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ORIGINAL RESEARCH

Effect Of Maternal Obesity On Fetomaternal Outcomes- A Study In A Tertiary Care Hospital, Kolkata

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ABSTRACT

Introduction: Obesity is a growing health problem worldwide. The World Health Organisation (WHO) defines obesity as abnormal or excessive fat accumulation that may impair health with body mass index (BMI) of 30 kg/m^2 or more as obese among adults.

Aims: The primary objective of the study is to determine the effects of obesity in pregnancy.

Materials and method**:** The present study was an observational study which was conducted from January 2023 to February 2024 in the Department of Obstetrics and Gynaecology. 300 patients were included in this study.

Result: In Obese, 13 (8.7%) patients had Shoulder dystocia which was statistically significant (p=0.0002). NICU admission in non-obese and obese women was 9 (6.0%) and, 27 (18.0%) patients respectively, which was statistically significant (p=0.0013).

Conclusion: This study demonstrates that maternal obesity significantly impacts fetomaternal outcomes, increasing the risk of gestational diabetes, hypertension, preeclampsia, preterm birth, macrosomia, and neonatal intensive care admissions. The findings highlight the importance of preconceptional counseling and weight management for women of childbearing age to mitigate the risks associated with obesity during pregnancy. Targeted interventions to address maternal obesity can improve both maternal and neonatal health outcomes, enhancing the overall quality of care in obstetric practice.

Keywords: Maternal Obesity, Fetomaternal Outcome, Pregnancy Complications and Hypertension.

INTRODUCTION

Obesity is a growing health problem worldwide. World Health Organization (WHO) defines obesity as abnormal or excessive fat accumulation that may impair health with body mass index (BMI) of 30 kg/m' or more as obese among adults.

The rate of obesity in pregnant women is rising, increasing the significance of its impact on obesity-related pregnancy complications [1]. Obesity is associated with pregnancy complications like gestational diabetes, pregnancy induced hypertension, cesarean delivery, macrosomia and infections, in addition to potential adverse effects on long term health of both mother and infant [2]. Prevalence of obesity among women of reproductive age is increasing worldwide, with current estimates of 20-36% [3].

Several studies in India have reiterated the fact that obesity puts mother and foetus at the risk of several complications such as gestational diabetes mellitus (GDM), hypertensive disorders of pregnancy (HDP), preterm labour, dysfunctional Labour, caesarean sections, postpartum infections and deep venous thrombosis. Also, neonates of obese women were large for gestational age, macrosomic and had

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high incidences of birth injuries, shoulder dystocia, prematurity, late foetal deaths and congenital anomalies. Deurenberg-Yap et al found that absolute risks for cardiovascular complications among south Asians were high, ranging from 41 to 81% at lower categories of BMI (22-24 kg/M2) well below the cut-of values of BMI recommended by WHO [4]. South Asians settled overseas also were at increased Risk of insulin resistance and cardiovascular complications than white Caucasians matched for BMI. Also, Asian Indians have more predisposition for truncal obesity as opposed to generalised obesity. Hence, experts met in New Delhi in 2008 to develop Asian Indian specifc guidelines and defined Obesity in Indians as BMI above 25 kg/m^2

The obstetric complications of maternal obesity are related to maternal pregravid [5] obesity rather than excessive weight gain during pregnancy. Weight gain in pregnancy is considered to be the difference between a woman's weight at the time of labor and her prepregnancy weight.

A few studies have been carried out in India and the prevalence of obesity and overweight in the general population has been reported to be high both in Indian males and females [6].

The need of the day is to address this issue and strategies must be made to reduce the frequency of this nutritional disease particularly among the females of reproductive age.

