

# Impact of Obesity on the Fetal Outcome in Pregnancy and its Association with Age of Pregnant Female

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**Abstract:** *The number of obese pregnant women is rising, which poses a threat to the future health of children. This study will help to understand the impact of obesity on the pregnancy outcome and its relation with age in pregnant females. Aim & Objectives: To find out the impact of obesity on fetal outcome and its relation with age. Material and Methods: A hospital based study was conducted among 80 pregnant females in the age group of 20-35 years in Muzaffarnagar Medical College & Hospital, Muzaffarnagar, Uttar Pradesh. Study was conducted from October, 2023 to September, 2024. Data was analysed statistically and chi square test was applied. Results: According to BMI, 43.75% females were obese in their first trimester of pregnancy at the time of data collection while 35% were in the normal category and 21.25% were overweight. In terms of foetal outcome, miscarriage 20% and 54.3% babies were admitted to NICU in case of obese females. Conclusion: There is a need to increase awareness about the adverse effects of obesity in pregnant females. This can be done by providing pre-conceptional counselling to females and by telling them the importance of regular physical activity and a healthy lifestyle (healthy diet, avoiding smoking and alcohol). This will also reduce the maternal and perinatal mortality and morbidity. Background: The obesity has become a worldwide problem not only from the medical point*

**Keywords:** BMI, Obesity

## 1. Introduction

The obesity has become a worldwide problem not only from the medical point of view but also from the social one. The alarming increase in obesity worldwide has led the World Health Organization (WHO) to classify obesity as one of the most pressing global health issues of the 21st century.<sup>[1]</sup>

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<sup>2</sup> or more as obese among adults.<sup>[2]</sup> In 2009, based on the BMI, the Institute of Medicine (IOM) classified body weight into underweight (BMI < 18.5 kg/m<sup>2</sup>), normal weight (BMI = 18.5–24.9 kg/m<sup>2</sup>), overweight (BMI = 25.0–29.9 kg/m<sup>2</sup>), and obese (BMI 30 kg/m<sup>2</sup>). Based on the BMI, obesity has three levels: BMI 30.0–34.9 (class I), BMI 35.0–39.9 (class II), and BMI 40 (class III) or morbid obesity. Obesity in pregnancy is defined as BMI 30 kg/m<sup>2</sup> at the first prenatal counselling visit. The IOM recommends a range of healthy weight gain amongst expectant mothers, for underweight (12.5–18.0 kg), normal weight (11.5–16.0 kg), overweight (7.0–11.5 kg), and obese (5.0–9.0 kg).<sup>[3]</sup>

In developed countries, most women of childbearing age are already overweight or obese before becoming pregnant. The number of obese pregnant women is rising, which poses a threat to the future health of children.<sup>[4]</sup> The WHO reports that the prevalence of obesity during pregnancy ranges from 1.8% to 25.3%.<sup>[1]</sup>

Maternal early pregnancy body mass index (BMI) and gestational weight gain (GWG) have a meaningful impact on pregnancy outcomes. The birth weight of the neonate is the

reflection of the various conditions during pregnancy and has an impact on the quality of life, the growth and development of the child, as well as childhood morbidity and mortality.<sup>[5]</sup> During the past few years, a secular trend toward increased birth weight and macrosomia related to greater maternal weight has been observed.<sup>[6]</sup> Gestational weight gain is also an important predictor of adverse maternal and neonatal health outcomes.<sup>[7]</sup> Insufficient weight gain is associated with increased risks of preterm birth and delivery of a low-birth-weight infant, whereas excessive weight gain is associated with increased risks of gestational hypertension, preterm birth, delivery of a high-birth-weight infant, and cesarean delivery.<sup>[8,9]</sup>

This study will help to understand the impact of obesity on the fetal outcome and its relation with age in pregnant females. It will also help to identify the modifiable risk factors responsible for several complications in mother and baby and to educate females about the importance of pre-conceptional counselling regarding importance of appropriate weight during pregnancy.

