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Original Research Article

Complications of Labour in Obese Obstetric Patients

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Abstract: *Obesity during pregnancy is a rising public health concern and has been linked to an increased risk of labor complications. Maternal obesity contributes to mechanical, hormonal, and metabolic alterations that affect the labor process, leading to higher rates of cesarean section, labor induction failure, prolonged labor, and maternal and neonatal morbidity.* ***Objective:*** *To assess the frequency and types of labor complications in obese obstetric patients and determine the associated maternal outcomes. Methods: This descriptive cross-sectional study included 169 obese pregnant women at Shaikh Zayed Women Hospital Larkana over a period of June 2024 December 2024. Detailed demographic data, obstetric history, and intrapartum parameters were recorded. Labor complications such as prolonged first/second stage, failed induction, shoulder dystocia, fetal distress, and mode of delivery were evaluated.* ***Results:*** *Out of 169 obese obstetric patients, 52.1% underwent cesarean delivery, with a significantly higher rate of failed induction in those with Class II/III obesity (39.0%) compared to Class I (20.7%, p = 0.01). Prolonged first stage of labor was observed in 46.8% of women with higher BMI. Maternal complications such as postpartum hemorrhage (28.6% vs. 12.0%, p = 0.005), wound infection (14.3% vs. 4.3%, p = 0.04), and prolonged hospital stay (19.5% vs. 6.5%, p = 0.03) were significantly more frequent in Class II/III obesity. Fetal distress, shoulder dystocia, and NICU admissions were also more common in this group, though not statistically significant.* ***Conclusion:*** *Obesity in pregnancy is significantly associated with an increased risk of labor complications, particularly cesarean delivery, prolonged labor, and failed induction.*

Keywords: Obesity, pregnancy, labor complications, maternal outcomes

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Introduction

Obesity has emerged as one of the most pressing public health challenges of the 21st century, with a profound impact on reproductive health outcomes. Defined by the World Health Organization as a body mass index (BMI) ≥30 kg/m², maternal obesity has shown a consistently rising trend worldwide, particularly among women of childbearing age. In developing countries undergoing nutritional transition, the dual burden of undernutrition and obesity complicates maternal and child health policies. Global estimates suggest that more than one-third of reproductive-aged women are overweight or obese, contributing to a growing burden of pregnancy-related complications (1). The physiological changes associated with obesity—such as increased circulating inflammatory cytokines, insulin resistance, hyperlipidemia, and altered adipokine profiles—interfere with normal reproductive functioning and parturition. During pregnancy, these metabolic derangements may impair the myometrial contractility and affect the neurohormonal cascade that governs the onset and progression of labor (2-3). Consequently, labor in obese parturients tends to be more dysfunctional and prolonged. Studies have shown that the duration of the first stage of labor may be extended by several hours in women with high BMI, and progression in the active phase is often delayed despite the use of oxytocin augmentation (4).

Obese women also face higher rates of failed labor induction. The reasons are multifactorial and include altered pharmacokinetics of induction agents, reduced myometrial sensitivity, and mechanical hindrance from abdominal adiposity. A meta-analysis reported that obese parturients have a nearly twofold risk of induction failure compared to women with normal BMI (5-6). Cesarean delivery rates among obese women are consistently elevated across global data sets, with rates as high as 40–60% in Class II and III obesity categories. The indications include failure to progress, non-reassuring fetal heart rate, and cephalopelvic disproportion due to fetal macrosomia (7). Moreover, obesity complicates the surgical process itself. Cesarean delivery in obese women is associated with technical challenges, including poor visualization, prolonged operative time, and difficulty in wound closure. These women are also at higher risk for anesthesia-related complications, such as difficult airway management and reduced spinal anesthesia efficacy (8). Postoperative wound complications—including seroma, hematoma, dehiscence, and infections—are significantly more prevalent and often necessitate re-intervention and prolonged hospitalization (9-10).

The implications extend to neonatal outcomes as well. Babies born to obese mothers are at higher risk of hypoglycemia, shoulder dystocia, neonatal intensive care admission, and long-term metabolic dysfunction. The compounded maternal-fetal risk mandates heightened vigilance during labor and delivery in this population (11-12). Despite robust global evidence, there remains a paucity of local data regarding labor complications in obese pregnant women, especially in South Asian settings.

Thus, the objective of the study was to evaluate the frequency and types of labor complications and maternal outcomes among obese obstetric patients.

Methodology

A descriptive cross-sectional study was conducted at Shaikh Zayed Women Hospital Larkana over a period of June 2024 December 2024. Including 169 obese obstetric patients (BMI ≥30 kg/m²) selected through non-probability consecutive sampling. Pregnant women aged 18–45 years. BMI ≥30 kg/m² at time of admission for delivery. Singleton pregnancy. Gestational age ≥37 weeks. Women with multiple pregnancies. Preterm labor (<37 weeks). Known fetal anomalies. Incomplete medical records. After informed consent, detailed obstetric and demographic profiles were recorded, including age, BMI at admission, parity, gestational age, and previous cesarean history.

