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Original Research Article

Maternal Outcomes in Morbidly Obese Pregnant Women

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Abstract:

Objective: To determine the frequency of maternal outcomes in morbidly obese pregnant women presenting to a tertiary care hospital. **Study Design:** A descriptive study. **Place and Duration of Study:** Department of Obstetrics and Gynaecology Mardan Medical Complex Mardan from 27th August 2025 to 27th November 2025. **Methodology:** A total of 95 morbidly obese pregnant women aged 18 to 40 years with singleton pregnancy were included by non-probability consecutive sampling. Maternal outcomes including preeclampsia, gestational diabetes, postpartum haemorrhage and caesarean section were recorded until delivery. Data were analysed using Statistical Package for the Social Sciences version 26. Quantitative variables were presented as mean ± standard deviation, while qualitative variables were expressed as frequency and percentage. Chi-square test or Fisher's exact test was applied after stratification and a p-value of ≤0.05 was considered statistically significant. **Results:** The mean age was 30.28 ± 5.00 years, mean gestational age was 38.08 ± 0.72 weeks, mean parity was 1.98 ± 1.19, and mean body mass index was 43.18 ± 2.43 kg/m^2. Preeclampsia was observed in 34 (35.8%), gestational diabetes in 25 (26.3%), postpartum haemorrhage in 10 (10.5%), and caesarean section was performed in 66 (69.5%) women. Preeclampsia was significantly more frequent among women aged more than 30 years (p<0.001). Caesarean section showed significant association with age more than 30 years (p=0.009) and body mass index greater than 43 kg/m^2 (p=0.027). Postpartum haemorrhage was significantly associated with parity greater than 2 (p=0.035). **Conclusion:** Morbidly obese pregnant women had high frequency of preeclampsia and caesarean section.

Keywords: Body mass index, Caesarean section, Gestational diabetes, Morbid obesity, Postpartum haemorrhage, Preeclampsia, Pregnancy.

INTRODUCTION

Obesity in pregnancy is common in many nations and represents a serious public health issue. Obese pregnant women have a greater chance of developing various problems than those who are not overweight.1 Increased fat tissue leads to changes in metabolism and hormonal function that may affect the course of the pregnancy. Moreover, obesity is often accompanied by chronic inflammatory conditions, insulin resistance, and increased stress for the heart, which makes the pregnancy even more difficult.2 Hence, obese pregnant women usually need to be more closely monitored during their pregnancy.

The outcomes for the mother are significantly affected in cases where a woman who is pregnant suffers from morbid obesity. One of the most common complications is that of preeclampsia, and it develops more frequently in such women because of obesity-related dysfunction of the endothelium and chronic inflammation.3 Similarly, gestational diabetes mellitus affects pregnant women more often because of their insulin resistance.4

Postpartum hemorrhage and cesarean delivery are conditions that obese women are at risk for developing.5 Obstructed uterine contractility,

prolonged delivery, and increased fetal weight can lead to postpartum bleeding.6 Women who are morbidly obese have increased risks of undergoing emergency or elective cesarean delivery because of labor dystocia, fetal distress, and progress arrest.7 There is increased operative difficulty, infection of the incisional wound, anesthetic problems, and slower recovery during cesarean delivery among this group.8

Objective

While there is ample literature on maternal problems associated with morbid obesity, the incidence and profile vary in different settings and populations. There is a lack of local information on maternal problems among morbidly obese pregnant women, which makes it difficult to develop an evidence-based approach to their treatment. For this reason, this research was performed to evaluate maternal problems among morbidly obese pregnant women in our local population. The results will help to detect potential patients earlier and plan treatment better.

