

# High Body Mass Index in Pregnancy, Its Effects on Maternal and Fetal Outcome

Vellanki Venkata Sujatha<sup>a, b</sup>, Kocherlakota Venkata Lakshmi Narasimha Sharma<sup>a</sup>,  
Kaul Rajesh<sup>a</sup>

## Abstract

**Background:** To examine the maternal and foetal risks of adverse pregnancy outcome in obese women (BMI > 30).

**Methods:** This study is a prospective non randomized descriptive study conducted in the Department of Obstetrics and Gynaecology of KIMS in Narketpally from April 2007 to April 2009, 100 women with high BMI were compared with 100 women with normal BMI with regard to ante-natal complications, intervention in labour, maternal morbidity and neonatal outcome.

**Results:** Compared to women with normal BMI, the following outcomes were significantly more common in obese pregnant women (odds ratio (95% confidence interval)) for BMI > 30 gestational diabetes mellitus (4.8 (1.01 - 3.02)); pre-eclampsia (2.52 (1.04 - 6.11)); macrosomia (13.8 (3.1 - 60.57)); caesarean section (3.45 (1.65 - 7.15)) and infections (1.7 (0.39 - 7.32)).

**Conclusions:** This study points out a strong association between maternal morbid obesity in early pregnancy and a number of threatening complications during pregnancy, delivery, and in the neonatal period.

**Keywords:** High body mass index; Obesity (BMI); Pregnancy complications; Macrosomia

## Introduction

Obesity has reached epidemic proportions globally, with more than one billion adults overweight and is a major contributor to the global burden of chronic disease and disability. The increasing 'epidemic is equally relevant to the carers of pregnant women in UK [1]. The prevalence of obesity in UK has trebled since 1980. According to CEMACH 2004 Report says 35% deaths mothers were obese (BMI > 30 kg/m<sup>2</sup>) [2].

Incidence of obesity is on the rise in India as well. In a study done by Shukla HC et al [3] in Mumbai urban population, the incidence of obesity in adults was found to be as high as 37.5%.

A generally accepted definition of obesity is a body mass index [4] (BMI) > 30 kg/m<sup>2</sup> (Table 1). Increased obesity rates among pregnant women are a significant public health concern with various implications for pre natal care and supervision of delivery. In pregnancy, BMI is calculated using pre pregnant weight. If this is unknown, the first weight measurement at prenatal care is used. Booking body mass index (BMI) is of clinical interest since obese pregnant women face far greater risks of pregnancy complications like pre-eclampsia, gestational diabetes and macrosomia. Awareness of these findings needs to be increased in both women planning a pregnancy and their careers.

## Methods

This study is a prospective non randomized descriptive study conducted in the Department of Obstetrics and Gynaecology of KIMS in Narketpally from April 2007 to April 2009.

Complications during pregnancy, labour, puerperium were studied in 100 pregnant women with high BMI at first booking and compared with 100 pregnant women with normal BMI.

Adverse pregnancy outcomes assessed were pre eclampsia, gestational diabetes and preterm labour.

Labour outcomes assessed were induction of labour, mode of delivery and macrosomia. Maternal adverse out-

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<sup>a</sup>Kamineni Institute of Medical Sciences Narketpally, India

<sup>b</sup>Corresponding author: Vellanki Venkata Sujatha, D1/08, Doctors Quarters, Kamineni Institute of Medical Sciences, Sreepuram, Narketpally, Nalgonda; Andhra Pradesh-508254, India.  
Email: sujathavv@yahoo.com

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**Table 1.** Acceptable Weight Gain in Pregnancy [5, 6]

Initial Body mass Index	Recommended Weight gain (kg)
< 19.8 (low)	12.5 - 18
19.8 - 26.0 (normal)	11.5 - 16
26.1 - 29.0 (high)	7 - 11.5
> 30 (obese)	at least 6

comes assessed were wound infection, urinary tract infection, genital tract infection and post partum hemorrhage. A blood loss of more than 500 ml was considered to be excessive as per the definition of postpartum hemorrhage by the World Health Organization (WHO). Fetal wellbeing was assessed using APGAR < 7 at 5 minutes, trauma, asphyxia, meconium stained liquor and, babies requiring neonatal ward admissions.

The observations were then computed and compared to evaluate the problems associated with high BMI in pregnancy.

Statistical analysis was done using CHI Square test, multicollinearity, Logistic Regression of confounding variables.