### Aim & Objectives

- 1) To find out the impact of obesity on fetal outcome.
- 2) To find out the association between obesity and maternal age.

## 2. Material and Methods

**Study design:** A hospital based cross-sectional study.

**Study area:** Department of Obstetrics & Gynaecology, Muzaffarnagar Medical College & Hospital, Muzaffarnagar.

**Study population:** Booked pregnant females in first trimester of pregnancy coming to the Department of Obstetrics & Gynaecology, Muzaffarnagar Medical College & Hospital, Muzaffarnagar.

**Sample size:** 80 females in first trimester of pregnancy who got registered and later delivered also in the Department of Obstetrics & Gynaecology, Muzaffarnagar Medical College & Hospital, Muzaffarnagar; were taken.

**Sampling technique:** 80 females were randomly selected using lottery method, who were registered in first trimester of pregnancy in the month of October and November, 2023 and who delivered in the Muzaffarnagar Medical College & Hospital, Muzaffarnagar.

**Study duration:** 12 months i.e. October, 2023 to September, 2024.

**Study method:** All the selected females were followed up till the time of the delivery and then foetal outcomes were recorded.

**Data collection:** Socio-demographic data of females along with their height and weight in first trimester along with the final foetal outcome were recorded.

#### Inclusion criteria:

- Pregnant females in the age group 20-35 years.
- Females in first trimester of pregnancy.
- Registered females.
- Females who gave consent.
- Females who delivered in the Department of Obstetrics & Gynecology, Muzaffarnagar Medical College & Hospital, Muzaffarnagar.

#### Exclusion criteria:

- Pregnant females <20 and >35 years of age.
- Non- registered females.
- Females who didn't give consent.
- Underweight females.
- Females who delivered outside the Muzaffarnagar Medical College & Hospital, Muzaffarnagar.

**Ethical approval:** This study was approved by the institute's ethical committee and written informed consent was taken from all the participants.

**Consent:** Written informed consent was taken from all the study participants.

**Statistical analysis:** Observations were expressed in the form of tables and figures. Chi- square test was applied to find out the association between obesity and maternal age. p- value was calculated.  $p < 0.05$  was considered significant.

### 3. Results

Most of the pregnant females were in the age group 20-25 years (53.75%). 51.25% females were housewife and around 48.75% were working (Table 1). 63.75% females were primigravidae while 36.25% females were multigravidae. Around 62% females lived in a joint family (Table 1).

According to BMI, 43.75% females were obese in their first trimester of pregnancy at the time of data collection while 35% were in the normal category and 21.25% were overweight. (Fig.1).

In terms of foetal outcome, miscarriage was more in obese females (20%) as compared to non- obese females (8.9%). 37.1% babies were born pre- term in obese females as compared to 20% in non – obese. This can be due to associated co- morbidities in obese females like PPH, PROM, GDM, etc. (Fig. 2). Shoulder dystocia (25.7%) and birth asphyxia (31.4%) were also more in obese females as compared to non- obese females. This can be due to the large size of baby in obese females (Table 3). 54.3% babies were admitted to NICU whose mothers were obese as compared to 35.5% NICU admission in non- obese females because of more problems present in babies of obese females at the time of birth. Perinatal mortality was more in non- obese females i.e. 11.1% as compared to 8.6% in obese females. This can be due to some other associated conditions which are not mentioned here in non- obese females like pre- eclampsia, eclampsia, APH, etc. (Fig. 2).

There was a positive association between obesity and maternal age as more girls in the age group 30-35 years (31.4%), were obese. This can be due to different lifestyle, unhealthy eating habits and more stress among women of this age group (Table 4).

### 4. Discussion

In the present study, 63.75% females were primigravida and 36.25% females were multigravidae. This finding was almost similar to a study done by Kutchi et al, there were 60% primipara and 40% multipara in each group.<sup>[10]</sup>

In the present study, there were 37.1% pre term births in obese females and 20% in non- obese females while in a study done by Kutchi et al, obese subjects were 4.63 times more prone to have preterm birth than non-obese subjects<sup>[10]</sup> Same results were found in a 2010 systematic review of maternal overweight and obesity and risk of preterm birth.<sup>[11]</sup> In a study done by D'Souza R et al, the preterm births were higher in obese patients that is 8 (16%) as compared to normal patients 0(0%).<sup>[12]</sup> The finding of pre- term births in all these studies is more in obese females.

