

ORIGINAL RESEARCH

Study on Maternal obesity and Its Impact on Antenatal and Immediate Postnatal Outcome: an Observational Cohort Study

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Received: 18 March, 2023

Accepted: 22 April, 2023

ABSTRACT

Introduction: In India, the percentage of obese women grow from 10.6% to 14.8%. Obese or overweight mothers during pregnancy and labor significantly increase the risk of prenatal, intrapartum, postpartum, and neonatal problems. The present study aimed to explore the impact of maternal obesity on antenatal and immediate Postnatal Outcome. **Material & methods:** This observational cohort study was conducted in the department of Obstetrics and gynecology, Tripura Medical College & Dr BRAM Teaching Hospital, Agartala for a period of 12 months, among all antenatal booked mother attended in this institute through OPD or emergency labour room and delivered in this hospital during the study period. Data was analysed using SPSS version 20.00 at $p < 0.05$. **Results:** 33% cases developed gestational diabetes mellitus during their antenatal period and 39% developed gestational hypertension. The proportion of cases who developed ante partum complications including gestational diabetes mellitus, gestational hypertension and preeclampsia were higher than in control groups (p value = 0.04, 0.00, 0.002 respectively). The need for induction of labour and caesarean section was found to be higher in cases than in controls ($p = 0.013, 0.04$ respectively). **Conclusion:** The results of the current study made it abundantly clear that maternal obesity had negative effects on both the mother and the fetus. Preeclampsia, gestational diabetes mellitus, gestational hypertension, preeclampsia, and an increased requirement for labor induction and surgical interference were all substantially correlated with maternal obesity.

Keywords: Antenatal, Obesity, Outcome, Pregnancy, Postnatal

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INTRODUCTION

Obesity is a global health problem [1]. Among adults of all ages, women generally have higher rates of obesity than men [2]. Rates of obesity in pregnancy are increasing, particularly in developed countries [3, 4].

In this modern era, obesity has become a worldwide phenomenon due to risky and sedentary life style. Increase prevalence of PCOS in adolescent girl, also increasing the obesity rate in reproductive period.

Overweight and obesity is a condition characterised by excess of body fat impairing health and longevity significantly. The world health organization (WHO) defines "overweight" as a BMI equal to or more than

25kg/m² and "obesity" as a BMI equal to or more than 30kg/m² [5].

This high rate of obese women in reproductive age group leads to an enormous public health problem because obesity during pregnancy has been associated with both short- and long-term health effects for women and their offspring.

In general, maternal obesity during pregnancy increases the risk for morbidity and mortality of mother and child.

The increasing prevalence of obesity also constitutes a major problem in obstetrics practice. Complications associated with obesity in pregnancy are gestational diabetes mellitus, hypertensive disorders and thromboembolic complications during labor are

augmentation, early amniotomy, cephalopelvic disproportion, cesarean section and peri operative morbidity and in fetus are macrosomia, shoulder dystocia, small for gestational age, late fetal death and congenital malformation especially neural tube defect. It is well established that the strong association exists between obesity 3 and complications of pregnancy and delivery [5].

There are very few studies available on this topic in this North East region, therefore, this study is aimed to explore the impact of maternal obesity on antenatal and immediate Postnatal Outcome.

MATERIAL & METHODS

This observational cohort study was conducted in the department of Obstetrics and gynecology, Tripura Medical College & Dr BRAM Teaching Hospital, Agartala for a period of 12 months, among all antenatal booked mother attended in this institute through OPD or emergency labour room and delivered in this hospital during the study period. The plan was approved by institutional ethical committee. The sample size was calculated using convenient sampling method. Considering, 95% confidence interval, 80% power and expected odds ratio of 1.6 [5]. of fetal complication and expected proportion of the outcome in control group 40% the sample size calculated to 631 in each group. i.e total 1262 by epinfo. Software. All the delivered patient will be considered as a sample for the next 12 months after ethical approval considering the inclusion and the exclusion criteria.

