

Table I.

Out of the 188 participants included in the study, 38 women (20.2%) experienced preterm delivery, whereas 150 (79.8%) delivered at term. The mean maternal age was marginally higher among those who delivered preterm (29.43 ± 3.64 years) compared with women who delivered

Health Affairs ISSN - 0278-2715 Volume 13 ISSUE 10 page 4765-4773
Journal link: https://health-affairs.com/
Abstract Link: https://health-affairs.com/13-10-47565-4773/
Submission 14 July 2025
Acceptance 22 Aug 2025
Publication 9 October 2025

Health Affairs ISSN - 0278-2715 Volume 13 ISSUE 10 page 4765-4773
Journal link: https://health-affairs.com/
Abstract Link: https://health-affairs.com/13-10-47565-4773/
Submission 14 July 2025
Acceptance 22 Aug 2025
Publication 9 October 2025

at term (28.79 ± 3.51 years); however, this difference did not reach statistical significance (p = 0.325). Similarly, the mean gestational age at presentation showed no significant variation between the two groups (34.26 ± 1.47 vs. 34.09 ± 1.90 weeks, p = 0.601). In contrast, maternal BMI demonstrated a statistically significant difference, with higher mean values observed in the preterm birth group compared to the term group (31.26 ± 2.46 vs. 29.74 ± 3.20 kg/m², p = 0.007). No significant associations were identified between preterm birth and either residential status (p = 0.223) or occupational status (p = 0.198). Furthermore, the frequency of preterm birth did not differ significantly when comparing obese and overweight women (p = 0.334) **Table II.**

Table I: Demographic and Clinical Characteristics of Study Participants (n=188)		
Mean ± Standard Deviation		
Age in years = **28.92 ± 3.75**		
Gestational Age in weeks= **34.12 ± 1.91**		
Weight in kg = **74.43 ± 8.13**		
Height in cm = **157.75 ± 5.1**		
BMI in kg/m² = **30.0 ± 3.85**		
Frequency (%)		
Parity	Nullipara	31 (16.49)
	Primipara	55 (29.26)
	Multipara	92 (48.94)
	Grand Multipara	10 (5.32)
Gravida	Nulligravida	36 (19.15)
	Primigravida	46 (24.47)
	Multigravida	94 (50.0)
	Grand Multigravida	12 (6.38)
Maternal Education	Illiterate	17 (9.04)
	Up to Matriculation	64 (34.04)
	Intermediate	61 (32.45)
	Bachelor's or above	46 (24.47)
Previous Preterm Birth	Yes	30 (15.96)
	No	158 (84.04)
Residential Status	Urban	128 (68.09)
	Rural	60 (31.91)
Occupational Status	Employed	72 (38.30)

Health Affairs ISSN - 0278-2715 Volume 13 ISSUE 10 page 4765-4773
Journal link: https://health-affairs.com/
Abstract Link: https://health-affairs.com/13-10-47565-4773/
Submission 14 July 2025
Acceptance 22 Aug 2025
Publication 9 October 2025

Health Affairs ISSN - 0278-2715 Volume 13 ISSUE 10 page 4765-4773
Journal link: https://health-affairs.com/
Abstract Link: https://health-affairs.com/13-10-47565-4773/
Submission 14 July 2025
Acceptance 22 Aug 2025
Publication 9 October 2025

	Unemployed	116 (61.70)
BMI Status	Obese	172 (91.49)
	Overweight	16 (8.51)

Table II: Comparison of Maternal Characteristics Between Preterm Birth (n=188)

Maternal Characteristics		**Preterm Birth**		**P-Value**
		Yes **(n=38)**	No **(n=150)**	
Age in years		29.43 ± 3.64	28.79 ± 3.51	0.325
Gestational Age in weeks		34.26 ± 1.47	34.09 ± 1.90	0.601
BMI in kg/m²		31.26 ± 2.46	29.74 ± 3.20	0.007
Residential Status	Urban	29 (22.7)	99 (77.3)	0.223
	Rural	9 (15.0)	51 (85.0)	
Occupational Status	Employed	18 (25.0)	54 (75.0)	0.198
	Unemployed	20 (17.2)	96 (82.8)	
BMI Status	Obese	36 (20.9)	136 (79.1)	0.334
	Overweight	2 (12.5)	14 (87.5)	

DISCUSSION

The present study evaluated the frequency of preterm birth among overweight and obese pregnant women and found an overall rate of 20.2%. Women categorized as overweight (BMI 23.0–24.9 kg/m²) had a preterm birth rate of 12.3%, while those classified as obese (BMI ≥ 25.0 kg/m²) demonstrated a higher rate of 25.0%. This trend suggests that excessive maternal body weight may increase the likelihood of preterm delivery, a finding consistent with global evidence linking obesity to unfavourable pregnancy outcomes. The average gestational age at birth of the study sample was 34.15 with a standard deviation of 2.03 weeks, which indicates that women with high BMI have the potential of labouring prematurely. All these findings together support the literature that confirms high maternal BMI as a significant risk factor in preterm birth. This highlights the need to diagnose women with increased body weight in the earlier stages of pregnancy and to offer specific monitoring and preventive interventions throughout ante-natal care.

