

## STUDY ON MATERNAL OBESITY AND ITS OUTCOMES ON PREGNANCY

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### Abstract

**Background:** Obesity is a worldwide growing health concern. Maternal obesity can result in negative outcomes for both women and fetuses. The maternal risks during pregnancy include gestational diabetes and preeclampsia, heart disease, and hypertension. The fetuses born to obese women are at increased risk of still births, congenital anomalies and an increased risk of developing obesity and heart disease in the future. **Materials and Methods:** This study was conducted by the department of Obstetrics and Gynaecology, NRI Medical College, Chinakakani, Guntur, Andhra Pradesh, over a period of 1 year, i.e. from February 2023 to January 2024, including 100 pregnant women who were obese (BMI  $\geq 30$  kg/m<sup>2</sup>). **Result:** 54% of women belonged to Class II obesity. Most of the study participants were multigravida. Elective cesarean section was the most common mode of delivery. Gestational diabetes was the most common maternal complication, followed by hypothyroidism. The incidence of still births in present study is 11%. **Conclusion:** Counseling prior to pregnancy, especially to women who are obese is a must. Awareness must be created regarding health risks of women and their future offspring through health programs. High risk pregnancies must be managed at a tertiary care center which has proper facilities with an NICU.

## INTRODUCTION

The worldwide prevalence of obesity has been on an exponential rise over the past few decades. The main culprit is excess of high-calorie food intake and little or no physical activity. Due to this there is metabolic dysregulation causing a myriad of conditions owing to poor lifestyle habits.

Maternal obesity is associated with increased risk of a number of complications in pregnancy such as preeclampsia, and gestational diabetes mellitus (GDM).<sup>[1]</sup> Excessive weight gain during pregnancy not only increases risk of gaining weight later in life, but also impacts the fetal development and health of that child in future.<sup>[2,3]</sup> The fetus is provided with abundance of nutrients which may change their physiology and metabolism, making them prone to a number of metabolic diseases such as heart disease, hypertension, and diabetes, later in life.<sup>[3]</sup>

Maternal obesity is a risk factor for spontaneous abortion and unexplained still birth due to the higher risks of developing hypertensive diseases (preeclampsia, eclampsia) and diabetes during pregnancy.<sup>[4]</sup> For each increase in BMI of 5-7 kg/m<sup>2</sup>,

there is a 2-fold increased risk of developing preeclampsia.<sup>[5]</sup>

Maternal obesity is more prone to develop complications during parturition. The rate of successful vaginal delivery decreases with increase in BMI.<sup>[6]</sup> It also influences the success rates of attempted vaginal birth after caesarean section, along with increase in rates of caesarean section. During operative delivery, obese women are more prone to develop complications during surgery, more prone for infections and poor wound healing. There is also increased risk of developing anesthesia related complications such as failed intubation and higher time required for induction of general anesthesia.<sup>[7]</sup> Increase in BMI is associated with increase in insulin resistance. This triggers the continuous production of counter-regulatory (anti-insulin) hormones by the growing placenta. Thus pregnancy is associated with higher risk of developing gestational diabetes (GDM). Pregnancies complicated by GDM have a 4-fold increase in perinatal mortality.<sup>[8,9]</sup>

Fetal macrosomia (estimated fetal weight > 4.5kg) has a 2-3 fold increased incidence in obese pregnant

women. There is an increased risk of development of neural tube defects (NTD) in the offspring.<sup>[10,11]</sup> This study was conducted with an aim to evaluate the impact of maternal obesity on overall outcomes of pregnancy and parturition.

## MATERIALS AND METHODS

This observational study was conducted in the department of Obstetrics and Gynaecology, NRI Medical College, Chinakakani, Guntur, Andhra Pradesh. The study was conducted over a period of 1 year, i.e. from February 2023 to January 2024.

Pregnant women who are obese with BMI  $\geq 30$  kg/m<sup>2</sup> and pregnant women who were obese prior to pregnancy were included in the study. Pregnant women with BMI  $< 30$  kg/m<sup>2</sup> or pregnant women with prior diabetes or hypertension who did not give consent to participate in the study were excluded from the study. A total of 100 pregnant women were included in the study.

A detailed history, general physical examination and obstetric examination were done for all patients. Gestational age was calculated using the first day of last menstrual period and by ultrasound examination. Women were categorized into obesity class I (BMI =

30 – 34.9 kg/m<sup>2</sup>); obesity class II (BMI = 35 – 39.9 kg/m<sup>2</sup>) and obesity class III (BMI =  $\geq 40$  kg/m<sup>2</sup>). An informed written and verbal consent was taken from all patients prior to start of study. ethical committee approval was taken before conducting this study.

## RESULTS

A total of 100 pregnant women were included in the study. The mean age of study population was 27.7 $\pm$ 4.8 years. Majority of the women belonged in the age range of 20-30 years (85%) and the rest 15% being above 30 years.

