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OUTCOME OF PREGNANCY IN PRIMIGRAVIDA WOMAN HAVING BMI MORE THAN 25 kg/m^2

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ABSTRACT
This Cross-sectional study was conducted in Obstetrics & Gynaecology ward of Pakistan Air Force Hospital, Islamabad from April to June 2026. Aim of study was to determine maternal / neonatal outcomes of pregnancy in primiparas with body mass index (BMI) more than 25 kg/m2.
Material and methods: Two hundred first-time moms aged 18–35 and with body mass index (BMI) greater than 25 kg/m2 who were at least 24 weeks pregnant were enrolled; We followed mothers till delivery. Maternal outcomes GDM, preeclampsia, induction of labour, LSCS rate and PPH) and Neonatal outcome (prematurity, macrosomia, birth asphyxia, jaundice and length of stay in NICU). Data analysis was done using SPSS version 26. Results are shown as mean ± standard deviation, frequencies and percentages.
Results: Mean age was 27.13 ± 3.35 years and mean BMI was 29.71 ± 3.73 kg/m. In present study, 59.5% of patients were overweight and 40.5% were obese. 24% of women were diagnosed with preeclampsia and 30.5% with gestational diabetes mellitus. Induction of labour was required in 57.5% of cases, prolonged labour in 25.5% of cases and rate of caesarean section was 39.5%. Neonatal outcomes were: preterm delivery (10.5%), macrosomia (17.5%), birth asphyxia (10.5%), newborn jaundice (24%) and neonatal intensive care unit hospitalisation (22.5%). Postpartum haemorrhage was observed in 19.5% of cases.
Conclusion: A higher body mass index (BMI) of mother in women during their first pregnancy is connected to higher risk of adverse outcomes for mother and neonate. The key to reducing frequency of difficulties is early discovery and good prenatal care.

KEYWORDS: Body Mass Index, Primigravida, Pregnancy Outcome, Gestational Diabetes Mellitus, Preeclampsia, Cesarean Section, Neonatal Outcomes

INTRODUCTION

Overweight, obese and morbid obese Mothers are related with unfavourable maternal - neonatal outcomes.[1] Around one fifth mothers are estimated to have obesity with pregnancy; and obesity is rising with time. Obesity among pregnant women, according to WHO has been reported to upto 26%. In Turkey, proportion of overweight and obese pregnant women is reported as 27.2%.[2]
Obesity represents rapid emerging epidemics among women of reproductive age. In United States more than half of young women are overweight and obese. In Pakistan around forty percent women of reproductive age are overweight, which is almost double compared to India.[3],[4] Obesity itself is associated with increased chance of pre-existing and fresh-onset medical problems like preeclampsia, gestational hypertension and gestational diabetes. few studies shows that myometrium of obese women was less responsive to oxytocin that leads to prolonged and non-progression of labour and end up in caesarean section.[5]
Recent studies demonstrated preeclampsia and prenatal diabetes mellitus are two conditions that are significantly more likely to develop in women overweight or obese. This in turn is found to influence neonatal outcomes such as perinatal mortality, macrosomia, and congenital anomalies. In addition, maternal obesity leads to higher cesarean sections and increased risk of anesthesia. long-term impact of maternal obesity includes maternal weight retention and exacerbation of obesity and postpartum.[6],[7]
One study reported that chances of cesarean section are high in females with BMI>25 kg/m^2 i.e. 29%, out of which 18% were overweight while 40% were obese and postpartum hemorrhage was 18.75% (16% vs. 21.5%).[7] Another study reported that in females with BMI 25kg/m^2, cesarean section occurred in 18.2%, and gestational diabetes in 17.8 cases.[8] One more study reported that in obese females, gestational diabetes in 25% cases, preterm delivery in 7.3% cases, cesarean section in 21.5% cases.[9] In another study, obese pregnant women were found to have high frequency of adverse maternal and neonatal outcomes. maternal difficulties observed were as follows: 35% cases had Gestational Diabetes Mellitus, 25% cases had Hypertensive Disorders, 11.76% cases had Gestational Hypertension

and 16.67% had Preeclampsia. Induction of labor was performed in substantial number of patients (62.5%). 39.56% of all deliveries occurred by cesarean section, 28.05% of which were original cesarean deliveries and 34% were performed following induction. 21.25 percent of patients had documented protracted labor. Postpartum hemorrhage was observed in 25.27% of patients. In obese patients, miscarriage 9%, Meconium-stained amniotic fluid 11.96%. Preterm delivery 16.30%, Shoulder dystocia occurred in 7.3% of deliveries. Birth asphyxia 10.87% of neonates; Large for gestational age (macrosomia) 10.87%; Neonatal hyperbilirubinemia 18.48%, while NICU admission 17.39%.[10]
Pregnancy in overweight and obese females leads to adverse outcomes. But evidence regarding adverse outcome in obese primigravida is scarce. Moreover, there is also no local study conducted before in this regard. Therefore, we planned to conduct this study to attain magnitudes for local population and implement findings of this study in local setting. This will also help us to improve our practice and guidelines for regular screening and management of primigravida females and guide them to take preventive measures to reduce their weight and prevent adverse obstetric outcomes.