## Results

In the present study 68 of non obese pregnant and 60 of obese pregnant women were of 20 - 25years group, 24 of non obese women and 12 of obese women were of 26 - 30 years group, 8 of non obese pregnant and 28 of obese pregnant group women were of 31 - 35 years group. In this study 56 of non obese pregnant and 66 of obese pregnant group women were primipara, 44 of normal pregnant and 34 of obese pregnant group women were multipara. Compared to women with normal BMI, gestational diabetes mellitus, pre-eclampsia and preterm labour were more common in obese pregnant women (Table 2). In this study 20 of non obese

**Table 2.** Adverse Pregnancy and Labour Outcomes

Characteristic	Obese	Non obese	OR	95%CI	P value
Pre eclampsia	18	8	2.52	1.04 - 6.11	< 0.001
Gestational diabetes	9	2	4.8	1.01 - 3.02	< 0.001
Preterm labour	9	2	4.8	1.01 - 3.02	< 0.001
Labour induction	44	20	3.14	1.60 - 5.80	< 0.001
Cesarean delivery	32	12	3.45	1.65 - 7.15	< 0.001
Meconium liquor	4	2	2.04	0.36 - 11.4	> 0.05
LGA <sup>a</sup> > 2SD <sup>b</sup>	22	2	13.8	3.1 - 60.57	< 0.001
Fetal distress	4	2	2.04	0.36 - 11.4	> 0.05
APGAR 1 min < 7	8	2	4.2	0.88 - 20.5	< 0.001
PPH <sup>c</sup>	6	5	1.21	0.35 - 4.11	< 0.001
Genital tract infection	2	1	2.02	0.18 - 22.6	< 0.001
Wound infection	5	3	1.7	0.39 - 7.32	< 0.001
Urinary tract infection	5	4	1.2	0.32 - 4.80	< 0.001

<sup>a</sup>Large for gestational age; <sup>b</sup>Standard deviation; <sup>c</sup>Post partum hemorrhage.

women and 44 of obese women had induction of labor, 6 of non obese and 14 of obese women had instrumental delivery and 12 of non obese and 32 of obese women had cesarean section which was statistically significant. Two non obese and 22 of obese women had macrosomia, two non obese and 8 of obese women had low APGAR score, four non obese and two of obese women had meconium stained liquor during labour and required admission to the neonatal unit and required assistance with feeding. Blood loss, urinary tract infection, genital tract infection and wound infection were greater in the group of women with increased BMI.

## Discussion

Obesity is a growing epidemic and its effect on the outcome of pregnancy and delivery in the Indian population has not hitherto been extensively studied. This study is a prospective study and aims to report the effect of maternal obesity on pregnancy complications. An increasing trend towards obesity was found over the last 10 years, and at present, one-third of UK pregnant population has a BMI > 30. This study detected a higher incidence of gestational diabetes and macrosomia which has been consistently reported by other authors [4, 7, 8]. Therefore it is pertinent to identify women at risk of gestational diabetes as this increases the risk of hypertensive disorders of pregnancy, macrosomia of the infant and predisposes the women to a higher risk of developing diabetes in later life [4]. Thus active strategies for weight control and life style advice after delivery with regular follow up is needed for the management of these women. Similarly, the increased risk of preeclampsia has also been reported as reported by others [4, 7, 8]. The incidence of pre term labor is high probably because of early interventions due to preeclampsia. This is consistent with the findings in literature as to significantly increased incidence of elective pre term labor in obese women [5, 9]. This study detected a significantly higher incidence of induction of labour and caesarean section in the group of women with increased BMI. Usha et al [10] reported one to two fold higher risk of cesarean section. The researchers advocate that this may be an effect of the increased rate of large for gestational age infants as was significantly found to be very high in our study. Further more they suggest it may be possible that uterine contractility may be suboptimal in obese women [10]. There was an increased incidence of post partum hemorrhage and infections in women with high BMI.

Stringent anti obesity measures need to be implemented in women to prevent the complications of obesity in reproductive years. Nutritional education, behavior modification, drug treatment and dieting have not been successful in reducing weight in obese adults [4, 11]. A recent meta analysis showed that bariatric surgery is more effective than non surgical treatment for weight loss in women with BMI > 40 and

is previous bariatric surgery is not associated with adverse perinatal outcome although the study showed high cesarean rate and an increased risk of anaemia [6]. Olson et al evaluated the efficacy of an intervention, which was that health-care providers monitored gestational weight gain and send patient education leaflets by mail to these women and this reduced the risk of excessive weight gain and self monitor weight gain [12].

## Conclusion

This study, however, clearly demonstrates the increased risk associated with embarking upon a pregnancy when overweight and shows that this group of women need to be regarded as 'high risk' when counseling and risk assessment is done in the antenatal clinic. It has been recommended that all mothers should have their BMI calculated at booking as a part of the full risk assessment and should be offered advice about sensible weight reduction, including diet and exercise and referral to a dietician where appropriate.

Research is needed into creation of an effective affordable and acceptable community based program for obese pregnant women and their carers.

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