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Maternal complications, mode of delivery and fetal outcome in obese women

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***Abstract*---**Background-Obesity among fertile women is reaching epidemic proportions. Mothers who are overweight or obese during pregnancy and childbirth are known to be at risk of significant antenatal, intrapartum, postpartum and neonatal complications. Objectives- To evaluate the effect of obesity on the maternal and perinatal outcomes in pregnancies complicated by obesity. Material and methods:It was a Prospective case control study conducted among pregnant women with BMI>30 (kg/m^2) attending obstetrics OPD of Vinayaka Mission's KirupanandaVariyar Medical College & Hospital, Salem between MARCH 2022 to AUGUST 2022. 50 pregnant women were selected through purposive sampling technique who were attending OPD with obesity during the study period and 50 controls who are also pregnant but not obese attending the same OPD. IBM SPSS version 22 was used for statistical analysis. Results: The mean of Age was 23± 3.43 among controls and it was 25± 4.14 among cases the majority of the participants belonged to 20-24 years. A maximum number of cases 42 (93.51%) and controls 40 (82.19%) belong to class III socioeconomic status and the difference between 2 groups was statistically significant (P-value 0.03). 48.05% were Multiparity among cases and 40 (51.95%) participants were primiparity. An increased risk of hypertensive disorders of pregnancy, gestational diabetes mellitus (GDM), pre-eclampsia, induction of labour, caesarean section, postpartum complications like wound infection, atonic PPH (post-partum haemorrhage). Conclusion: Pregnancy complications related to

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maternal BMI is a growing problem. Maternal obesity is a risk factor for gestational diabetes, preeclampsia, labor induction, cesarean for fetal distress.

***Keywords*---**obesity, gestational diabetes, preeclampsia, labor induction, fetal distress, intrapartum complications, post-partum haemorrhage.

Introduction

A pregnancy is defined as high risk, when the probability of an adverse outcome for the mother or child is increased over the base line risk of that outcome among the general population by the presence of one or more ascertainable risk factors. One such pre-existing maternal morbidity that makes a pregnancy high risk is obesity.[1] Obesity is the most common nutritional disorder increasing in developed and developing nations. The morbidities of obesity includes cardiovascular disease, diabetes, hypertension, stroke etc.[2] It becomes a major issue when it affects the women of reproductive age group, as obesity makes a pregnancy high risk, by the increased incidence of gestational diabetes, preeclampsia, gestational hypertension, labour induction, increased caesarean rates, anaesthetic complications, postoperative morbidity, prolonged hospital stay. They are at increased risk of delivering large babies and NICU admission.[3,4]

Although routine weighing of pregnant women is being carried out in most the antenatal clinics, not much importance is given to the weight of the women as such. In fact prenatal counselling plays a vital role in identifying women who are obese. Advice on weight reduction before embarking on pregnancy will go a long way in reducing the morbidity due to obesity in pregnancy. Worldwide obesity is defined as BMI>30, exists at a prevalence of 15-20%. BMI is a simple index of weight for height that is commonly used to identify underweight, overweight and obesity in adults."It is defined as weight in kg divided by the square of the height in meters (kg/m^2).[5,6]. The risk of maternal and neonatal morbidity and mortality has been increased, there is also an increased risk of pregnancy loss, congenital abnormalities, gestational hypertension, and gestational diabetes. Intrapartum risks include increased rates of emergency caesarean section, labour dystocia, and postpartum haemorrhage. Postpartum complications that appear to be higher in this group include infection, thromboembolism as well as prolonged hospital stay, and/or hospital readmission.[7,8] So, the rationale behind the study was to evaluateobesity related complications during intrapartum, mode of delivery and fetal outcome.

Material and Methods

It was a Prospective Observational study conducted among pregnant women with BMI>30 (kg/m^2) attending obstetrics OPD of Vinayaka Mission's KirupanandaVariyar Medical College & Hospital, Salem between MARCH 2022 to AUGUST 2022. 50 pregnant women were selected through purposive sampling

technique who were attending OPD with obesity during the study period and 50 controls who are also pregnant but not obese attending the same OPD.

Inclusion criteria

- Pregnant women with first trimester BMI ≥30kg/m².
- Irrespective of age, parity, socio-economic status.
- Singleton pregnancies.
- Cephalic presentation (confirmed either by ultrasound or by physical examination).
- Complete obstetric documentation/records.