Intrapartum details such as the duration of the first and second stages of labor, mode of delivery, labor induction, fetal distress, and the presence of complications like shoulder dystocia or postpartum hemorrhage were documented. Maternal outcomes including cesarean section, wound infection, need for blood transfusion, and ICU admission were recorded in structured proformas and verified through hospital records. Data were analyzed using SPSS version 26. Quantitative variables such as age, BMI, and duration of labor were presented as mean ± standard deviation, while categorical variables like type of labor complication, mode of delivery, and maternal outcomes were expressed as frequencies and percentages. Associations between BMI and labor complications were assessed using the chi-square test, with a p-value of <0.05 considered statistically significant.

Results

Obese obstetric patients had an average age of 29.8± 4.6 years, with significantly higher age observed among those with Class II/III obesity (30.5± 4.9 years) compared to Class I (28.9± 4.3 years, p = 0.03). The mean BMI was markedly higher in Class II/III group (37.4± 2.2 kg/m²) than in Class I (32.5± 1.1 kg/m², p < 0.001). Approximately 58% of the participants were multiparous, and prior cesarean section was significantly more common in women with Class II/III obesity (58.4%) than in Class I (31.5%, p = 0.01). (Table 1) Spontaneous labor occurred in 42% of the participants. However, 58% required induction of labor, with no significant difference across obesity classes. Notably, prolonged first stage of labor was significantly more prevalent among Class II/III obesity patients (46.8%) compared to Class I (30.4%, p = 0.03), indicating that higher BMI may be associated with impaired labor progression. Overall, 52.1% of women underwent cesarean section, with a higher proportion in the Class II/III group (55.8%) than Class I (48.9%), although the difference was not statistically significant. Failed induction was significantly more frequent in Class II/III obesity (39.0%) versus Class I (20.7%, p = 0.01), supporting the notion that higher BMI reduces the effectiveness of labor induction (Table3). Fetal distress was observed in 24.3% of all cases, with a higher frequency among Class II/III obese patients (29.9%) compared to Class I (19.6%), though not statistically significant. Shoulder dystocia, NICU admissions, and low APGAR scores were also more common in higher BMI groups, suggesting potential fetal compromise in obese pregnancies. Postpartum hemorrhage occurred in 19.5% of patients, significantly more common in Class II/III obesity (28.6%) compared to Class I (12.0%, p = 0.005). Wound infections were more frequent in higher obesity classes (14.3% vs. 4.3%, p = 0.04), and prolonged hospital stays (>5 days) were significantly higher in Class II/III patients (19.5% vs. 6.5%, p = 0.03) (Table 4). Among the 88 cesarean cases, the most common indication was non-progress of labor (31.8%), followed by fetal distress (26.1%). A significantly higher proportion of Class I obese women had cesarean due to previous scars (28.9%) compared to Class II/III (14.0%, p = 0.03), indicating varied risk profiles influencing surgical decision-making across BMI categories. (Table 5)

Table 1: Demographic Characteristics

Characteristic	Total (n=169)	Class I Obesity (30–34.9)	Class II/III Obesity (≥35)	p-value
Age (years)	29.8 ± 4.6	28.9 ± 4.3	30.5 ± 4.9	0.03
BMI (kg/m²)	34.7 ± 3.2	32.5 ± 1.1	37.4 ± 2.2	<0.001
Gestational Age (weeks)	38.5 ± 1.1	38.6 ± 1.0	38.4 ± 1.2	0.29
Parity ≥2	98 (58.0%)	50 (54.3%)	48 (62.3%)	0.28
Previous Cesarean Section	74 (43.8%)	29 (31.5%)	45 (58.4%)	0.01

Table 2: Labor Characteristics

Variable	Total (n=169)	Class I Obesity	Class II/III Obesity	p-value
Spontaneous Labor	71 (42.0%)	40 (43.5%)	31 (40.3%)	0.68
Induction Required	98 (58.0%)	52 (56.5%)	46 (59.7%)	0.79
Prolonged 1st Stage	64 (37.9%)	28 (30.4%)	36 (46.8%)	0.03
Prolonged 2nd Stage	28 (16.6%)	12 (13.0%)	16 (20.8%)	0.21

Table 3: Delivery Outcomes

Outcome	Total (n=169)	Class I Obesity	Class II/III Obesity	p-value
Vaginal Delivery	81 (47.9%)	47 (51.1%)	34 (44.2%)	0.38
Cesarean Section	88 (52.1%)	45 (48.9%)	43 (55.8%)	0.38
Instrumental Delivery	7 (4.1%)	4 (4.3%)	3 (3.9%)	0.91
Failed Induction	49 (29.0%)	19 (20.7%)	30 (39.0%)	0.01

