

A Study to Assess Maternal and Fetal Outcome of Obesity in Pregnancy

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Received: 26-02-2023 / Revised: 24-03-2023 / Accepted: 20-04-2023

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Conflict of interest: Nil

Abstract

Introduction: India is dealing with a twin nutritional burden of undernutrition and a growing problem of overweight and obesity. Significant prenatal, intrapartum, postpartum, and neonatal problems are recognized to be a danger for mothers who are overweight or obese during pregnancy and childbirth, as determined by rising maternal body mass index (BMI).

Aim and Objectives: To evaluate the effect of obesity on the maternal and perinatal outcome in pregnancies complicated by obesity.

Material and Methods: This is a Prospective cohort study conducted at Antenatal outpatient department & Antenatal Ward and Labour ward, Dept. of Obstetrics & Gynaecology Sikkim Manipal Medical College and Hospital, during March 2022 to March 2023. 50 Obese, 50 normal women in first trimester. Sikkim Manipal Hospital has on an average 1st trimester AN Registrations of 60 / week. From this I had collected consecutive cases of obese and normal pregnancies till required sample size is reached.

Result: The gestational diabetes was 8.0% and 4.0 % respectively in obese and control group. The pre-eclampsia was 14.0% and 6.0% in obese and control group. The incidence of gestational hypertension was 8.0% and 6.0% in obese and control group. The results were statistically significant. Obstetric complications like Multiple pregnancy, Placenta previa, Abruptio placenta and Malpresentation existed in both groups, but the difference was not statistically significant.

Conclusions: Our study highlights the multiple maternal and perinatal hazards associated with obese pregnancies, which present a significant challenge to the obstetrician. Significant obesity is also linked to a variety of health problems later in life in women of childbearing age. This underlines the need of focusing efforts on attempting to lower the rising prevalence of obesity in reproductive women.

Keywords: Obesity, BMI, Pre-eclampsia, Baby Weight.

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Introduction

Obesity is a global health issue that is becoming alarming. According to the World Health Organization (WHO), persons with a body mass index (BMI) of 30 kg/m² or more are considered obese. These people have abnormal or excessive fat buildup that might harm their health. The American Medical Association designated obesity as an illness in 2013. Global estimates of the prevalence of obesity among women of reproductive age range from 20–36% . Pregnant women see a rise in prevalence at the same rate as other women in the reproductive age range[1]

India is dealing with a twin nutritional burden of undernutrition and a growing problem of overweight and obesity. Over 30 million Indians are fat, and the figure is frighteningly rising. Numerous studies found that during the past few decades, the frequency of overweight and obesity among all ages has increased. Significant prenatal, intrapartum, postpartum, and neonatal problems are recognized to be a danger for mothers who are overweight or obese during pregnancy and childbirth, as determined by rising maternal body mass index (BMI). Maternal obesity has been linked to diabetes, hypertensive illnesses such preeclampsia, fetal mortality, large newborns, postdate pregnancies, and caesarean sections [2].

Obesity promotes maternal and fetal morbidity and is linked to a number of unfavourable reproductive outcomes. It is crucial to recognize obesity as an obstetric risk factor, and treatment should begin prior to conception and continue during the postpartum period. Maternal obesity and macrosomia seem to have a dose-dependent association. Babies born to obese mothers also have higher postpartum infant death rates and stillbirth rates. This study's goal was to determine how obesity in pregnant women affected the results for the mother and the fetus.[3]

The Institute of Medicine (IOM) updated its recommendations for how much weight pregnant women should acquire during pregnancy. The evaluation of outcomes in investigations of fetomaternal unfavourable outcomes has been constrained by the use of weights rather than BMI, retrospective research, reviews, and birth registries. With the help of this study, we may draw attention to an issue with a modifiable risk factor (BMI) and its effects on the fetus, as well as treating doctors about the significance of preconceptional counselling with obesity and related difficulties.[4]

Aims and Objectives

To evaluate the effect of obesity on the maternal and perinatal outcome in pregnancies complicated by obesity

Materials & Methods

This is a Prospective cohort study conducted at Antenatal outpatient department & Antenatal Ward and Labour ward, Dept. of Obstetrics & Gynaecology Sikkim Manipal Medical College and Hospital, during March 2022 to March 2023.