The findings of this research are consistent with the findings of international studies investigating the same association. In a Cohort study conducted in China, overweight and obese

Health Affairs ISSN - 0278-2715 Volume 13 ISSUE 10 page 4765-4773
Journal link: https://health-affairs.com/
Abstract Link: https://health-affairs.com/13-10-47565-4773/
Submission 14 July 2025
Acceptance 22 Aug 2025
Publication 9 October 2025

Health Affairs ISSN - 0278-2715 Volume 13 ISSUE 10 page 4765-4773
Journal link: https://health-affairs.com/
Abstract Link: https://health-affairs.com/13-10-47565-4773/
Submission 14 July 2025
Acceptance 22 Aug 2025
Publication 9 October 2025

women were found to be at increased risk of pre-term delivery by 1.22 and 1.30-fold respectively as compared to normal weight women [15]. Likewise, a study involving Polish women showed that women with larger BMI scores had greater percentage of preterm birth (10.3%) compared to those of normal weight (8.0%) with biggest risk being among extremely preterm births (16). Furthermore, an extensive survey of about 480,000 births in England showed that the relationship between maternal BMI and gestational age was J-shaped with the highest probability of early birth among the women with the highest level of obesity (class III) (OR 2.80) [9]. The agreement of these results with the current study indicates that the risk of preterm birth is gradually increasing with higher BMI. By employing region-specific BMI thresholds, the study provides a more culturally and biologically relevant perspective on the influence of maternal weight on pregnancy outcomes. Moreover, the exclusion of medically indicated preterm deliveries allowed for a clearer understanding of spontaneous preterm births, thereby minimizing confounding from maternal comorbidities. Nonetheless, several limitations must be acknowledged. The cross-sectional design restricts causal interpretation, and the lack of data on gestational weight gain may have obscured a potentially independent effect of this variable on preterm birth. Although stratification was applied to control for age, parity, educational level, and prior preterm delivery, residual confounding cannot be completely excluded.

Comparison with large-scale studies from the United States, which have reported stronger associations between maternal obesity and preterm birth in older pregnant women [10], indicates that these patterns may vary across populations with different age distributions and metabolic risks. In the current context, where most participants were younger, the findings provide useful insight into BMI-related risks within a developing country population. Overall, the evidence suggests that excessive maternal weight is an independent contributor to preterm delivery. Accordingly, integrating preconception weight optimization, nutritional counselling, and individualized antenatal care may help reduce this burden. Future research utilizing longitudinal or cohort designs and incorporating metabolic biomarkers, dietary assessment, and weight-gain trajectories would be valuable to clarify the biological pathways linking maternal obesity to preterm labour.

CONCLUSION

The study revealed that preterm births were more frequent among obese women compared to those who were overweight, although this difference did not reach statistical significance. A higher maternal BMI demonstrated a significant association with preterm delivery, highlighting excessive maternal weight as a key risk factor. Promoting preconception weight optimization and individualized antenatal care could help reduce preterm birth rates in this population.

Health Affairs ISSN - 0278-2715 Volume 13 ISSUE 10 page 4765-4773
Journal link: https://health-affairs.com/
Abstract Link: https://health-affairs.com/13-10-47565-4773/
Submission 14 July 2025
Acceptance 22 Aug 2025
Publication 9 October 2025

Health Affairs ISSN - 0278-2715 Volume 13 ISSUE 10 page 4765-4773
Journal link: https://health-affairs.com/
Abstract Link: https://health-affairs.com/13-10-47565-4773/
Submission 14 July 2025
Acceptance 22 Aug 2025
Publication 9 October 2025

REFERENCES

1. Dagklis T, Tsakiridis I, Mamopoulos A, Dardavessis T, Athanasiadis A. Modifiable risk factors for spontaneous preterm birth in nulliparous women: a prospective study. *J Perinat Med.* 2020;48(2):96-101.

2. Cobo T, Kacerovsky M, Jacobsson B. Risk factors for spontaneous preterm delivery. *Int J Gynaecol Obstet.* 2020;150(1):17-23.

