

ORIGINAL ARTICLE

**A STUDY ON THE INCIDENCE OF PREGNANCY RELATED MEDICAL DISORDERS IN
OBESE WOMEN**

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ABSTRACT

Introduction: Obesity is now become global epidemic resulting in new challenges for all health care professionals. . One third of our pregnant population has a BMI greater than 30. Obese women appear to be at increased risk of gestational diabetes mellitus, gestational hypertension, pre-eclampsia, increased cesarean deliveries, postpartum complications and increased NICU admissions of the babies. The study was undertaken to evaluate the incidence of pregnancy related medical disorders like gestational diabetes mellitus, gestational hypertension and pre- eclampsia in both obese and non-obese antenatal women. Methods: This prospective study was conducted in the department of Obstetrics and gynecology at Rajah Muthiah Medical College and Hospital, Chidambaram, Tamilnadu. This study consists of 50 obese and 50 non obese antenatal women. A detailed history, physical examination, relevant investigations, mode of delivery and detail of intrapartum and postpartum period, were recorded for each individual and results were obtained. Observations: Out of 50 obese antenatal women 16 (32.0%) of them had pregnancy related medical disorders like gestational diabetes mellitus, gestational hypertension and pre-eclampsia whereas in 50 normal antenatal women only 7 (14.0%) of them had such disorders. Among these pregnancy related medical disorder incidence of gestational hypertension, gestational diabetes mellitus, and prexlampsia were more in obese group.

Keywords: Obesity, gestational diabetes mellitus, gestational hypertension, prexeclampsia

1.INTRODUCTION

Worldwide prevalence of obesity has increased substantially over the past few decades. We are eating more and moving less. An increased association of morbidity and mortality with obesity is well established in both pregnant and non-pregnant women. Obese women appear to be at increased risk of gestational diabetes mellitus, gestational hypertension, pre-eclampsia, preterm deliveries, increased labour induction, increased cesarean delivery rates, anaesthetic complications, increased postpartum complications, increased birth weight of the neonates, fetal macrosomia, increased NICU admission of babies, prolonged hospital stay. Obesity in pregnancy can also affect health later in life for both mother and child. For women, these risks include heart disease and hypertension. Children have a risk of future obesity and heart disease. Obstetrician-

gynecologists are well positioned to prevent and treat this epidemic. One mechanism thought to underlie these relationships is in utero fetal programming by nutritional stimuli. Fetuses have to adapt to the supply of nutrients crossing the placenta whether a deficit or an overabundance, and these adaptations may permanently change their physiology and metabolism. These programmed changes may serve as the origins of a diverse array of diseases that arise later in life, including heart disease, hypertension, and non-insulin dependent diabetes.

A crude population measure of obesity is the body mass index (BMI). "It is defined as weight in kgs divided by the square of the height in meters (kg/m²)"¹. According to WHO, a person with a BMI of 30 or more is generally considered obese. A person with a BMI equal to or more than 25 is considered overweight.

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Aims and Objectives:

Aim

Our aim is to study the incidence of medical disorders associated with pregnancies complicated by obesity

Objectives:

1. To study the incidence of pregnancy related medical disorders in obese and normal weight antenatal women.

2.MATERIALS AND METHODS:

This prospective study was conducted in the department of obstetrics and gynecology at Rajah Muthiah Medical College and Hospital, Chidambaram between November 2013 and September 2015. Aim of the work was explained to all pregnant women.

Inclusion criteria:

1. Pregnant women with first trimester BMI ≥ 30 kg/m²
2. Pregnant women with first trimester BMI 18.5 kg/m² and 24.99kg/m²
3. Irrespective of the age, parity and socioeconomic status.

Exclusion criteria:

1. Mothers not booked at first trimester.
2. Miscarriage
3. Anomalous baby
4. Women with a BMI between 25 kg/m² and 29.9 kg/m²
5. Women with a BMI <18.5 kg/m²
6. Women who could not be followed until delivery.
7. Women with chronic hypertension, pregestational diabetes mellitus and other preexisting chronic morbidities were excluded.