In our study, shoulder dystocia was more in babies born to obese females i.e. 25.7% as compared to 11.1% in non- obese females. In the study done by Kutchi et al also, shoulder dystocia was significantly common among obese subjects similar to Vijay et al. and Leung et al.<sup>[10,13,11]</sup>

In the present study, birth asphyxia was more in babies born to obese females i.e. 31.4%. while in a study done by Kutchi et al, there was no significant difference in incidence of birth asphyxia between the two groups.<sup>[10]</sup> Dasgupta et al. has shown increased risk of birth asphyxia among obese subjects.<sup>[14]</sup> Callaway et al. in their study concluded that respiratory distress was not significantly different among the groups while the need of mechanical ventilation significantly increased with increase in maternal BMI.<sup>[15]</sup> This difference can be due to different study settings.

In our study, in case of obese females, 54.3% newborns were admitted to NICU as compared to 35.5% in non-obese group. Similarly, in study done by Kutchi et al., the newborns in obese group were 3.26 times more likely to be admitted in NICU. [10] Vijay et al. had similar results at BMI cut-off of 30 kg/m<sup>2</sup>. [13]

In the present study, perinatal mortality was more among non-obese i.e. 11.1% as compared to 8.6% in obese. In the study done by Kutchi et al., perinatal mortality occurred among 3.26% obese subjects while none among non-obese subjects. [10] This finding is not similar to our study. Dasgupta et al. also found no significant difference in incidence of perinatal mortality. [14]

## 5. Conclusion

Our findings conclude that females with higher BMI during pregnancy had increased risks of complications for both mother and the baby. There is a need to increase awareness about the adverse effects of obesity in pregnant females. This can be done by providing pre-conceptional counselling to females and by telling them the importance of regular physical activity and a healthy lifestyle (healthy diet, avoiding smoking and alcohol). This will also reduce the maternal and perinatal mortality and morbidity.

## 6. Recommendations

There are few recommendations according to the study done:

- Weight should be recorded at every visit of pregnant female to the hospital and female should be educated about the difference between the weight between two consecutive visits.
- Grass root level health workers like ASHA, ANM, etc. should inform females about side effects of obesity during pregnancy and its adverse effect on foetal outcome.
- Pre-conceptional counselling should be carried out in all the hospitals so that females can be made aware of healthy dietary habits during pregnancy and its effect on maternal and foetal outcome. It will also help the females to know about the physiological changes occurring in the body during pregnancy and importance of weight gain during pregnancy.

## 7. Limitations of the Study

The study has few limitations. Firstly, the sample size is small because due to some unknown reasons, not all the registered females delivered in the hospital under study. There were some associated co-morbidities also in some females who were not excluded from the study.

### Relevance of the study:

This study helps to understand the current situation of obesity among pregnant females and their lack of knowledge about the adequate weight gain during pregnancy. It will also help to make the women aware about the importance of adequate nutrition during pregnancy and the impact of obesity on adverse fetal outcome.

### Authors Contribution:

The study was done under the continuous and expert guidance of Dr. Bharti Maheshwari (Professor and Head).

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**Table 2:** Classification of participants according to BMI: (N= 80)

	Number	Percentage (%)
Normal (18.0–22.9)	28	35
Overweight (23.0–24.9)	17	21.25
Obesity (> 25)	35	<b>43.75</b>

**Table 3:** Fetal outcome in relation to obesity: (N= 80)

	Obese females (n=35) (%)	Non-obese females (n=45) (%)
Miscarriage	<b>07 (20%)</b>	04 (8.9%)
Congenital anomaly	00 (00%)	<b>02 (4.4%)</b>
Pre- term	<b>13 (37.1%)</b>	09 (20%)
Shoulder dystocia	<b>09 (25.7%)</b>	05 (11.1%)
Birth asphyxia	<b>11 (31.4%)</b>	13 (28.9%)
Admission to NICU	<b>19 (54.3%)</b>	16 (35.5%)
Perinatal mortality	03 (8.6%)	<b>05 (11.1%)</b>