Inclusion Criteria

- Pregnant women with first trimester BMI > 30 kg/m² as cases.
- Pregnant women with first trimester BMI between 18.5 kg/m² and 24.9 kg/m² as control.

Exclusion Criteria

- Mothers not booked at first trimester.
- Miscarriage.
- Anomalous baby.
- Women who could not be followed until delivery.

Sample Size & Sampling

50 Obese, 50 normal women in first trimester. Sikkim Manipal Hospital has on an

average 1st trimester AN Registrations of 60 / week. From this I had collected consecutive cases of obese and normal pregnancies till required sample size is reached. The present study is carried out as a prospective cohort study and the antenatal mothers are selected according to the criteria and in all women detailed history followed by complete general and physical examination done. Relevant hematological, biochemical investigations, USG also done. They are followed up to delivery and postpartum until discharge and the following outcomes are studied,

- Gestational diabetes
- Pre-eclampsia
- Gestational hypertension
- Malpresentation.
- Multiple pregnancy.

- Abruptio placenta
- Placenta previa
- Labour induction and their indication

Benefits of the Study

- 1) Pregnancies among obese women are classified as high-risk pregnancies and appropriate antenatal care can be provided with heightened surveillance.
- 2) Through this study we can anticipate the complications and intervene earlier if complications arise.
- 3) Obesity is modifiable and preventable so we can give reconception counselling and awareness regarding exercise and healthy nutritious diet.
- 4) Screening for diabetes and hypertension can be done before conception and at 1st antenatal visit.

Result

Table 1: Distribution of study subjects as per age

Age (Years)	Control		Obese	
	No	Percentage	No	Percentage
<20	4	8.0%	3	6.0%
20-24	26	52.0%	15	30.0%
25-29	13	26.0%	22	44.0%
>30	7	14.0%	10	20.0%
Total	50	100%	50	100

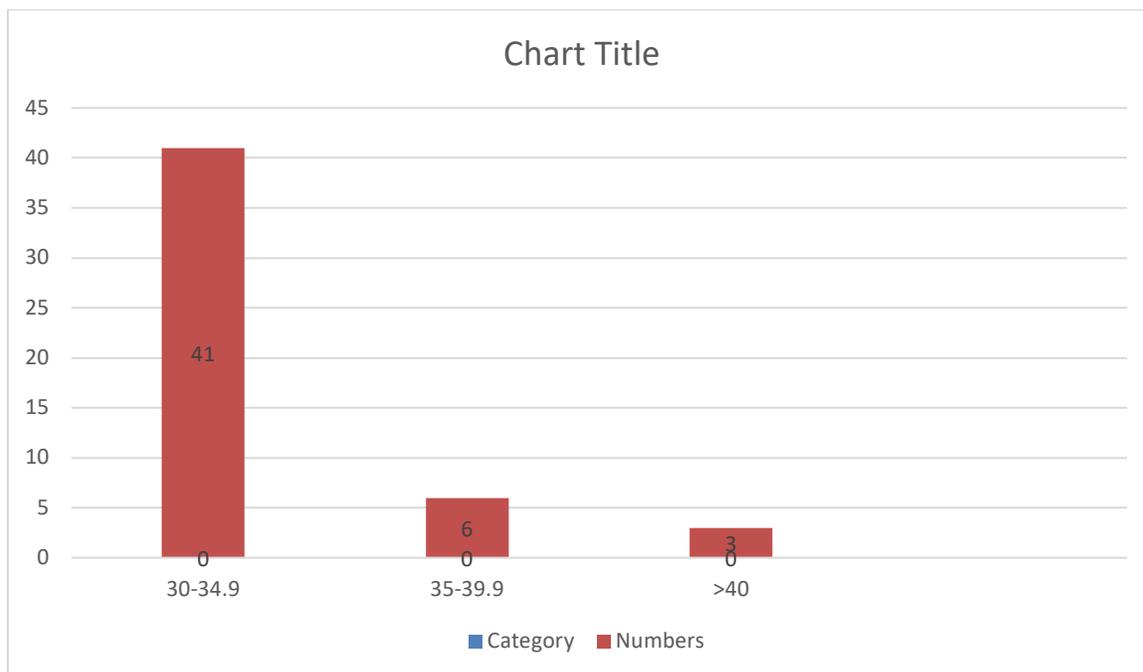
In our present study the majority of obese women (44.0%) were between 25-29 yrs whereas majority of control women (52%) were between 20-24 yrs., proportion of women in the age group >30 yrs were 20.0% in obese group and only 14.0% in control group. This difference in age group distribution was statistically significant.