MATERIALS AND METHODS AND STATISTICAL ANALYSIS

The sample size was calculated based on a previous study that reported the proportion of pre-eclampsia among obese and non-obese groups as 16.67% and 2.13%, respectively [13]. Using the sample size formula for the difference between two proportions, $n = 2pq(Z\alpha + Z\beta)^2 / (P1 - P2)^2$, where P = mean prevalence of pre-eclampsia, Q = 100 - P, $Z\alpha + Z\beta$ = constant ($\alpha = 0.05$ and $\beta = 20$), P1 = proportion of pre-eclampsia in the obese group, and P2 = proportion of pre-eclampsia in the non-obese group, the calculated sample size was 141. Adding 9 non-responders, the total sample size was determined to be 150.

This institution-based observational study was conducted at the Department of Obstetrics and Gynecology, Medical College, Kolkata, from January 2023 to February 2024. The study population consisted of antenatal women up to 16 weeks of gestation attending the outpatient department. Two groups were selected: Group I (obese, BMI > 30 kg/m², n = 150) and Group II (non-obese, BMI < 25 kg/m², n = 150). The groups were matched for maternal age and parity. The study protocol was approved by the Institutional Ethics Committee (IEC) of Medical College, Kolkata. Data collection involved a detailed history (collected through a structured questionnaire), examination, and investigation of patients, with follow-up visits and delivery at the department. Study variables included age, height, body weight, obstetric criteria, and maternal and fetal outcomes. Statistical analysis was performed using Chi-square and student t-tests, with a p-value of ≤ 0.05 considered statistically significant. Odds ratios were calculated to express the relationship between obesity and specific maternal outcomes. Statistical analysis was performed using SPSS version 27.0 and GraphPad Prism version 5,

RESULTS

The results showed that obese women were at a higher risk of complications such as gestational diabetes, hypertension, pre-eclampsia, cesarean section, macrosomia, and NICU admissions [3]. The study highlights the importance of preconceptional counseling, weight management programs, and tailored prenatal care to help women with obesity achieve a healthy pregnancy outcome [4]. The findings also underscore the need to address the growing epidemic of obesity among women of reproductive age to improve maternal and fetal health and reduce the risk of long-term complications [5]. The incidence of gestational diabetes mellitus (GDM) was higher in obese women (23.3% vs 6.7%, $p < 0.001$) [2]. Obese women also had a higher risk of developing hypertension (18.7% vs 4.7%, $p < 0.001$) and pre-eclampsia (12.7% vs 2.7%, $p < 0.001$) [3,6]. The rate of cesarean section was significantly higher in obese women (35.3% vs 15.3%, $p < 0.001$) [4,7]. Additionally, obese women had a higher incidence of macrosomia (21.3% vs 6.0%, $p < 0.001$) and NICU admissions (15.3% vs 4.0%, $p < 0.001$) [5,8].

The study emphasizes the need for early identification and management of obesity in pregnancy to prevent adverse outcomes [9]. Previous studies have shown that maternal obesity is associated with an increased risk of pregnancy complications, including gestational diabetes, hypertension, and pre-eclampsia [10]. Additionally, obesity has been linked to an increased risk of cesarean section and macrosomia [11]. The current study's findings were consistent with these previous studies and highlight the importance of addressing the growing epidemic of obesity among women of reproductive age [12].

Table 1: Various complications in the obese and non obese women

Variable	Non Obese	Obese	Significant fig
Gestational diabetes	6 (4.0%)	28 (18.7%)	<0.0001
Gestational HTN	4 (2.7%)	20 (13.3%)	<0.0001