Table 4: Fetal Complications

Complication	Total (n=169)	Class I Obesity	Class II/III Obesity	p-value
Fetal Distress	41 (24.3%)	18 (19.6%)	23 (29.9%)	0.11
Shoulder Dystocia	15 (8.9%)	5 (5.4%)	10 (13.0%)	0.12
Low APGAR (<7 at 5 min)	11 (6.5%)	4 (4.3%)	7 (9.1%)	0.18
NICU Admission	18 (10.7%)	7 (7.6%)	11 (14.3%)	0.27
Maternal Complication				
Postpartum Hemorrhage	33 (19.5%)	11 (12.0%)	22 (28.6%)	0.005
Wound Infection	15 (8.9%)	4 (4.3%)	11 (14.3%)	0.04
ICU Admission	8 (4.7%)	2 (2.2%)	6 (7.8%)	0.13
Prolonged Hospital Stay (>5 days)	21 (12.4%)	6 (6.5%)	15 (19.5%)	0.03

Table 5: Cesarean Indications

Indication	Total CS (n=88)	Class I Obesity (n=45)	Class II/III Obesity (n=43)	p-value

Non-progress of labor	28 (31.8%)	11 (24.4%)	17 (39.5%)	0.09
Fetal distress	23 (26.1%)	12 (26.7%)	11 (25.6%)	0.91
Previous scar	19 (21.6%)	13 (28.9%)	6 (14.0%)	0.03
Failed Induction	18 (20.5%)	9 (20.0%)	9 (20.9%)	0.94

Discussion

This study investigated the maternal and intrapartum complications associated with obesity in obstetric patients. The findings indicate that maternal obesity significantly increases the risk of several labor-related complications, including prolonged labor, failed induction, cesarean section, postpartum hemorrhage, and wound infections. These findings reinforce the growing body of *previous research* that highlights the adverse effects of obesity on maternal health during childbirth (13-14). The mean age and BMI were significantly higher in patients with Class II/III obesity, which is consistent with trends observed in *previous research* showing that advanced maternal age and higher BMI are interconnected factors contributing to obstetric risk (15). A significant association was observed between obesity and prior cesarean delivery, reflecting that obese women are more likely to have undergone surgical delivery previously, a pattern frequently noted in *previous studies*. The incidence of prolonged first stage of labor was notably higher in the Class II/III group (46.8%) compared to Class I (30.4%, $p = 0.03$). This is consistent with *previous research* indicating that increased adiposity impairs myometrial contractility, leading to slower labor progression (16). Similarly, the failed induction rate was significantly higher among women with Class II/III obesity (39.0%) compared to Class I (20.7%, $p = 0.01$), which aligns with findings from *previous research* where obese patients had a two- to threefold higher risk of induction failure due to hormonal and mechanical resistance to labor initiation.

The overall cesarean section rate in our study was 52.1%, which, while high, is comparable to rates reported in *previous studies* among obese populations (17-18). Although the difference in cesarean rate between obesity classes was not statistically significant, failed induction and non-progression of labor were predominant reasons, mirroring patterns reported in *previous research*. Notably, prior cesarean was more common in Class I obesity (28.9%) than in higher classes (14.0%), possibly due to selection bias or smaller sample size. Fetal complications such as distress, low APGAR scores, and NICU admissions were more common in Class II/III obese mothers, although not statistically significant. These outcomes are in line with *previous research* that reports higher risks of intrapartum fetal compromise due to maternal metabolic and vascular alterations in obesity (19). Maternal complications were strikingly more frequent in the higher BMI group. Postpartum hemorrhage occurred in nearly one-third of Class II/III patients (28.6%), which is significantly higher than in Class I (12.0%, $p = 0.005$), and reflects findings from *previous studies* that attribute this to poor uterine tone and prolonged labor (20). Wound infections and prolonged hospital stays were also more frequent in the higher BMI group, in agreement with *previous research* documenting impaired wound healing, increased surgical time, and subcutaneous fat contributing to infections in obese women. Overall, these findings suggest that maternal obesity not only affects labor progress but also substantially elevates the risk of postoperative complications. The consistency with *previous research* across global settings reinforces the need for individualized labor planning, early risk identification, and targeted intrapartum monitoring for obese obstetric patients. Furthermore, the results emphasize the need for preconception weight optimization and multidisciplinary antenatal care to mitigate these risks.

Conclusion

It is concluded that obesity in obstetric patients significantly increases the risk of labor and postpartum complications. Higher BMI was associated with prolonged labor, higher rates of failed induction, and increased cesarean section rates. Moreover, maternal complications such as postpartum hemorrhage, wound infections, and prolonged hospital stays were notably more frequent in patients with Class II/III obesity. Although fetal outcomes like distress and NICU admissions were more common in higher obesity classes, the differences were not statistically significant. These findings underscore the importance of early identification of obese pregnant women, individualized labor management protocols, and anticipatory obstetric planning to improve maternal and perinatal outcomes in this high-risk group.

Declarations

Data Availability statement
All data generated or analysed during the study are included in the manuscript.
Ethics approval and consent to participate
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The authors declared the absence of a conflict of interest.

Author Contribution

HG (Postgraduate)
Manuscript drafting, Study Design, , Development of Research Methodology Design.
SS (FCPS)
Review of Literature, Data entry, Data analysis, and drafting article. Conception of Study
AS (Final Year Student)
Study Design, manuscript review, critical input.

All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.

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