Table 2: Distribution of study subjects as per maternal weight

	Group	Total	Mean (kg)	Standard deviation
Wt at booking	Control	50	53.47	4.42
	Obese	50	77.43	8.98
BMI at booking	Control	50	21.64	1.68
	Obese	50	31.98	2.59
Wt at delivery	Control	50	62.46	5.58
	Obese	50	84.38	8.85

Table 2 shows Distribution of study subjects as per maternal weight. The mean weight at booking in obese women was 77.43 kg and in control women it was 53.47 kg. The mean BMI at the time

of booking of pregnant patients in obese was 31.98 kg/m² and in control it was 21.64 kg/m². The mean weight at term in obese patients was 84.38 kg and in control it was 62.46 kg.



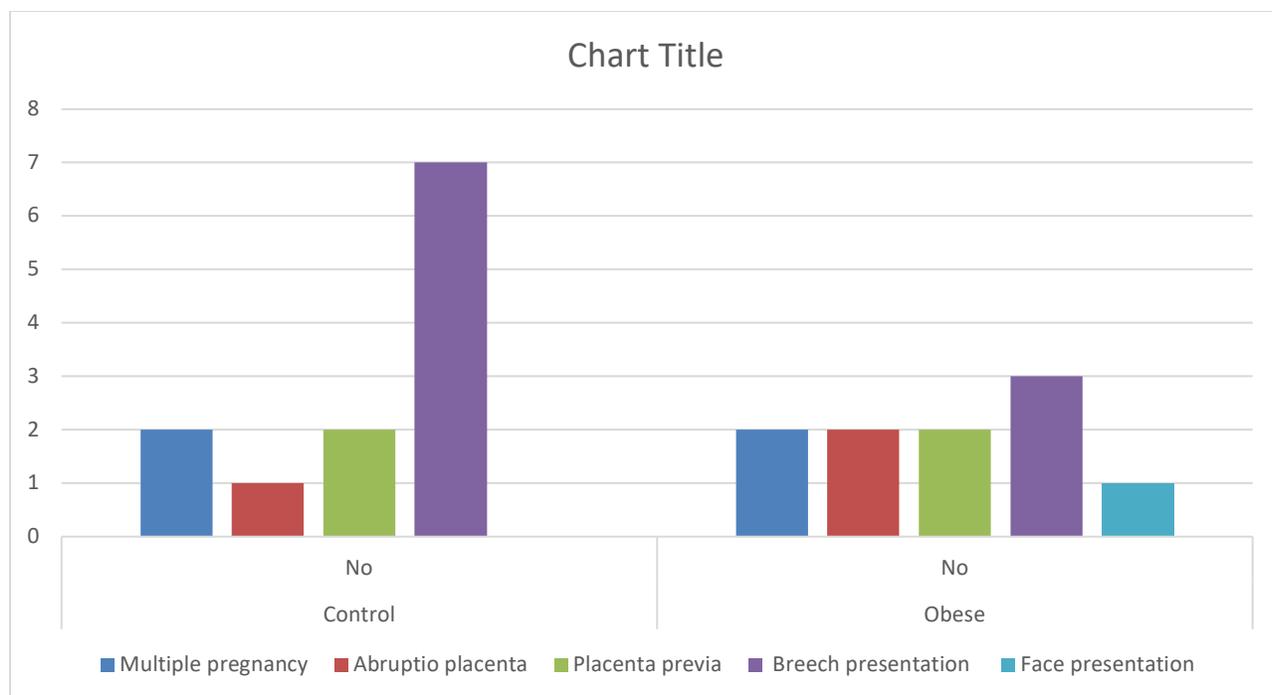
Graph 1: Categorisation of obese women

In the study group 82.0% were moderately obese, 12.0% were severely obese and only 6.0% were very severely obese.