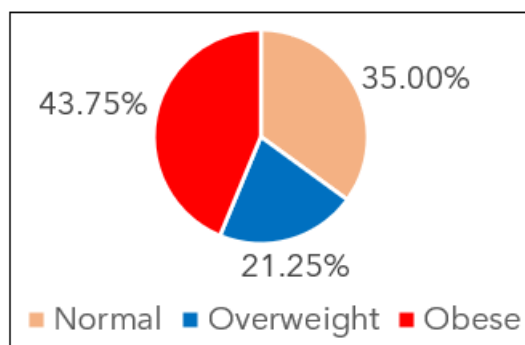
**Tables**

**Table 1:** Socio- demographic characteristics of females (N=80)

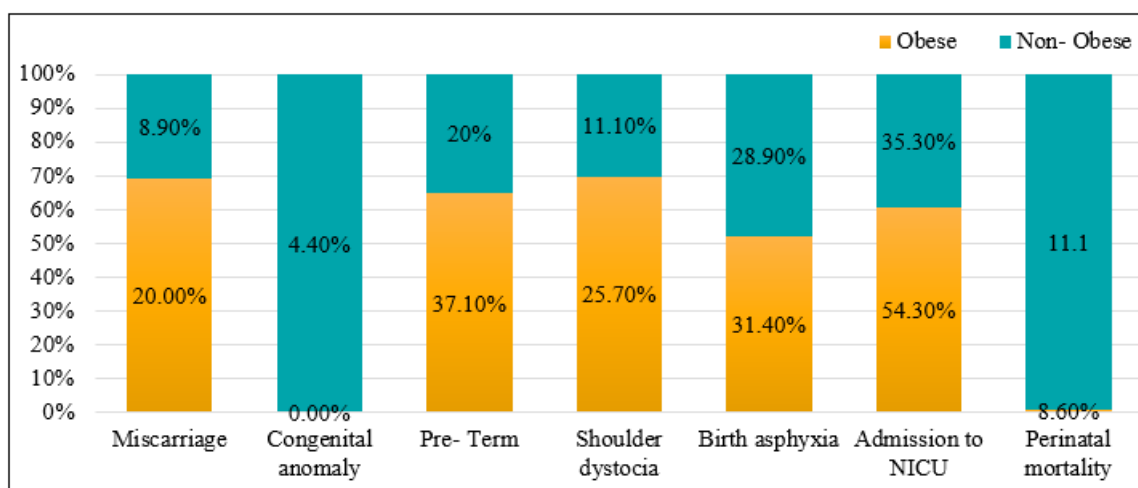
Variant	Number	Percentage (%)
<b>Age group (years)</b>		
20-25	43	<b>53.75</b>
25-30	21	26.25
30-35	16	20
<b>Religion</b>		
Hindu	38	47.5
Muslim	42	<b>52.5</b>
<b>Occupation</b>		
Housewife	41	<b>51.25</b>
Private job	27	33.75
Government job	12	15
<b>Type of family</b>		
Nuclear	31	38.75
Joint	49	<b>61.25</b>
<b>Parity</b>		
Primigravida	51	<b>63.75</b>
Multigravida	29	36.25

**Table 4:** Association between obesity and age of female in relation to obesity: (N= 80)

Age-group	Obese (%) (n= 35)	Non-obese (%) (n= 45)	Chi-square test
20-25	14 (40%)	29 (64.4%)	<b>6.3799 (p= 0.0412) (p&lt;0.05)</b>
25-30	10 (28.6%)	11 (24.4%)	
30-35	11 (31.4%)	05 (11.1%)	



**Figure 1:** Participants according to BMI



**Figure 2:** Fetal outcome in obese and non- obese females