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Research Article

A Study of the Effect of Body Mass Index on Pregnancy Outcomes

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Abstract

Objective: To estimate the proportion of various pregnancy complications in pregnant women with either low or high and on their gestational weight gain and to describe the effect of the maternal body mass index and gestational weight gain on neonatal outcomes.

Materials and Methods: A minimum of 100 pregnant women booked at CSI Hospital seeking antenatal care (< 8 weeks GA) from May 2014 to April 2015 after their consent has been obtained. The age, parity, socioeconomic status as per modified Kuppuswamy classification 2012 was noted. Maternal weight and height was recorded at our institute at their first antenatal visit at less than 8 weeks of gestation and BMI calculated with BMI chart. The pregnant woman was counseled regarding their calorie requirement and recommended weight gain based on their BMI (Table 1) [1-3], according to the guidelines suggested by IOM. Regular antenatal care was provided and antenatal investigations carried out. Weight of the pregnant woman was recorded at the time of admission to the hospital.

Results and Discussion: In this prospective analysis of 100 pregnant women 30% were overweight, 13% were obese and 17% were underweight. Overweight/Obese women have significant risk of developing gestational diabetes and an increased risk of PPROM/PROM, caesarean delivery. These women had significantly protective effect for anemia and no risk of preterm labor or preeclampsia. Neonates of obese women had significant risk for low birth weight and ICU admissions and lower risk of macrosomia [4-7].

Underweight women have increased risk for anemia, preterm labor, reduced risk for gestational diabetes, pre-eclampsia, PROM/PPROM and caesarean delivery. Neonates of underweight women were at increased risk for preterm births, low birth weight and ICU admissions [8-10,20,22].

Majority of the women had inadequate weight gain (45%) or gained excessively (24%). Inadequate weight gain during pregnancy has increased risk of preterm labor, PROM, anemia and cesarean delivery and at lower risk for preeclampsia and gestational diabetes. Neonates born to mothers with inadequate weight gain during pregnancy increased the risk for preterm birth, low birth weight, IUGR and ICU admissions [11,12,21].

Excessive weight gain increased the risk for gestational diabetes, preterm delivery [15,16]. Neonates born

to mothers with excessive weight gain during pregnancy increased risk for preterm birth [17,18].

Conclusion: Prepregnancy Body mass index high or low effects pregnancy outcomes, in the neonate also there may be LBW, IUGR, ICU admissions, preterm delivery [24-27]. GWG either excessive or inadequate [28] increases the risk for several pregnancy related outcomes, even the neonates are effected [11,12].

Keywords: *Impaired Glucose Tolerance; Gestational Diabetes; Gestational Hypertension and Preeclampsia*

Abbreviations

BMI: Body Mass Index; PPROM: Preterm Premature Rupture of Membranes; PROM: Premature Rupture of Membranes; NICU: Neonatal Intensive Care Unit; IUGR: Intra Uterine Growth Retardation; LBW: Low Birth Weight; LGA: Large for Gestational Age; SGA: Small for Gestational Age; hFFM: Free Fat Mass; HDP: Hypertensive Disorders of Pregnancy; AHRQ: Agency for Healthcare Research and Quality

Introduction

In India, obesity is emerging as an important health problem particularly in urban areas, paradoxically co-existing with undernutrition. Almost 30 - 65% of adult urban Indians are either overweight or obese or have abdominal obesity [1]. This suggests that more than 50% of our women enter pregnancy with an inappropriate weight i.e. they are either undernourished or over nourished. This has raised concerns among health care professionals as both have their attended problems. Body Mass Index is a simple, noninvasive, method of estimating body fat percentage and assessing a person's nutritional status [2]. BMI is standard method used globally instead of weight to help quantify its effect. The World Health Organization has used this screening tool to classify people as underweight, normal and obese [3] (Table 1). The effect of BMI on pregnancy and neonatal outcomes have been studied extensively and now it has been recognized that a high or low pre pregnancy body mass index (BMI) can have detrimental effects on health outcomes for mother and child, both in the short-term and long-term.

Classification	**BMI(kg/m^2)**	
	Principal cut-off points	**Additional cut-off points**
Underweight	**< 18.50**	**< 18.50**
Severe thinness	< 16.00	< 16.00
Moderate thinness	16.00 - 16.99	16.00 - 16.99
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**
Pre-obese	25.00 - 29.99	25.00 - 27.49
		27.50 - 29.99
Obese	**≥ 30.00**	**≥ 30.00**
Obese class I	30.00 - 34-99	30.00 - 32.49
		32.50 - 34.99
Obese class II	35.00 - 39.99	35.00 - 37.49
		37.50 - 39.99
Obese class III	≥ 40.00	≥ 40.00

Table 1: *The International Classification of adult underweight, overweight and obesity according to BMI.*

Source: Adapted from WHO, 1995, WHO, 2000 and WHO 2004.

Materials and Methods

Ethics committee approval was obtained for the study. In this study, 100 pregnant women booked at CSI Hospital seeking antenatal care (< 8 weeks GA) were included after obtaining consent. The age, parity, socioeconomic status as per modified Kuppuswamy classifi-

cation (2012) were noted. A detailed history was elicited. General and systemic examination was done. Documented assessment of risk factors for VTE was done in early pregnancy and accordingly thromboprophylaxis given. Maternal weight was recorded at our institute using a manual weighing scale. Although dial scales are more imprecise than digital scales, absolute imprecision tended to be within 0.91 kg of calibration weights, a level far below the threshold that would cause weight to result in an error of one BMI unit (i.e. approximately 2.7 kg). It is also within the ~0.5 kg fluctuation in body weight considered as normal daily variation in healthy adult and height measured using a measuring scale at their first antenatal visit at less than 8 weeks of gestation.