Exclusion criteria

- Mothers not booked at First Trimester
- Miscarriage
- Anomalous baby
- Women with BMI between 25.1kg/m² and 29.9kg/m².
- Women with BMI <18.5kg/m².
- Women who could not be followed until delivery

Methodology

50 pregnant women with BMI ≥30kg/m² admitted in our labour room were included in the study. A detailed history regarding age, parity, last menstrual period, menstrual irregularity (delayed), use of OCP pill, past medical history and first trimester scan were entered in Proforma. General physical examination to note pallor, pedal oedema, pulse and BP is taken from hospital record.

Assessment of Obesity

Although obesity can be easily identified at first sight, a precise assessment requires measurement and reference standards. Various methods to assess the obesity are as follows

- Body mass index - BMI (Quetelet's Index)
  Weight (kg) / Height (m²)
- Ponderal Index
  Height (cms) / Cube root of body weight (kg)
- Broca's Index
  Height (cm) -100

Abdominal examination to note fundal height, presentation, lie, engagement of presenting part, fetal heart sound and per vaginal examination for calculating modified Bishop score and pelvic adequacy clinical examination and obstetric ultrasound finding.

- On the basis of Bishop score if cervix was unfavorable (bishop score< 6) for induction, cervical ripening agents like Dinoprostone gel or Misoprostol

tablets or oxytocin are used and if cervix is favorable (bishop score≥ 6), oxytocin augmentation is done after assessing the uterine contraction.

- spontaneous vaginal delivery could not be possible, then the decision of LSCS is taken. Onset of labour (spontaneous / Induced), mode of delivery (operative vaginal delivery, Normal vaginal delivery, caesarean section), caesarean section due to fetal distress, meconium stained liquor and for other indication.
- The patient is followed up to discharge after delivery and following perinatal outcome are recorded in terms of birth weight, APGAR Score at 1minute and 5minute, NICU admission rate and perinatal death.

Statistical Analysis

Analysis of data was done by using SPSS software ver. 22. Data were statistically described in terms of mean (±SD), frequencies (number of cases) and percentages when appropriate. Comparison of quantitative variables between the study groups was done using Student t test for independent samples if normally distributed. For comparing categorical data, Chi square test was performed. A probability value (p value) less than 0.05 was considered statistically significant.

Results

Table 1
Baseline charactersitics between Cases and Controls

Baselinematernalparameters	Studygroup		P-value
	Control(N=50)	Obese (N=50)	
MaternalAge(N%)			
<20	5 (6.85%)	2 (2.6%)	0.134
20-24	20 (61.64%)	20 (51.95%)	
24-29	19 (23.29%)	20 (25.97%)	
>30	6 (8.22%)	8 (19.48%)	
Age(Mean±SD)			
Age	23± 3.53	25± 4.44	0.134
Socio-EconomicStatus(N%)			
Class III	40 (82.19%)	42 (93.51%)	0.033
Class IV	10 (17.81%)	7 (6.49%)	
Obstetric(N%)			
PRIMI	33 (45.21%)	40 (51.95%)	0.409
MULTI	40 (54.79%)	37 (48.05%)	
GestationalAge (N%)			
< 37	3(4.11%)	8 (10.39%)	0.332
37-40	46 (76.71%)	46 (72.73%)	
> 40	14 (19.18%)	13 (16.88%)	

As per table 1 The mean of Age was 23± 3.43 among controls and it was 25± 4.14 among cases the majority of the participants belonged to 20-24 years. A

maximum number of cases 42 (93.51%) and controls 40 (82.19%) belong to class III socioeconomic status and the difference between 2 groups was statistically significant (P-value 0.033). 48.05% were Multiparity among cases and 40 (51.95%) participants were primiparity. A greater number of participants gave birth in the Gestational age of 37 to 40 weeks. When anti Partum complications were considered among cases majority had 16 (20.78%) Gestational hypertension, followed by 8 (10.39%) had gestational diabetes, 4 (5.19%) had Anaemia and 3 (3.9%) had Severe Preeclampsia.