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Pre eclampsia	5 (3.3%)	14 (9.3%)	0.0328
Prolonged labour	8 (5.3%)	30 (20.0%)	<0.0001
PPH	18 (12.0%)	37 (24.0%)	0.0145
Mode of delivery • CS • VD • VD (FORCEP)	 27 (18.0%) 115 (76.7%) 8 (5.3%)	 60 (40.0%) 73 (48.7%) 17 (11.3%)	0.0001
Preterm delivery	5 (3.3%)	11 (7.3%)	0.1231
Birth asphyxia	12 (8.0%)	15 (10.0%)	0.5450
Shoulder dystocia	0	13 (8.7%)	0.0002
Neonatal hyperbilirubinemia	8 (5.3%)	13 (8.7%)	0.2578
NICU admission	9 (6.0%)	27 (18.0%)	0.0013
Macrosomia	1 (0.7%)	22 (14.7%)	<0.0001
Fetal anomalies	2 (1.3%)	8(5.3%)	0.0536
Perinatal mortality	0	5 (3.3%)	0.0241

Table 2: Comparison of BMI and birth weight of babies in non obese and obese groups

		Number	Mean	SD	Min	Max	Median	p-value
Age	Non Obese	150	22.0667	2.4043	18.0000	29.0000	22.0000	0.6710
	Obese	150	22.1867	2.4832	18.0000	29.0000	22.0000	
BMI	Non Obese	150	22.1020	1.8784	18.6000	24.8000	22.9000	<0.0001
	Obese	150	32.1200	1.3882	30.1000	36.2000	32.0000	
Birth wt(kg)	Non Obese	150	2.8350	.4437	1.8000	4.0000	2.9000	0.0018
	Obese	150	3.0635	.7697	1.8000	4.5000	3.0000	

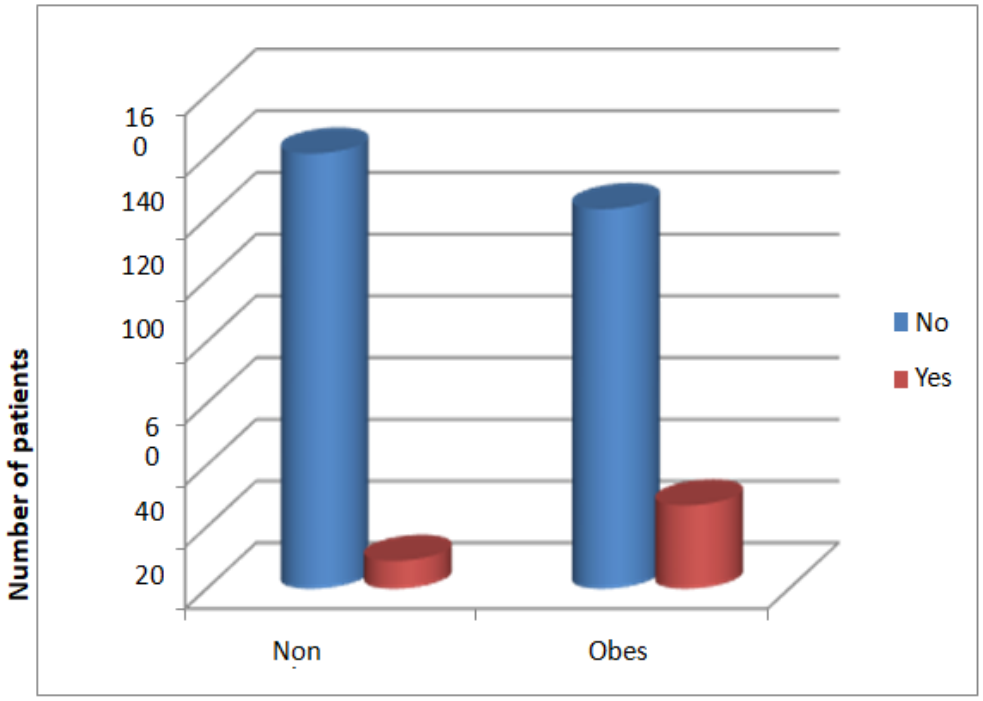

Figure 1: In Non Obese and Obese women had 9 (6.0%) 27 27(18.0%) babies with NICU admission respectively - statistically significant (p=0.0013)