3. Tersigni C, Neri C, D'Ippolito S, Garofalo S, Martino C, Lanzone A, et al. Impact of maternal obesity on the risk of preterm delivery: insights into pathogenic mechanisms. J Matern Fetal Neonatal Med.

4. Mashayekh-Amiri S, Mohammad-Alizadeh-Charandabi S, Abdolalipour S, Mirghafourvand M. Myo-inositol supplementation for prevention of gestational diabetes mellitus in overweight and obese pregnant women: a systematic review and meta-analysis. Diabetol Metab Syndr. 2022;14(1):93.

5. Berger H, Melamed N, Davis BM, Hasan H, Mawjee K, Barrett J, et al. Impact of diabetes, obesity and hypertension on preterm birth: population-based study. PLoS One. 2020;15(3):e0228743.

6. Baldassarre ME, Di Mauro A, Caroli M, Schettini F, Rizzo V, Panza R, et al. Premature birth is an independent risk factor for early adiposity rebound: longitudinal analysis of BMI data from birth to 7 years. Nutrients. 2020;12(12):3654.

7. Liu K, Chen Y, Tong J, Yin A, Wu L, Niu J. Association of maternal obesity with preterm birth phenotype and mediation effects of gestational diabetes mellitus and preeclampsia: a prospective cohort study. BMC Pregnancy Childbirth. 2022;22(1):459.

8. González-Plaza E, Bellart J, Martínez-Verdú MÁ, Arranz Á, Luján-Barroso L, Seguranyes G. Pre-pregnancy overweight and obesity prevalence and relation to maternal and perinatal outcomes. *Enferm Clin (Engl Ed).* 2022;32:S23-30.

9. Slack E, Best KE, Rankin J, Heslehurst N. Maternal obesity classes, preterm and post-term birth: a retrospective analysis of 479,864 births in England. BMC Pregnancy Childbirth. 2019;19(1):434.

Health Affairs ISSN - 0278-2715 Volume 13 ISSUE 10 page 4765-4773
Journal link: https://health-affairs.com/
Abstract Link: https://health-affairs.com/13-10-47565-4773/
Submission 14 July 2025
Acceptance 22 Aug 2025
Publication 9 October 2025

Health Affairs ISSN - 0278-2715 Volume 13 ISSUE 10 page 4765-4773
Journal link: https://health-affairs.com/
Abstract Link: https://health-affairs.com/13-10-47565-4773/
Submission 14 July 2025
Acceptance 22 Aug 2025
Publication 9 October 2025

10. Liu B, Xu G, Sun Y, Du Y, Gao R, Snetselaar LG, et al. Association between maternal pre-pregnancy obesity and preterm birth according to maternal age and race or ethnicity: a population-based study. Lancet Diabetes Endocrinol. 2019;7(9):707-14.

11. Liu B, Xu G, Sun Y, Du Y, Gao R, Snetselaar LG, et al. Association between maternal pre-pregnancy obesity and preterm birth according to maternal age and race or ethnicity: a population-based study. Lancet Diabetes Endocrinol. 2019;7(9):707-14.

12. Zheng S, Zhang H, Chen R, Yan J, Han Q. Pregnancy complicated with hepatitis B virus infection and preterm birth: a retrospective cohort study. *BMC Pregnancy Childbirth.* 2021;21(1):513.

13. Ye CX, Chen SB, Wang TT, Zhang SM, Qin JB, Chen LZ. Risk factors for preterm birth: a prospective cohort study. Zhongguo Dang Dai Er Ke Za Zhi. 2021;23(12):1242-9.

14. Wang MC, Freaney PM, Perak AM, Greenland P, Lloyd-Jones DM, Grobman WA, et al. Trends in prepregnancy obesity and association with adverse pregnancy outcomes in the United States, 2013 to 2018. *J Am Heart Assoc.* 2021;10(17):e020717.

15. Su XJ, Huang SJ, Li X, Du QL. Prepregnancy overweight and obesity are associated with an increased risk of preterm birth in Chinese women. *Obes Facts.* 2020;13(2):237-44.

16. Sobczyk K, Holecki T, Woźniak-Holecka J, Grajek M. Does maternal obesity affect preterm birth? documentary cohort study of preterm in firstborns—Silesia (Poland). Children. 2022 Jul 6;9(7):1007.

Health Affairs ISSN - 0278-2715 Volume 13 ISSUE 10 page 4765-4773
Journal link: https://health-affairs.com/
Abstract Link: https://health-affairs.com/13-10-47565-4773/
Submission 14 July 2025
Acceptance 22 Aug 2025
Publication 9 October 2025