Based on the inclusion and exclusion criteria patients were categorized into study (obese) and normal (non-obese) group. Informed verbal and written consent were obtained from the patients and also from the patient's husband or guardian. Detailed history were taken with a common proforma followed by general examination with regards to patient's weight, height, BMI, pulse, BP were recorded. Socio economic status was computed using the modified kuppuswamy scale². Breast, thyroid examinations, cardiovascular and respiratory examinations were done. Obstetric examination carried out to assess gestational age, lie, presentation, liquor volume. Bimanual pelvic examination done for patients nearing term. Relevant investigations were taken. With above information, the pregnant women were followed up during antenatal period, delivery and postpartum until discharge for the development of any complications. Neonates were examined for APGAR score, weight and abnormality. All information was gathered. Results were analyzed and statistical analysis was done with Chi square test value and p-value <0.05 was considered as significant.

3.RESULTS:

Table .1: Age wise distribution of the obese and normal weight antenatal women

Age group	obese		normal		Chi square test value	p-value
	No.	%	No.	%		
<=20	3	6.0	5	10.0	15.705	0.003
21-25	12	24.0	28	56.0		
26-30	21	42.0	13	26.0		
31-35	9	18.0	4	8.0		
>35	5	10.0	0	--		

Interpretation: P value <0.05(significant). Majority of obese women (42.0%) were in the age group between 26-30 years and majority of normal women (56.0%) were in the age group between 21-25 years. Women in the age group >30 years were 28.0% in obese group whereas only 8.0% in normal group. This differentiation in age group distribution is statistically significant

Table 2: Distribution of the obese and normal weight antenatal women by the BMI at booking

BMI at booking (kg/m ²)	Obese		Normal	
	No	%	No	%
18.5-24.99	-	0	50	100
30-34.99	38	76.0	-	0
35-39.99	8	16.0	-	0
≥ 40	4	8.0	-	0

Interpretation: Majority of obese women (76.0%) had a BMI between 30-34.99 kg/m² (Category 1 BMI-Moderate obesity)

Table 3: Distribution of the obese and normal weight antenatal women by the presence of pregnancy related medical disorders

Medical disorders	Obese		Normal		Chi Square test value	p-value
	No	%	No	%		
Yes	16	32.0	7	14.0	4.574	0.032
No	34	68.0	43	86.0		

Relative risk : 2.28

Interpretation: p value <0.05. In obese group 32.0% had pregnancy related medical disorders whereas in normal group only 14.0% had pregnancy related medical disorders. This difference is statistically significant. The risk of developing pregnancy related medical disorder is 2.28 times more in obese group.

Table 4 : Distribution of obese and normal weight antenatal women by the presence of pregnancy related medical disorders

Medical disorders	Obese		Normal	
	No	%	No	%
GDM	5	10.0	3	6.0
Gestational HTN	6	12.0	2	4.0
Pre-eclampsia	5	10.0	2	4.0

Interpretation: Among the medical disorders during pregnancy incidence of gestational diabetes was 10.0% and 6.0% respectively in obese and normal group and incidence of gestational hypertension was 12.0% and 4.0% in obese and normal group. The incidence of pre-eclampsia was 10.0% and 4.0% in obese and normal group. This is statistically significant.

4.DISCUSSION:

Obesity is defined as an abnormal growth of the adipose tissue due to an enlargement of fat cell size (hypertrophic obesity) or an increase in fat cell number (hyperplastic obesity) or a combination of both¹. BMI is a crude measure of obesity and it is measured by weight of the person (in kilograms) divided by the square of the height (in metres). New updated WHO classification of BMI:

Classification	Principal Cut- off points	Additional Cut-off points
Underweight	<18.50	<18.50
a)Severe thinness	<16.00	<16.00
b)Moderate thinness	16.00-16.99	16.00-16.99
c)Mild thinness	17.00-18.49	17.00-18.49
Normal range	18.50-24.99	18.50-22.99 23.00-24.99
Overweight	≥25.00	≥25.00
a) Pre-obese	25.00-29.99	25.00-27.49 27.50-29.99
Obese	≥30.00	≥30.00
a)Class I	30.00-34.99	30.00-32.49 32.50-34.99
b)Class II	35.00-39.99	35.00-37.49 37.50-39.99
c)Class III	≥40.00	≥40.00

Source : adapted from WHO 1995, WHO 2000, WHO 2004
Medical disorders in obesity complicating pregnancy:

Obesity is often associated with insulin resistance, dyslipidemia and hypertension which has led to the concept of metabolic syndrome^{2,3}. Prevalence is increased with age. According to NHANES III, prevalence was about 6% in those with 20 years of age, 14% in those with 30-39 years of age, 20% in those with 40-49 years of age and >30% for women over 50 years of age⁴. 20% in reproductive age group⁴. Several studies in western world have shown that obesity is associated with adverse pregnancy outcomes^{5,6}. Among pregnancy complications, gestational diabetes mellitus and pregnancy induced hypertension are significantly more common in obese women. These facts are supported by a study conducted in Canada comparing pre-pregnant BMI categories with obstetrical and neonatal outcomes⁷. This is proved in our study, in that the risk of developing pregnancy related medical disorder is 2.28 times more in obese group.