Inclusion criteria: All antenatal booked mother attended in this institute through OPD or emergency labor room and delivered in this hospital during the study period.

EXCLUSION CRITERIA

1. Not ready to give consent.
2. Multiple gestation

DATA COLLECTION PROCEDURE

Quetlet's index values will be used to categorize patients

< 20kg/m (thin),

20-24 kg/m (normal),

25 -30kg/m (mildly overweight) and

> 26 - 30kg/m (obese).

A pre tested and validated questionnaire will be used to collected data. After 1st antenatal checkup, BMI will be calculated as per WHO criteria, and categorization will be done. All the cases will be subjected for routine ANC investigations, ultrasonogram for foetal assessment and Biophysical profile of foetus. Babies will be evaluated for features of prematurity, weight, meconium aspiration at Birth and for any other complications .

Variables like age, height, weight at first antenatal visit, gestational age at delivery will be collected. Pregnancy outcome variables will studied include infertility treatments, antenatal complications including PIH, GDM, urinary tract infections (UTI) and genital tract infections (GTI). Labor factors will be included preterm labor, mode of induction, mode of delivery - vaginal or instrumental delivery or caesarean section. Postpartum maternal outcomes also will be included like postpartum haemorrhage and wound infection. Neonatal outcome variables will be included the condition of neonate at delivery, baby weight and Neonatal Intensive Care Unit (NICU) admission will be collected from their case records and entered in a proforma.

Statistical Analysis - All the data collected were entered in Microsoft excel sheet and analysed using SPSS version 20.00. Student's t test, chi square test, ANOVA and logistic regression will be used. A p value < 0.05 will be taken as a statistically significant.

RESULTS

The age of cases-obese study participants ranged from 21 years -35 years with mean \pm SD of 28.9 ± 2.8 . Among the controls the age range is 20-33 years with mean \pm SD of 28.1 ± 2.7 . Among the study participants, the proportion of cases (obese participants) who developed antepartum complications like gestational diabetes mellitus, gestational hypertension and pre-eclampsia were higher than in control groups (p value = 0.04, 0.00, 0.002 respectively). Intrapartum complications like need for induction of labour, operative interference especially emergency caesarean section were found to be higher in cases (Table 3). Amniotic fluid index was higher among cases when compared to controls (Table 4).

Table 1 shows profile of study participants

Profile	Cases (n=631) N (%)	Controls (n=631) N (%)
Age (in years)		
20-24	32 (5)	88 (14)
25-30	372 (59)	411 (65)
31-35	227 (36)	126 (20)
>35	(0)	6 (1)
Gravida		
Primipara	214 (34)	297 (47)
Multioara (2 nd gravida)	233 (37)	133 (21)
Multipara (3 rd gravida)	133 (21)	158 (25)

Multipara (4 th gravida)	51 (8)	43 (7)
Parity		
Zero	247 (39)	284 (45)
One	297 (47)	196 (31)
Two	63 (10)	132 (21)
Three	24 (4)	19 (3)
Previous abortion		
Yes	120 (19)	549 (87)
No	511 (81)	82 (13)
Childhood obesity		
Yes	170 (27)	202 (32)
No	461 (73)	429 (68)

Table 2: shows vital parameters of study participants

Vital signs	Cases Mean \pm SD	Controls Mean \pm SD
Height (cm)	159 \pm 5.8	160 \pm 5.9
Weight ()	89 \pm 6.1	61 \pm 3.8
BMI (Kg/m ²)	37 \pm 3.5	24 \pm 1.8
Pulse rate (per min)	85 \pm 6.9	82 \pm 7.3
Systolic blood pressure (per mm Hg)	121 \pm 21	108 \pm 12
Diastolic blood pressure (per mm Hg)	80 \pm 9	72 \pm 8