METHODOLOGY

A descriptive study was carried out in the Department of Obstetrics and Gynaecology, Mardan Medical Complex, Mardan, from 27th August 2025 to 27th November 2025. Ethical approval was obtained from the Institutional Ethical Committee of Bacha Khan Medical Complex, Mardan, under Certificate No. 535/BKMC dated 14/06/2023 before commencement of the study. A total of 95 pregnant women were enrolled. The sample size was calculated by using the WHO sample size software with a 95% confidence level, 7% margin of error and an expected frequency of postpartum haemorrhage of 14% among morbidly obese pregnant women.9 A non-probability consecutive sampling technique was used for recruitment of participants. Women aged 18 to 40 years with singleton pregnancy confirmed on ultrasound, gestational age greater than 36 weeks according to LMP, any parity and morbid obesity were included in the study. Women having history of Type 2 diabetes, hypertension, cardiovascular disease, or intrauterine fetal demise on ultrasound were excluded from the study.

Morbid obesity was considered when body mass index (BMI) was 40 kg/m^2 or more before 37 weeks of gestation. BMI was calculated by dividing weight in kilograms by height in metres squared. Written informed consent was obtained from all eligible women after explaining the purpose and benefits of the study. Demographic information including age, gestational age, parity, BMI, socioeconomic status and residential status was recorded. A detailed history was taken and relevant obstetric examination and ultrasound findings were reviewed to confirm eligibility. All enrolled women were followed until delivery and maternal outcomes including preeclampsia, gestational diabetes, postpartum haemorrhage and cesarean section were documented.

Preeclampsia was considered when systolic blood pressure was 140 to 159 mmHg with proteinuria of ≥300 mg/day confirmed by laboratory testing after 20 weeks of gestation according to LMP. Gestational diabetes was diagnosed when the 50-g glucose screening test performed between 24 and 28 weeks of gestation showed plasma glucose level >140 mg/dl and was confirmed by a 75-g 2-hour oral glucose tolerance test after overnight fasting, with 1-hour glucose level of 180 mg/dl and 2-hour glucose level of 150 mg/dl considered significant.

Postpartum haemorrhage was considered when estimated blood loss was ≥1000 ml following cesarean section or ≥500 ml following vaginal delivery within 24 hours after birth. Blood loss was measured by weighing soaked gauzes, pads after subtracting their pre-use weight from post-use weight and blood clot with 1 ml of blood taken as equal to 1 g. Cesarean section was considered when the baby was delivered through an abdominal operation using a 6- to 7-inch horizontal skin incisions.

Data were entered and analysed using IBM SPSS version 26. Quantitative variables including age, gestational age, BMI and parity were presented as mean ± standard deviation. Categorical variables including residential status, socioeconomic status, preeclampsia, gestational diabetes, postpartum haemorrhage, and cesarean section were presented as frequencies and percentages. Maternal outcomes were stratified according to age, parity and BMI. Post-stratification comparison was performed by Chi-square test or Fisher's exact test where appropriate. A p-value of ≤0.05 was considered statistically significant.

RESULTS

The mean age of the morbidly obese pregnant women were 30.28±5.00 years, with mean gestational age of 38.08±0.72 weeks and mean parity of 1.98±1.19. Mean BMI recorded was 43.18±2.43 Kg/m^2. Regarding residential status, 48 (50.5%) patient belong to rural area and 47 (49.5%) belong to urban area. In term of socioeconomic status, 37 (38.9%) patient was of low status, 39 (41.1%) were middle status and 19 (20.0%) fall in high socioeconomic status (Table 1).

Table 1. Maternal Demographics n=95

Demographics	Mean ± SD
Age (years)	30.28±5.00
Gestational Age (weeks)	38.08±0.72
Parity	1.98±1.19
BMI (Kg/m^2)	43.18±2.43
Residential Status	
Rural n (%)	48 (50.5%)
Urban n (%)	47 (49.5%)
Socioeconomic Status	
Low n (%)	37 (38.9%)
Middle n (%)	39 (41.1%)
High n (%)	19 (20.0%)

Among the maternal outcomes assessed, preeclampsia was observed in 34 (35.80%) patient while remaining 61 (64.20%) did not developed this complication. Gestational diabetes occurs in 25 (26.30%) of women, whereas 70 (73.70%) not affected. Postpartum haemorrhage was noted in only 10 (10.50%) cases, with majority 85 (89.50%) not experiencing this outcome. Caesarean section was required in 66 (69.50%) of patient, while 29 (30.50%) delivered via other mode (Table 2).