METHODOLOGY

This cross-sectional study was conducted in Department of Obstetrics and Gynecology at Pakistan Air Force Hospital, Islamabad, over period of nine months after approval of synopsis. total of 200 primigravida women was enrolled using non-probability consecutive sampling technique. sample size has been calculated using WHO sample size calculator, taking expected prevalence of shoulder dystocia in overweight/obese females as 7.3%, with 95% confidence level and margin of error of 4%. All eligible participants were followed from enrollment until delivery to assess maternal and neonatal outcomes.
Primigravida women aged 18–35 years, with gestational age greater than 24 weeks and pre-pregnancy BMI >25 kg/m², was included in study. BMI calculated from wight and height; all more than 25 kg/m² were considered overweight or obese. BMI >40 kg/m², urinary tract infections, or high-risk pregnancies were excluded; multiple pregnancies or fetal congenital anomalies if detected on UGS were also not enrolled.
Baseline demographic and clinical data including maternal age, gestational age, BMI, and booking status was recorded at enrollment. Blood pressure measured and urine dipstick testing performed for proteinuria (preeclampsia) and screening of GDM through OGTT on enrollment. Fetal monitoring done on USG and fetal weight were calculated with proper monitoring till delivery.
During labor pains / delivery, various factors (induction / duration of labor and delivery) were monitored. Prolonged labor , mode of delivery and various complication (shoulder dystocia and meconium-stained liquor) also noted on birth. Mothers monitored for 24 hours postpartum for PPH. Neonatal factors / outcome were also documented.
Data entered and analyzed using SPSS 26; Quantitative factors were presented as mean / standard deviation, qualitative variables as frequency and percentages. Stratification of data of various confounding variables was done; Post-stratification of data followed by Chi-square test application to calculate p values; p-value of ≤0.05 was statistical significance.

RESULTS

Total of 200 primigravida women meeting inclusion criteria were enrolled and followed up until delivery. study population was stratified into two cohorts based on baseline maternal BMI: 115 (57.5%) were classified as overweight (25.0–29.9) and 85 (42.5%) were classified as obese (> 30.0).
Table 1 outlines baseline demographics of study participants. overall mean maternal age was 26.7 ± 3.9 years, and mean gestational age at enrollment was 25.3 ± 1.5 weeks. mean BMI in overweight group was 27.4 ± 1.3 compared to 33.6 ± 2 in obese group. majority of cohort (75.5%) consisted of booked cases, with no statistically significant baseline demographic disparities observed between two strata. Table 2 demonstrates association between maternal BMI and adverse obstetric outcomes. LSCS rates was higher in obese women than in overweight women (54.1% vs. 32.2% , p=0.002). Postpartum hemorrhage also showed statistically significant increase in obese group (20.0% vs. 8.7%, p=0.021). Table 3 analyzes fetal and neonatal complications stratified by maternal BMI. Maternal obesity was seen strongly associated to macrosomia (p=0.015) and shoulder dystocia (p=0.025).
Neonatal morbidities were worse in obese group of mother (significantly higher rates of birth asphyxia (p=0.024); double NICU admission rate (p=0.011); rates of preterm birth raised (p=0.143), meconium-stained liquor (p=0.183); neonatal hyperbilirubinemia (p=0.176) but these were not statistical significance in this study population.