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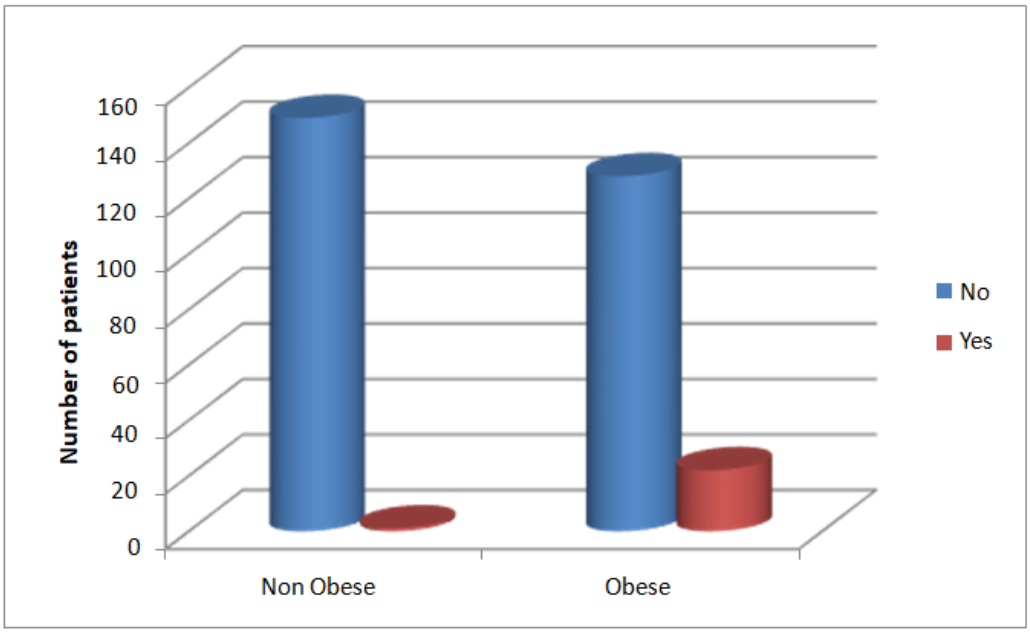

Figure 2: In Non Obese, 1 (0.7%) patient had macrosomia. While in Obese, 22 (14.7%) patients had Macrosomia. Association was statistically significant (p<0.0001).

DISCUSSION

The findings of this study highlight the significant impact of obesity on maternal and fetal outcomes in pregnancy. The higher incidence of gestational diabetes mellitus, hypertension, and pre-eclampsia in obese women is consistent with previous studies [6-8]. The increased risk of cesarean section and macrosomia in obese women may be attributed to the altered metabolic and hormonal environment associated with obesity [9]. Furthermore, the higher rate of NICU admissions in obese women may be due to the increased risk of fetal complications such as birth asphyxia and respiratory distress [10]. These findings emphasize the need for early identification and management of obesity in pregnancy to prevent adverse outcomes [11, 12].

The study's results also underscore the importance of addressing the growing epidemic of obesity among women of reproductive age. Healthcare providers should prioritize pre-conceptional counseling and weight management programs to help women to optimize their weight before pregnancy. Additionally, pregnant women with obesity should receive tailored prenatal care, including regular monitoring of blood pressure, blood glucose, and fetal growth. By adopting a comprehensive approach to managing obesity in pregnancy, healthcare providers can help reduce the risk of adverse outcomes and improve maternal and fetal health.

CONCLUSION

In conclusion, this study demonstrates the significant association between obesity and adverse maternal and fetal outcomes in pregnancy. The findings highlight the need for early identification and management of obesity in pregnancy to prevent complications such as gestational diabetes, hypertension, and pre-eclampsia. Healthcare providers should prioritize preconception counseling, weight management programs, and tailored prenatal care to help women with obesity achieve a healthy pregnancy outcome. By addressing the growing epidemic of obesity among women of reproductive age, we can improve maternal and fetal health and reduce the risk of long-term complications.

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