Table 2. Maternal Outcomes in Morbidly obese pregnant women n=95

Outcome	Frequency	% age
Preeclampsia		
Yes	34	35.80%
No	61	64.20%
Gestational Diabetes		
Yes	25	26.30%
No	70	73.70%
Postpartum Haemorrhage		
Yes	10	10.50%
No	85	89.50%
Caesarean Section		
Yes	66	69.50%
No	29	30.50%

On stratified analysis, age above 30 years shown significant association with higher frequency of preeclampsia, 27 (51.9%) compare to 7 (16.3%) in younger group, with p-value <0.001. Caesarean section rate also found significantly higher in women aged >30 years, 42 (80.8%) versus 24 (55.8%) in ≤30 years group, p=0.009, and in those with higher BMI group >43 Kg/m^2, 39 (79.6%) compare to 27 (58.7%), p=0.027. Postpartum haemorrhage shown significant association with parity group, being higher in patient with parity >2, 6 (21.4%) versus 4 (6.0%) in ≤2 group, p=0.035. No other demographic factor shown statistically significant association with gestational diabetes or the remaining outcomes (Table 3).

Table 3. Association of Maternal Outcomes with Demographic Factors

Demographic Factors	Category	Yes n(%)	No n(%)	p-value
Preeclampsia				
Age (years)	≤30	7 (16.3%)	36 (83.7%)	<0.001*
	>30	27 (51.9%)	25 (48.1%)	
Parity Group	≤2	25 (37.3%)	42 (62.7%)	0.632*
	>2	9 (32.1%)	19 (67.9%)	
BMI Group (Kg/m^2)	≤43	15 (32.6%)	31 (67.4%)	0.531*
	>43	19 (38.8%)	30 (61.2%)	
Gestational Diabetes				
Age (years)	≤30	9 (20.9%)	34 (79.1%)	0.278*
	>30	16 (30.8%)	36 (69.2%)	
Parity Group	≤2	15 (22.4%)	52 (77.6%)	0.179*
	>2	10 (35.7%)	18 (64.3%)	
BMI Group (Kg/m^2)	≤43	11 (23.9%)	35 (76.1%)	0.606*

	>43	14 (28.6%)	35 (71.4%)	
Postpartum Haemorrhage				
Age (years)	≤30	4 (9.3%)	39 (90.7%)	0.752**
	>30	6 (11.5%)	46 (88.5%)	
Parity Group	≤2	4 (6.0%)	63 (94.0%)	0.035**
	>2	6 (21.4%)	22 (78.6%)	
BMI Group (Kg/m^2)	≤43	2 (4.3%)	44 (95.7%)	0.092**
	>43	8 (16.3%)	41 (83.7%)	
Caesarean Section				
Age (years)	≤30	24 (55.8%)	19 (44.2%)	0.009*
	>30	42 (80.8%)	10 (19.2%)	
Parity Group	≤2	44 (65.7%)	23 (34.3%)	0.213*
	>2	22 (78.6%)	6 (21.4%)	
BMI Group (Kg/m^2)	≤43	27 (58.7%)	19 (41.3%)	0.027*
	>43	39 (79.6%)	10 (20.4%)	

*Chi-Square Test **Fischer Exact Test

DISCUSSION

Present study was conducted to assess the maternal outcome in morbidly obese pregnant women and its association with demographic factors like age, parity and BMI. Findings of this study shown that preeclampsia occur in 34 (35.80%) of patient which is likely due to excessive adipose tissue causing chronic low-grade inflammation and endothelial dysfunction leading to abnormal placentation and rise in blood pressure. GDM was found in 25 (26.30%) cases, which can be attributed to insulin resistance, which increases with an increase in body weight, causing glucose intolerance during pregnancy. CS was found in 66 (69.50%) cases, which could be owing to large fetus, soft tissue dystocia, and reduced contractility of uterus due to obesity, thus making vaginal delivery challenging for the patient. PPH was noted in 10 (10.50%) cases, which may have been due to the fact that uterine atony is more common in obese patients due to myometrial overdistension, but the incidence rate was relatively lower in the present study.