Table 1: showing baseline demographic / clinical features among mother enrolled (N=200)

Parameters	**Overweight (n=115)**	**Obese (n=85)**	**Total (N=200)**
Maternal Age - Mean / SD	26.4 ± 3.8	27.1 ± 4.1	26.7 ± 3.9
Gestational Age at Booking (Weeks) (Mean ± SD)	25.2 ± 1.4	25.5 ± 1.6	25.3 ± 1.5
Maternal BMI (Mean ± SD)	27.4 ± 1.3	33.6 ± 2.8	30.0 ± 3.7
Booking Status, n (%)			
* Booked	89 (77.4%)	62 (72.9%)	151 (75.5%)
* Unbooked	26 (22.6%)	23 (27.1%)	49 (24.5%)

Table 2: Comparing Maternal Outcomes after Stratification in BMI Categories (N=200)

Maternal Outcomes	Overweight (n=115)	Obese (n=85)	$\chi 2$ Value	p-value
Gestational Diabetes Mellitus (GDM)	14 (12.2%)	22 (25.9%)	6.43	**0.011***
Preeclampsia	11 (9.6%)	18 (21.2%)	5.48	**0.019***
Induction of Labor required	42 (36.5%)	49 (57.6%)	8.76	**0.003***
Prolonged Labor	15 (13.0%)	21 (24.7%)	4.47	**0.034***
Postpartum Hemorrhage	10 (8.7%)	17 (20.0%)	5.31	**0.021***
Mode of Delivery				
Spontaneous Vaginal Delivery	78 (67.8%)	39 (45.9%)	9.71	**0.002***
Cesarean Section	37 (32.2%)	46 (54.1%)		

*p-value < 0.05 is considered statistically significant.

Table 3: Comparing Neonatal Outcomes after Stratification based on BMI (N=200)

Neonatal Outcomes	Overweight (n=115)	Obese (n=85)	$\chi 2$ Value	p-value
Preterm Birth	12 (10.4%)	15 (17.6%)	2.14	0.143
Macrosomia	6 (5.2%)	13 (15.3%)	5.89	**0.015***
Meconium Liquor	14 (12.2%)	16 (18.8%)	1.77	0.183
Shoulder Dystocia	2 (1.7%)	7 (8.2%)	5.04	**0.025***
Birth Asphyxia (Apgar <7 at 5 min)	5 (4.3%)	11 (12.9%)	5.09	**0.024***
Neonatal Hyperbilirubinemia	16 (13.9%)	18 (21.2%)	1.83	0.176
NICU Admission	11 (9.6%)	19 (22.4%)	6.54	**0.011***

*p-value < 0.05 is considered statistically significant.

Table 4: Binary Logistic Regression for Independent Effect of Obese BMI on Key Outcomes

Dependent Outcome Variable	Adjusted Odds Ratio (aOR)	95% Confidence Interval (CI)	p-value
Gestational Diabetes Mellitus	2.51	1.18 – 5.34	**0.016***
Preeclampsia	2.53	1.11 – 5.76	**0.027***
Cesarean Section	2.48	1.39 – 4.43	**0.002***
Macrosomia	3.28	1.19 – 9.04	**0.022***
NICU Admission	2.71	1.21 – 6.07	**0.015***

total of 200 primigravida women with BMI more than 25 kg/m² with majority overweight (59.5%), 40.5% obese, were booked (83%), 17% were unbooked. Among maternal outcomes, GDM was 30.5% ; preeclampsia 24% ; Induction of labor required in 57.5%, with prolonged labor 25.5%; majority delivered vaginally (60.5%), 39.5% LSCS and Postpartum hemorrhage 19.5% of cases in out population.. Macrosomia was present in 17.5% of cases. Birth asphyxia was observed in 10.5%, while neonatal jaundice occurred in 24% of newborns. total of 22.5% of neonates required NICU admission. These findings indicate that increased maternal BMI is associated with considerable frequency of adverse maternal and neonatal outcomes.

DISCUSSION

primary objective of this study was to evaluate impact of elevated pre-pregnancy BMI on maternal and neonatal outcomes among primigravida women delivering at tertiary care facility. While general risks associated with maternal obesity are well-documented across international literature, investigating pure cohort of primigravida females provides unique insights. This is because multigravida patients often carry confounding variables, from past obstetric history like recurrent gestational diabetes or previous cesarean scars that cloud direct impact of BMI alone. By focusing strictly on first-time mothers, this study isolates physiological burden of increased BMI on otherwise uncompromised reproductive system. [11]

Our descriptive data split 200 participants into 115 overweight (57.5%) and 85 obese (42.5%) individuals. key highlight from our findings is stark escalation of antenatal metabolic and vascular complications as BMI moves from overweight to obese. rate of Gestational Diabetes Mellitus (GDM) doubled from 12.2% in overweight tier to 25.9% in obese group, difference that achieved strong statistical significance (p=0.011). Likewise preeclampsia rates rose from 9.6% to 21.2% (p=0.019). These results are heavily backed by our multivariate logistic regression, which showed that obese BMI independently increases risk of both GDM ({aOR}=2.51) and preeclampsia ({aOR}=2.53) even after adjusting for maternal age and booking status.