Majority of the women belonged to Class II obesity (BMI = 35 – 39.9 kg/m<sup>2</sup>).

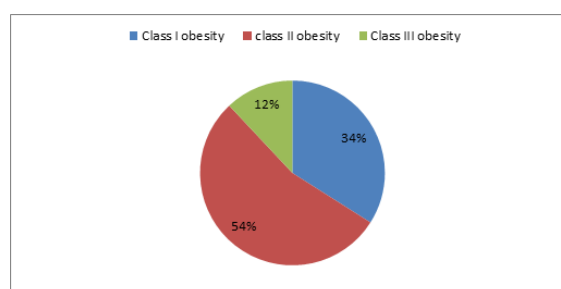


Figure 1: Obesity classes

Table 1: Mean height, weight and BMI of patients

Variables	Class I obesity	Class II obesity	Class III obesity
Height (in cm)	154.8cm	154.8 cm	155.8 cm
Weight (in Kg)	82.41 Kg	78.54 Kg	81.24 Kg
BMI (kg/m <sup>2</sup> )	36.21kg/m <sup>2</sup>	33.54kg/m <sup>2</sup>	38.24kg/m <sup>2</sup>

Table 2: Parity of study participants

Parity	Class I obesity (n=34)	Class II obesity (n=54)	Class III obesity (n=12)
Primiparous	12	30	6
Multiparous	22	24	6

Most common maternal complication was gestational diabetes (35%), followed by hypothyroidism (34%)

Table 3: Maternal outcomes

Complication	Class I obesity (n= 34)	Class II obesity (n=54)	Class III obesity (n=12)
Gestational Diabetes mellitus	8	18	9
Gestational hypertension	9	15	3
Hypothyroidism	12	20	2
Hyperthyroidism	3	8	0
Eclampsia	7	12	2
Severe pre-eclampsia	5	10	1

Elective cesarean section was the most common mode of delivery (36%), followed by normal vaginal delivery (29%). Most of the patients with Class II obesity had delivered by elective caesarean section and that with Class I obesity had delivered by vaginal delivery.

Table 4: Complications during parturition

Complication	Class I obesity (n= 34)	Class II obesity (n=54)	Class III obesity (n=12)
Elective caesarean section	10	20	6
Emergency caesarean section	5	14	3
Vaginal delivery	15	12	2
Assisted vaginal delivery	4	4	1

Table 5: Requirement of secondary suturing

Secondary suturing	Class I obesity (n= 34)	Class II obesity (n=54)	Class III obesity (n=12)
Performed	0	9 (16.67%)	10 (83.3%)
Not performed	34 (100%)	45 (83.3%)	2 (16.6%)

83.3% of the patients with class III obesity required secondary suturing. none of the patients with class I obesity required re-suturing.

**Table 6: Fetal outcomes**

Fetal outcome	Class I obesity (n= 34)	Class II obesity (n=54)	Class III obesity (n=12)
Still births	3	8	0
Live birth	31	46	12
NICU admission required	5	10	3
Fetal macrosomia	6	12	5

## DISCUSSION

A total of 100 obese pregnant women were included in the study. The mean age of study participants is 27.7±4.8 years. 48% were primiparous and the rest 52% were multiparous. Unlike present study, where majority were multiparous women, Gandhi et al,<sup>[12]</sup> observed that 60% of study participants in their study were primiparous. The mean height of present study is similar to that of Hakami et al.<sup>[13]</sup>

35% had developed gestational diabetes in present study. This is similar to study done by of Hakami et al.<sup>[13]</sup> However, Alfadhli et al,<sup>[14]</sup> had observed a higher incidence of gestational diabetes (47.8%) in Saudi women.

Obesity is a risk factor for thyroid dysfunction during pregnancy. Hypothyroidism affects approximately 2%–2.5% of pregnant women.<sup>[15]</sup> In present study, 34% of the study participants have hypothyroidism. Al Hadid et al,<sup>[16]</sup> studied a total of 384 pregnant women in Jordan for correlation between maternal obesity and pregnancy associated hypothyroidism and its effects on fetal outcomes. As per this study, pregnant women who are obese and have hypothyroidism have higher risk of developing fetal malformation, still births and IUGR.

In present study, 36% underwent elective cesarean section, 22% emergency cesarean section, 29% vaginal delivery and 9% assisted vaginal delivery. However, in study done by Hakami et al,<sup>[13]</sup> 31% underwent emergency cesarean section, which is higher than present study. Only 2% of patients underwent assisted vaginal delivery in their study, which is lower than that of in present study (9%).