Results and Discussion

In this prospective analysis of 100 pregnant women 30% were overweight, 13% were obese and 17% were underweight. Overweight/ Obese women have significant risk of developing gestational diabetes and an increased risk of PPROM/ PROM, caesarean delivery. These women had significantly protective effect for anemia and no risk of preterm labor or preeclampsia. Neonates of obese women had significant risk for low birth weight and ICU admissions and lower risk of macrosomia.

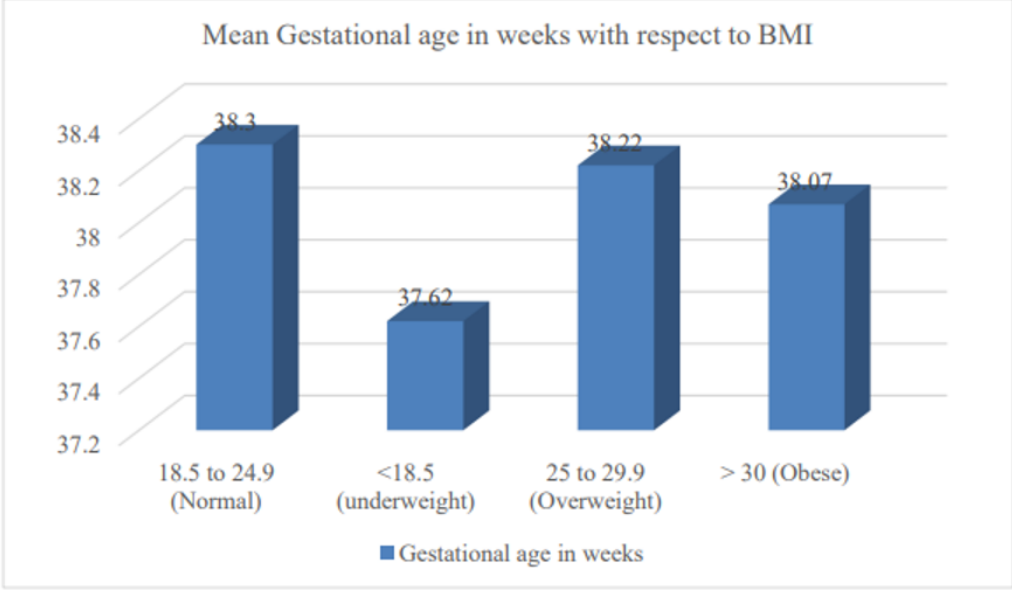

Figure 1: *Mean gestational age in regards to BMI.*

Underweight women have increased risk for anemia, preterm labor, reduced risk for gestational diabetes, pre-eclampsia, PROM/ PPROM and caesarean delivery. Neonates of underweight women were at increased risk for preterm births, low birth weight and ICU admissions. Majority of the women had inadequate weight gain (45%) or gained excessively (24%). Inadequate weight gain during pregnancy has increased risk of preterm labor, PROM, anemia and cesarean delivery and at lower risk for preeclampsia and gestational diabetes. Neonates born to mothers with Inadequate weight gain during pregnancy increased the risk for preterm birth, low birth weight, IUGR and ICU admissions. Excessive weight gain increased the risk for gestational diabetes, preterm delivery. Neonates born to mothers with excessive weight gain during pregnancy increased risk for preterm birth.

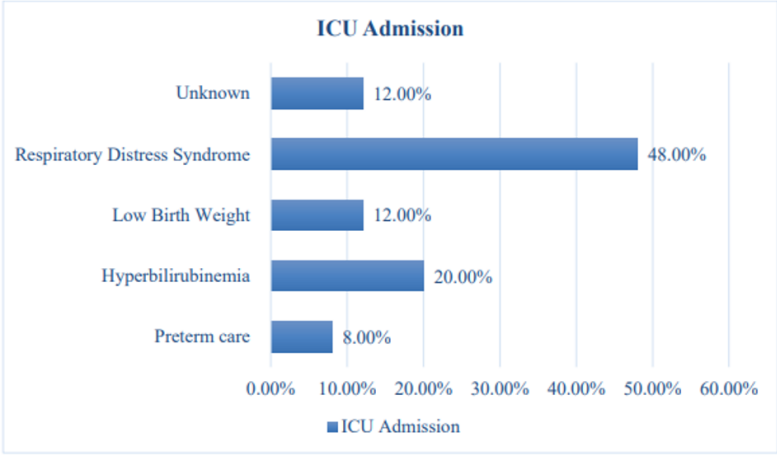

Figure 1: *Bar diagram for ICU admission.*

Conclusion

In this prospective analysis of 100 pregnant women 30% were overweight, 13% were obese and 17% were underweight. A similar prospective study in a tertiary care teaching hospital in North India women reported that 12.1% were underweight, 26.1% were overweight, 7.9% were obese (234). The WHO classification for BMI was used to categorize these women, if the classification for Indian population was used the percentage of obese and overweight will be much higher.

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Conflict of Interest

There is no conflict of interest exists.

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