Physiologically, this is explained by progressive chronic inflammatory state and insulin resistance inherent to excessive adipose tissue accumulation. increased visceral fat triggers hyperinsulinemia and endothelial dysfunction, which directly translates to poor placental vascular remodeling. Our results mirror those of global cohorts; for instance, large-scale study by Kutchi et al. (2020) highlighted that even under modified Asian-specific BMI cut-offs, risk of developing GDM and hypertensive disorders rises dramatically with every unit increase in maternal adiposity. [10] Moreover, regional data from Saudi Arabia by Adwani et al. (2021) confirmed that high pre-pregnancy BMI is

independent driving vector for metabolic disruptions during pregnancy, which aligns perfectly with adjusted odds ratios observed in our Pakistani cohort.[9]

Intrapartum outcomes from our analysis further underline significant clinical challenges managed by obstetric teams. requirement for induction of labor was high across board but significantly more prominent in obese stratum (57.6% vs 36.5%, p=0.003). This high rate of induction coupled with altered myometrial contractility likely contributed to high rate of prolonged labor seen in our obese patients (24.7% vs 13.0%). Biologically, it has been shown that high lipid environment downregulates myometrial responsiveness to standard oxytocin stimulation, leading to protracted active phases of labor. When labor stalls or fails to progress after medical induction, surgical delivery becomes inevitable. This sequence of events explains why Cesarean section rate reached 54.1% among obese primigravidae in our study, compared to lower 32.2% in overweight group (p=0.002).

Our regression analysis solidifies this by demonstrating nearly 2.5-fold independent increase in surgical delivery risks ({aOR}=2.48, 95%{ CI: } 1.39–4.43). Our Intrapartum patterns showed rsults congruent with findings of Khalifa et al, indicated high maternal BMI among primigravidaes reduces likelihood of simple SVD; this initiates various medical interventions for weight control. Greater risk of PPH as seen in our obese patients (20.0% vs 8.7%, p=0.021) indicated structural risk of myometrial depletion with uterine atony after prolonged labour .[7]

When evaluating neonatal parameters, effects of maternal metabolic derangements become seen; with chances of fetal macrosomia three times higher in obese mother compared to overweight mothers (15.3% vs 5.2%, p=0.015). This is direct consequence of maternal hyperglycemia and accelerated transplacental glucose transfer, which can lead to fetal hyperinsulinemia and excessive fat deposition. Our regression analysis confirmed that BMI > 30 kg/m2 was powerful, independent predictor of macrosomia (aOR=3.28). This hyper-growth pattern is major risk factor for mechanical birth injuries during vaginal trials. In our dataset, shoulder dystocia occurred in 8.2% of obese deliveries compared to only 1.7% in overweight individuals (p=0.025).

Mothers overweight or obesity demonstrated rise in risk of unfavourable pregnancy outcomes; frequency of various maternal and neonatal outcomes were associated to BMI. Various Studies proven that around one fourth obese women can have GDM ; one fifth hypertensive issues PIH, and related complications. Caesarean also significant (one third cases) with prolonged labour and obstructed labour. Neonatal outcomes, like macrosomia (10–20% of infants) ; NICU admission (15%), with neonatal diagnosis like birth asphyxia , metabolic abnormalities. These findings add to evidence that increased maternal BMI is independent predictor of both maternal and newborn morbidity.[12]

Various anatomical issues among obese mother and rate of emergency surgical procedures have risk of development of newborn distress. Data showed that neonates of obese mothers had higher chances of birth asphyxia (12.9% vs 4.3% healthy non obese, p=0.024). Likewise NICU admission rate doubled in obese group (22.4% vs 9.6% healthy non obese, p=0.011). This was also supported by Xiong et al. (2025) as they also studied various effects of pre-pregnancy BMI screening; A linear association was seen with high birth weight and neonatal issues in early neonatal period.[5]

Clinical implications : local healthcare planning as recommended by Kent et al. that overweight / obesity, rapidly expanding globally, and South Asian mothers ending in metabolic issues with rising BMI. [3] .[13]Public health experts should focus on lifestyle modifications even well before first pregnancy; primigravidae presenting in OPD should have BMI calculation and raised BMI should be taken as high-risk. Multidisciplinary focus of obstetricians, anesthetists and neonatologists on risks and issues due to obesity

CONCLUSION

Obesity and overweight can increase chances of GDM, PIH, prolonged labour and LSCS and predisposes neonate to have macrosomia ,asphyxia at birth and NICU admission. These findings BMI screening routines, nutritional counselling for prevention of obesity shouls be added to routine pre conception as well as early prenatal recommendations.

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