Table 3: Complication during pregnancy in both the study groups.

Complications	Control		Obese	
	No	Percentage	No	Percentage
Gestational diabetes mellitus	2	4.0%	4	8.0%
Pre-eclampsia	3	6.0%	7	14.0%
Gestational hypertension	3	6.0%	4	8.0%

Table 3 shows Complication during pregnancy in both the study groups. The gestational diabetes was 8.0% and 4.0% respectively in obese and control group. The pre-eclampsia was 14.0% and 6.0% in obese and control group. The incidence of gestational hypertension was 8.0% and 6.0% in obese and control group. The results were statistically significant.



Graph 2 : Distribution of study subjects as per other obstetrics complications

Obstetric complications like Multiple pregnancy, Placenta previa, Abruptio placenta and Malpresentation existed in both groups, but the difference was not statistically significant.

Table 4 : Indications for labour induction

Indications	Control		Obese	
	No	Percentage	No	Percentage
Gestational hypertension	-	-	1	16.66%
Pre-eclampsia	1	50%	2	33.33%
Post datism	1	50%	2	33.33%
PROM	-	-	1	16.66%

In both obese and control group, majority of induction of labour was done for Pre-eclampsia and post datism.

Table 5: Distribution of study subjects as per mode of delivery

Mode of delivery	Control		Obese	
	No	Percentage	No	Percentage
Vaginal delivery	29	58.0%	19	38.0%
Primary cesarean delivery	7	14.0%	13	26.0%
Repeat cesarean delivery	9	18.0%	15	30.0%
Forceps delivery	2	4.0%	2	4.0%
Assisted breech delivery	2	4.0%	0	0
VBAC	1	2.0%	1	2.0%

The normal vaginal delivery was lower in obese group (38.0%) when compared to control group

(58.0%). The primary cesarean delivery rates were higher in obese group (26.0%) when compared to control group (14.0%) The instrumental delivery rates and VBAC rates were equal in both groups. On applying chi-square there is significant difference between two groups.

Table 6: Distribution of study subjects as per gestational age at delivery

Gestational age (weeks)	Control		Obese	
	No	Percentage	No	Percentage
>37	47	94.0%	47	94.0%
35-36.6	2	4.0 %	3	6.0%
32-34.6	1	2.0 %	0	0

Table 6 shows Distribution of study subjects as per GESTATIONAL AGE AT DELIVERY. 94.0 % of obese women and 94.0 % of control women delivered at term. 6.0 % of obese women and 6.0 % of control group delivered preterm. The difference was not statistically significant.

Table 7: Distribution of study subjects as per birth weight of the neonate

Birth weight(kg)	Control		Obese	
	No	Percentage	No	Percentage
1.5-1.99	2	4.0%	2	4.0%
2-2.49	3	6.0%	2	4.0%
2.5-2.99	25	50%	13	26.0%
3-3.49	16	32.0%	22	44.0%
3.5-3.99	4	8.0%	9	18.0%
>4	0	0	2	4.0%
Total	50	100%	50	100%

Table 7 shows Distribution of study subjects as per birth weight of the neonate. Majority of the neonates of obese women (44.0%) were between 3-3.49 kg and of control women (50%) were between 2.5 – 2.99 kg. 18.0% babies of obese women were between 3.5-3.99 kg when compared to 8.0% babies of control women. 2 babies were > 4kg in obese women but none in control group. On applying chi-square test there is non-significant difference with p value 0.11.