Table 3: shows association between antepartum and postpartum complications

Outcomes	Cases N (%)	Controls N (%)	P value
Antepartum complications			
Gestational diabetes mellitus			
Yes	208 (33)	50 (8)	0.04
No	423 (67)	581 (92)	
Gestational hypertension			
Yes	246 (39)	57 (9)	0.00
No	385 (61)	574 (91)	
Preclampsia			
Yes	158 (25)	44 (7)	0.002
No	473 (75)	587 (93)	
Need for induction of labour			
Yes	139 (22)	19 (3)	0.013
No	492 (78)	612 (97)	
Mode of delivery			
Vaginal	385 (61)	549(87)	0.04
C section	246 (39)	82(13)	
Post partum complications			
Post partum fever			
Yes	44 (7)	(0)	-
No	587 (93)	631 (100)	
Wound infection			
Yes	32 (5)	(0)	-
No	599 (95)	631 (100)	
PPH			
Yes	38 (6)	6 (1)	-
No	593 (94)	625 (99)	

Table 4: shows association between maternal obesity and other variable

Variables	Mean \pm SD	T value	P value
Amniotic fluid index			
Case	13.32 \pm 2.9	4.612	0.000
Control	11.34 \pm 2.1		

Neonatal birth weight			
Case	3.19 ± 0.78	1.912	0.063
Control	2.6 ± 0.21		
Neonatal gestational age			
Case	38.98 ± 2.3	-1.023	0.421
Control	39.3 ± 4.1		
Shoulder dystocia	Median		
Case	60 seconds	1.012	0.000
Control	29 seconds		

DISCUSSION

In the current investigation, a statistically significant relationship between maternal obesity and gestational diabetes mellitus was discovered ($p = 0.04$). Uebe K et al. and Abenhaim HA et al. found a comparable elevated risk of gestational diabetes mellitus in their study. [6,7]

The proportion of cases who developed gestational hypertension and pre-eclampsia was greater than that of the control group ($p = 0.00$ and 0.002 respectively). Several studies have demonstrated the existence of a clear correlation between maternal obesity and pregnancy-induced hypertension. [8-14]

The frequency of stillbirth was higher than controls, and IUD use was among the cases. Similar findings have been found in prior research. [15-17] In the present study, there was a greater need for induction of labor among cases. In comparison to the controls, a greater proportion of cases required caesarean section (39% vs. 13%). Several research have indicated that the incidence of caesarean section among obese mothers has increased. [18,19]

While comparing cases to controls, it was discovered that the mean SD birth weight was greater in the cases ($p = 0.063$). A comparable greater frequency of macrosomia has been discovered in other research. [20-23] When compared to the control group, more instances were admitted to the NICU for the purpose of stabilizing the baby, according to the current study. Fetal distress was a major reason for this admission. Obesity in the mother had directly caused fetal discomfort and subsequent admission to the NICU. Similar results of increased NICU hospitalizations for infants of obese moms have been observed by other studies as well. [24]

Obese women have an increased risk of neonatal complications, which may be due to increased maternal pelvic soft tissue, difficulty estimating fetal weight, and intrapartum complications like inadequate monitoring of the fetus and contractions. The cause of this increased risk is unknown. In addition to mechanical hypotheses, pregnancy is linked to extensive cardiovascular changes due to an increase in oxygen demand, and changes brought on by obesity have a significant impact on cardiac and vascular function. Neonatal morbidity may be brought on by the mother's compromised cardiovascular health and challenges with hemodynamic adaptation during labor and delivery. [25]

CONCLUSION

The results of the current study made it abundantly clear that maternal obesity had negative effects on both the mother and the fetus. Preeclampsia, prenatal hypertension, and gestational diabetes mellitus were all substantially correlated with maternal fat. Maternal obesity was linked to a greater necessity for labor induction and a greater amount of operational interference. Large newborns, an elevated amniotic fluid index, and postpartum problems like wound infection and postpartum fever were also linked to maternal fat. To fully understand the clinical effects of maternal fat on pregnancy and offspring, more research must be done in other areas, such as neurodevelopmental outcomes and future offspring obesity. Better antenatal care and advanced preparation for an elective caesarean section could reduce the risk of complications from emergency caesarean sections since there is a larger likelihood of operational interference during labor.

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