Obesity and Hypertensive disorders in pregnancy:

Pregnancy induced hypertension is defined as woman having diastolic pressure of >90mmHg or systolic pressure of >140 mmHg two readings 4 hours apart or a single reading of diastolic >110mmHg after 20 weeks of pregnancy⁸. Hypertensive disorders including pre-existing hypertension and pregnancy induced hypertension are more common in

women with excess weight, although prevalence rate in different reports vary widely (7-46%)⁹. In our study, the incidence of gestational hypertension was 12.0% in obese group whereas in normal group it was 4.0% which is in correspondence to the study conducted by Clausen et al 2006¹⁰ in Norway and Weiss JL et al 2004¹¹ in New York in that they concluded that obese women are more prone to develop hypertension during pregnancy and obesity is an independent risk factor for adverse pregnancy outcomes like gestational hypertension.

Obesity and Preeclampsia:

Obesity play a role in metabolic syndrome^{2,3}. Chronic hypertension, insulin resistance and/or hypertriglyceridemia may be present prior to conception in obese women. Insulin resistance as well as hypertriglyceridemia are risk factors for preeclampsia¹². Endothelial dysfunction play a vital role in the pathogenesis of preeclampsia¹³, it is plausible that the prepregnancy presence of endothelial dysfunction by insulin resistance and/or hypertriglyceridemia may be causatively associated with the high incidence of preeclampsia in obese women¹⁴. Jensen et al 2003¹⁵ conducted study in women with normal glucose tolerance and found that the incidence of preeclampsia was still significantly higher in obese women (prepregnancy BMI ≥30; Odd ratio 5.6) and overweight women (prepregnancy BMI=25.0-29.9; Odd ratio 1.7) than in women with a prepregnancy BMI of 18.5-24.9. In our study the incidence of preeclampsia was 10.0% and 4.0% in obese and normal group respectively.

Obesity and Gestational Diabetes Mellitus:

Maternal obesity is associated with an increased risk of diabetes, both pregestational diabetes and GDM. Incidence varies from 7% to 17%. This increased risk is primarily related to an exaggerated increase in insulin resistance in the obese state¹⁶. The incidence of gestational diabetes in the pregnancies of obese gravidas can be derived from the data of Gross et al¹⁷ and Ehrenberg et al¹⁸. who each reported a 6.5% and 8.0% incidence of gestational diabetes, respectively in obese gravidas who were from a geographically similar U.S. urban population. However women who are obese during pregnancy and develop gestational diabetes have been shown to have a 2-fold increased prevalence of subsequent type 2 diabetes as compared to lean women¹⁹. Therefore maternal obesity is a significant long term risk factor for type 2 diabetes for both the mother and child^{20,21}. Here also in our study 10.0% of obese women and 6.0% of normal weight antenatal women had GDM.

Lifestyle modification:

Oteng-Ntim et al²² and Thangarathinam et al²³ reported that weight management interventions or dietary interventions in obese pregnant women resulted in a significant reduction in the incidence of gestational diabetes mellitus and preeclampsia respectively. ACOG recommended that nutrition and exercise counseling should continue not only antepartum, but also postpartum until attempting another pregnancy for obese pregnant women²⁴.

5. CONCLUSION:

This study concluded that the risk of developing pregnancy related medical disorders is more for obese pregnant women than normal BMI women. The increasing rate of maternal obesity provides a major challenge to obstetric practice. Obesity in pregnancy can also affect health later in life for both mother and child. There is a strong need to encourage and assist obese women to make life style changes, to lose weight pre-conceptionally in an attempt to optimize and potentially decrease the risk of complications in pregnancy. Despite improvements in our understanding of this endocrinopathy, there are still many barriers to the clinical care for such women. Obstetrician-gynecologists are in a key position to prevent and treat this epidemic.

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