Preeclampsia were noted in 34 (35.80%) of morbidly obese pregnant women in present study, which is comparable with findings of Rani et al. 10 who reported preeclampsia in 42.1% of obese women and Hanif et al. 11 who observed rate of 30.9%. This similarity may be explaining due to shared pathophysiological mechanism of chronic inflammation and endothelial dysfunction associated with excess adiposity across different obese population. However, finding is much higher than Bokhari et al. 12 who reported only 16% and Syed et al. 13 with 12%, difference could be due to variation in obesity severity, as present cohort exclusively include morbidly obese women whereas these study enrolled wider range of overweight and obese participant with lower average BMI.

Gestational diabetes mellitus were noted in 25 (26.30%) of cases in present study, which correspond closely with Inam et al. 14 who reported frequency of 30.6% and Suherman et al. 15 with 7.6% reported markedly lower, likely because Suherman et al. study population had substantial proportion of class I obesity only, whereas present cohort comprised women with markedly higher BMI, increasing insulin resistance and hence higher GDM frequency.

Postpartum haemorrhage occur in 10 (10.50%) of participant in present study, similar to Syed et al. 13 who reported 16% and Suherman et al. 15 with 2.7%, this wide variation across studies might reflect differences in institutional protocol for active management of third stage of labour and availability of uterotonic agent, along with differing definition of PPH used by various author.

Caesarean section rate were high at 66 (69.50%) in present study, which is markedly greater than most cited literature, including Joewono et al. 16 who reported 85% in morbidly obese women, a rate closely aligning with present finding. This consistency support notion that increasing BMI is strongly linked with higher operative delivery rate due to mechanical difficulty of labour and clinician preference for caesarean in high-risk obese patient. In contrast, lower rate reported by Bokhari et al. 12 at 38% and Syed et al. 13 at 30% may be attributed to inclusion of overweight and mildly obese women alongside morbidly obese, diluting overall caesarean frequency.

Regarding demographic association, present study found significant relationship between advance maternal age and preeclampsia as well as caesarean section, which is in agreement with Rahman et al. 17 who reported significantly higher risk of pregnancy-induced hypertension and caesarean delivery among obese women with increasing age-related risk factor, supporting biological plausibility that vascular ageing compound obesity-related risk. Similarly, higher BMI group in present study shown significant association with caesarean section, consistent with Flick et al. 18 and Pakniat et al. 19 both of whom demonstrated progressively rising caesarean and preeclampsia risk with escalating obesity class, reinforcing dose-

dependent relationship between BMI and adverse maternal outcome.20

There are various limitations of the current study. First, it is a single center study; thus, it lacks external validity and cannot be generalized to the whole population. Second, the number of participants was quite low; hence, there was less statistical power in the study. Third, because it was an observational study, it is impossible to draw conclusions about causality from it. Confounding variables that might affect the outcome measure, like diet and physical activity, were not considered in the study. Finally, the duration of the study was quite short.

CONCLUSION

Our results have revealed that morbid obesity among pregnant women is correlated with various unfavorable outcomes for the mother including pre-eclampsia and delivery by cesarean section. Maternal age and high body mass index were statistically significant factors for the increased risk of developing such complications. Postpartum hemorrhage, on the other hand, has been found to correlate with high parity among this particular group of patients.

Ethical Approval

Ethical approval for this study was obtained before commencement of the research from the Institutional Ethical Committee of Bacha Khan Medical Complex Mardan with Certificate No. 535/BKMC; dated: 14/06/2023.

Patients' Consent

Written informed consent was taken from all participant before enrolment in the study.

Competing Interest

The author declared that they had no competing interests.

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