In present study, majority of the class III obese women required secondary suturing. Conner et al in their study found a dose response relationship between increasing BMI and wound complications.<sup>[17]</sup>

23% in present study had fetal macrosomia, which is higher than that of in study by Hakami et al,<sup>[13]</sup> (11%). Alfadhli et al,<sup>[14]</sup> observed a significant correlation between fetal macrosomia and obese pregnant women with gestational diabetes mellitus.

In present study, 18% of the neonates required NICU admission, while in study done by Gandhi et al,<sup>[12]</sup> 26% required NICU admission, the most common cause of admission being respiratory distress.

## CONCLUSION

The rising incidence of maternal obesity and its related co-morbidities (gestational diabetes mellitus, eclampsia) also are increasing at an alarming pace. This not only affects the women of present generation but also affects the future generations, making it a major health problem. Obstetricians must identify those who are at risk and counsel them regarding the effects of excessive weight gain.

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## REFERENCES

- Lynch CM, Sexton DJ, Hession M, Morrison JJ. Obesity and mode of delivery in primigravid and multigravid women. *Am J Perinatol.* 2008;25:163-167.
- Rooney B, Schauburger C. Excess pregnancy weight gain and long-term obesity: one decadelater. *ObstetGynecol.*2002;100:245-252.
- deBooHA,Harding JE. The developmental origins of adult disease (Barker) hypothesis. *AustNZJObstetGynaecol.*2006;46:4-14.
- Chu SY, Kim SY, Lau C, et al. Maternal obesity and risk of still birth: a metaanalysis. *AmJObstetGynecol.*2007;197:223-228.
- O'Brien TE, Ray JG, Chan WS. Maternal body mass index and the risk of preeclampsia: a systematic overview. *Epidemiology.*2003;14: 368-374.
- Chu SY, Kim SY, Schmid CH, et al. Maternal obesity and risk of cesarean delivery: a meta-analysis. *ObstetRev.*2007;8:385-394.
- Soens MA, Birnbach DJ, Ranasinghe JS, van Zundert A. Obstetric anesthesia for the obese and morbidly obese patient: an ounce of prevention is worth more than a pound of treatment. *ActaAnaesthesiolScand.*2008;52:6-19.
- Catalano PM, Ehrenberg HM. The short- and long-term implications of maternal obesity on the mother and her offspring. *BJOG.* 2006; 113:1126-1133.
- Gillman MW, Rifas-Shiman S, Berkey CS, et al. Maternal gestational diabetes, birth weight, and adolescent obesity. *Pediatrics.*2003; 111:e221-e226.
- Sewell MF, Huston-Presley L, Super DM, Catalano P. Increased neonatal fat mass, not lean body mass, is associated with maternal obesity. *AmJObstetGynecol.*2006; 195:1100-1103.
- Waller DK, Mills JL, Simpson JP, et al. Are obese women at higher risk for producing malformed offspring? *AmJObstetGynecol.*1994; 170:541-548.
- Gandhi VV, Shrivastava A, Patel F. Evaluate the effect of maternal obesity on fetal outcome: an observational study in tertiary health care centre. *Int J Reprod Contracept Obstet Gynecol* 2023;12:1097-100.
- Al-Hakmani FM, Al-Fadhil FA, Al-Balushi LH, Al-Harthy NA, Al-Bahri ZA, Al-Rawahi NA, Al-Dhanki MS, Masoud I, Afifi N, Al-Alawi A, Padmakumar H, Kurup PJ. The Effect of Obesity on Pregnancy and its Outcome in the Population of Oman, Seeb Province. *Oman Med J.* 2016 Jan;31(1):12-7. doi:

- 10.5001/omj.2016.03. PMID: 26816564; PMCID: PMC4720950.
14. Alfadhli, E.M. Maternal obesity influences birth weight more than gestational diabetes. *BMC Pregnancy Childbirth* 21, 111 (2021). <https://doi.org/10.1186/s12884-021-03571-5>
  15. Poppe K, Bisschop P, Fugazzola L, Minziori G, Unuane D, Weghofer A. 2021 European thyroid association guideline on thyroid disorders prior to and during assisted reproduction. *European Thyroid Journal*. 2021; 9(6):281-95. [DOI:10.1159/000512790] [PMID] [PMCID]
  16. Al Hadid L, Z. Al-Rajabi O, Al Barmawi M, AL-Sagarat A Y. The Relationship Between Maternal Obesity with Pregnancy-Associated Hypothyroidism, Fetal Health, and Pregnancy Outcomes. *JHNM* 2023; 33 (3) :183-192
  17. Conner SN, Verticchio JC, Tuuli MG, Odibo AO, Macones GA, Cahill AG. Maternal obesity and risk of post cesarean wound complications. *Am J Perinatol*. 2014 Apr; 31(4):299-304. doi: 10.1055/s-0033-1348402. Epub 2013 Jun 13. PMID: 23765707; PMCID: PMC3796045.