Table 2
Association of maternal obesity with antepartum complications and neonatal outcomes

Outcomes	Obese(%)	Controls(%)	pvalue
Antepartumcomplication			
Gestationaldiabetesmellitus			
Yes No	16 (32) 34 (68)	4 (8) 46 (92)	0.01
Gestationalhypertension			
Yes No	19 (38) 31 (62)	4 (8) 46 (92)	0.00
PrecclampsiaYes No	12(24) 38(76)	2 (4) 48 (96)	0.04
Needforinductionoflabour			
Yes No	10 (20) 40 (80)	2 (4) 48 (96)	0.01
Intrapartum complication			
Shoulder dystocia Abruptio placenta	31(62) 19(38)	44 (88) 6(12)	0.03
Postpartumcomplications			
Postpartumfever			
Yes No	3 (6) 47(94)	0 50 (100)	-
Woundinfection			
Yes No	3 (6) 47 (94)	0 50 (100)	-

As per table 2 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 = 0.03,0.01,0.04 respectively). Intrapartum complications like need for induction of labour, operative interference especially emergency caesarean section were found to be higher in cases. During the postpartum period, requirement of NICU admission for delivered baby was higher in mothers who had childhood obesity

history (p = 0.01).Shoulder dystocia was the most common intra-partum complication which was statistically significant.

Table 3
Association between maternal obesity and other variables

Variables	Mean (SD)	Tvalue	Meandifference	95%CI	pvalue
Estimatedfetalweight					
Obese Control	3.13(±0.51) 2.80(±0.30)	6.31	0.53	0.318-0.703	0.01
Amnioticfluidindex					
Obese Control	12.48(±3.0) 10.08(±2.2)	4.59	2.40	1.311-3.450	0.01
Neonatalbirthweight					
Obese Control	3.11(±0.86) 2.9 (±0.28)	1.85	0.23	-0.011-0.488	0.07
Neonatalgestationalage					
Obese Control	37.36(±2.9) 38.6(±4.2)	-1.02	78.9	-213.67-75.854	0.31

As per table 3 Estimated fetal weight and amniotic fluid index was higher among cases when compared to controls which was found to be statistically significant.

Discussion

Our study found that increasing maternal BMI was associated with adverse health outcomes for both the mother and her baby. These findings are consistent with those of previous studies conducted by Glatiere-Dereure F et al[9], Kabiru W et al[10], in showing an association between increasing maternal BMI and an increased risk of hypertensive disorders of pregnancy, GDM, pre-eclampsia, induction of labour, caesarean section, postpartum complications like wound infection, Atonic Pph, longer length of maternal stay in hospital and preterm birth. Statistically, a significant association was observed between obesity and socioeconomic status which is in accordance Dinsa GD et al[11], who conducted a systematic review and reported that maternal obesity is disproportionately a problem of the poor at a lower level of economic development and further research needs to the interrelationship between SES and obesity in developing countries. Comparing the antepartum complications, obese women were at increased risk of gestational hypertension (20.78%) gestational diabetes (10.39%), pre-eclampsia (3.9%), and Caesarean delivery (41.56%), consistent with other studies conducted by Perlow JH et al.[12]Ehrenberb HM et al.[13]The present study is in line with a prospective multicenter study conducted by Wiess JL et al[14]in which more than 16,000 pregnant women who were obese were 2.5 times and 1.6 times more likely to develop gestational hypertension and preeclampsia, respectively. It has long been known that insulin resistance and hyperinsulinemia are hallmark features of gestational diabetes and obesity. Fasting and post-absorptive plasma insulin levels are higher in obese pregnant women.[15]When considering the intrapartum complications Shoulder Dystocia(1.3%), Abruptio Placenta (2.6%) were observed

in the present study which are in concurrence with Bianco AT et al[16]who reported Abruptio Placenta (0.5%) and Shoulder Dystocia(1.6%). The mean (SD) birth weight was found to be higher in cases when compared to controls (3.2 (±0.86) vs 2.9 (±0.28)) (p = 0.07). Other studies have found out similar higher incidence of macrosomia.[17,18] In the present study it was found that increased NICU admissions for stabilisation of the newborn of cases was found when compared to the control group (22% vs 10%) (p = 0.012).

Conclusion

Maternal obesity is a risk factor for gestational diabetes, preeclampsia, labour induction, caesarean for Fetal distress and wound infection. Pre-pregnancy counselling, health programs, and appropriate multidisciplinary management should be done to bring awareness among pregnant women. Maternal obesity was also associated with increased amniotic fluid index, big sized babies and postpartum complications like wound infection and postpartum fever. Higher NICU admissions due to fetal distress was also noted among the babies of obese women. Further exploration of other areas including neurodevelopmental outcome and future offspring obesity etc., need to be done to understand complete clinical course of maternal obesity on pregnancy and offspring.

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