Table 8: Distribution of study subjects as per NICU admissions and their indications

Indications	Control		Obese	
	No	Percentage	No	Percentage
Meconium aspiration	1	33.33%	1	14.28%
Infant of diabetic mother	1	33.33%	3	42.85%
Preterm	1	33.33%	1	14.28%
Abnormality	0	0	1	14.28%
Macrosomia	0	0	1	14.28%
Total	3	6.0%	7	14.0%

14% of babies born to obese women and 6.0% of babies born to control were admitted in NICU (P<0.05)

Discussion

Women in our research who were obese tended to be a little older than those whose BMI was normal. The majority of obese

women (44.0%) were between 25-29 yrs whereas majority of control women (52%) were between 20-24 yrs. With parity, the

mean BMI in the obese group rose. This is consistent with the findings of Ehrenberg HM *et al* [5], who found that parity and advancing age are risk factors for obesity.

When compared to women with normal BMI, we found that obese women had more menstrual irregularities and infertility. According to research by Neil and Nelson *et al* [6], menstrual irregularities in obese women are linked to ovulatory failure and insulin resistance, which can result in infertility.

According to earlier research, obese women are more likely to have underlying diabetes and chronic hypertension, which can complicate pregnancy. But due to the limited sample size in our investigation, we were unable to detect this link. According to Garbaciak *et al.*[7] There was an increased incidence of hypothyroidism (11.76%) in obese women. We discovered a higher (14.70%) risk of pre-eclampsia in the obese group. When compared to the control group, obese women were shown to have a higher prevalence of gestational hypertension (8.82%). When compared to women with normal BMI (2.94%), obese women were shown to have a greater probability of acquiring gestational diabetes (8.82%)

In our study, both obese and normal weight women had placental anomalies such as placenta previa and placental abruption. Although Bainco *et al.*[8] found a higher frequency of abruption, In the obese group, the cesarean delivery rate was 55.88%, compared to 32.35% in the control group. When compared to the control group, obese women had a 2.8 times greater chance of cesarean birth. The danger rose as obesity became more severe. When compared to the control group (14.70%), the main cesarean delivery rates were greater in the obese group (26.47%). Obese women who were not pregnant had greater rates of cesarean deliveries than thin women who had

previously normal deliveries. Additionally, we discovered no distinction between the two groups' repeat cesarean delivery rates.

Contrary to prior research, it was unexpected to find that the number of instrumental deliveries was not higher in the obese group. We may not have seen an association with instrumental delivery and obesity due to the higher cesarean delivery rates in obese women.

In line with previous research Myles *et al*[9], we discovered that obese women were more likely to experience post-operative wound infection and wound dehiscence. The literature on maternal obesity and preterm delivery has contradictory findings, with some research (Baeten *et al.*[10]) indicating increased risk and others (Sebire and al.[11]) indicating no change. In our investigation, there was no difference between the two groups for preterm births occurring before 37 weeks. The cause for the disparity in research outcomes might be due to the study population being different. In our study, the neonates of obese mothers had a mean birth weight of 3.16 kg, whereas the neonates of the control group had a mean birth weight of 2.92 kg. Obese mothers had a higher chance of giving birth to kids with high birth weights, as was previously observed (Ehrenberg *et al*, Sebire *et al*[11]. When compared to 8.82% of the control group, we discovered that 23.52% of the obese group delivered infants weighing 3.5 kg or more.

Infants of moms with diabetes were more frequently admitted to the NICU than infants of obese mothers. At five minutes, there was no change in the APGAR scores between the two groups. This is in line with the research conducted by Line Rode *et al.*[12] The obese women's lengthier hospital stays have been shown in other research, which may be related to linked medical issues, wound infection, and NICU admission.

Conclusion

Our study highlights the multiple maternal and perinatal hazards associated with obese pregnancies, which present a significant challenge to the obstetrician. Significant obesity is also linked to a variety of health problems later in life in women of childbearing age. This underlines the need of focusing efforts on attempting to lower the rising prevalence of obesity in reproductive women. Given that it is not advised for obese women to reduce weight while pregnant, the optimal period for intervention may be before a woman contemplates becoming pregnant.

This suggests that young women require pre-pregnancy guidance and counselling. Obese women who are thinking about getting pregnant should be aware of the risks that maternal obesity poses to the unborn child. In an effort to improve and perhaps lower the risk of pregnancy complications, health care practitioners need to motivate and support obese women to modify their lifestyles and lose weight prior to conception.

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