

Impact of Body Weight on the Outcome of Pregnancy: An Observational AnalysisShaktisinh Vaghela¹, Charmi Pawani², Prafulla Kotak³^{1,2,3}Associate Professor, Department of Obstetrics and Gynecology, Gujarat Adani Institute of Medical Science, Bhuj, Kutch, Gujarat, India

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Abstract

Background and Aim: The effect of maternal underweight on obstetric performance is less clear. While some researchers have found increased incidences of preterm delivery, low birth weight and increased perinatal loss in these women, others have reported a protective effect of maternal underweight on certain pregnancy complications and interventions. By performing this study it would be possible to evaluate the association between BMI and its adverse effect on pregnancy outcome.

Material and Methods: A total of 500 women with uncomplicated complications were included in the study. With the help of a predesigned questionnaire, basic information including weight and height was collected in the first checkup and BMI calculated accordingly. Patients were divided into 4 groups such as Underweight (<18.5 kg/m²), Normal (18.5-24.9), Overweight (25-29.9) and Obese (30 and above). Weight gain during each visit was recorded and development of any antenatal complications throughout pregnancy was noted down. Information regarding postnatal complications, gestational age at delivery and also birth weight and Apgar score of the neonate was collected from the case sheets following delivery.

Results: The mean age of the subjects in our study was 26 years. Maximum percentage of LGA babies were born to obese women compared to women with normal BMI. Likewise maximum percentage of SGA babies were born to women in the underweight group. There was a significant association between BMI and birth weight.

Conclusion: In India, previously the problems during pregnancy were more related to low BMI but with changing lifestyle, obesity is increasing rapidly especially in urban set ups and may become a major health problem in the future.

Keywords: BMI, Body Weight, Pregnancy, Weight Gain.

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Introduction

Female obesity has become one of the major public health concerns of the past century, due to its growing incidence and impact on pregnancy. Prevalence of female obesity in 2016 globally according to the World Health Organization was 15.1%. Obesity is rapidly increasing in all countries. Elevated maternal body mass index (BMI) is associated with numerous adverse pregnancy outcomes such as pre-eclampsia, eclampsia, pre- and post-term birth, labor induction, macrosomia, childhood obesity, cesarean section, and postpartum hemorrhage. [1-3] The effect of maternal underweight on obstetric performance is less clear. While some researchers have found increased incidences of preterm delivery, low birth weight and increased perinatal loss in these women, others have reported a protective effect of maternal underweight on certain pregnancy complications and interventions.

[4] More recently, the waist-hip ratio has been used to study the effects of obesity on pregnancy, but data relating to this parameter are seldom available. Despite the plethora of publications on obesity and obstetric outcomes, population based studies in the UK reporting on the effect of extremes of Body Mass Index (high as well as low BMI) on pregnancy outcomes are relatively few. [5,6]

By performing this study it would be possible to evaluate the association between BMI and its adverse effect on pregnancy outcome. It would also be possible to analyze the association between BMI and gestational weight gain in our Indian set up. The relative risk of various pregnancy outcomes that a patient with extremes of BMI can develop would also be possible to evaluate by doing this study.

Materials and Methods

The present study is the observational analysis done in the department of gynecology, medical college and associated hospital. The study was done for the period of one year. A total of 500 women with uncomplicated complications were included in the study. The patients were informed about the study and the informed consent was signed prior to the inclusion in the study. The inclusion and exclusion criteria followed in the study were as follows:

Inclusion criteria: Antenatal patients, booking in the first trimester of pregnancy

Exclusion criteria: Patients with pre-existing medical disorders like chronic hypertension, overt diabetes, over connective tissue disorders such as SLE, Multiple pregnancy hypothyroidism, No antenatal visits in the first trimester of pregnancy.

With the help of a predesigned questionnaire, basic information including weight and height was collected in the first checkup and BMI calculated accordingly. Patients were divided into 4 groups such as Underweight (<18.5 kg/m²), Normal (18.5-24.9), Overweight (25-29.9) and Obese (30 and above). Weight gain during each visit was recorded and development of any antenatal complications throughout pregnancy was noted down.

Information regarding postnatal complications, gestational age at delivery and also birth weight and Apgar score of the neonate was collected from the case sheets following delivery. Descriptive analysis has been done using SPSS 16.0 software and graphs, tables and charts obtained by Microsoft excel and word. Results on continuous measurements are presented on Mean \pm SD and categorical measurement in Number (%). Chi-

square test was used to find the association between early pregnancies BMI, weight gain, maternal and fetal outcomes.

Results

The observational study was done that included 500 pregnant women with uncomplicated pregnancies. The study was done for the period of one year to find the association between early pregnancy and weight gain during pregnancy in relation to adverse pregnancy outcomes. A pre-designed questionnaire and data collection analysis was performed. Variables like age, parity, gestational age, BMI distribution based on four classes of BMI, maternal and fetal complications, association between weight gain of the population according to BMI, fetal complications, association between BMI and pregnancy outcomes, association between birth weights with BMI were studied. The age of the subjects were in the range of 20 – 35 years. The mean age of the subjects in our study was 26 years. Frequency and percentage distribution was tabulated, 88.1 % of the subjects were term patients with gestational age 37- 40 weeks and 11.9 % of the subjects were preterm patients with gestational age less than 37 weeks. Frequency and percentage distribution is shown in the above table. 50 % of the subjects fell in the normal BMI group, 26% of the subjects fell in the overweight group, 9 % of the subjects fell in the obese group and 15 % of the women fell in the underweight group. Results were analyzed. It was seen that maximum percentage of LGA babies were born to obese women compared to women with normal BMI. Likewise maximum percentage of SGA babies were born to women in the underweight group. Pearson Chi square analysis was performed. It showed that there was a significant association between BMI and birth weight. (Table 2)

Table 1: Frequency and distribution of BMI at First Visit

BMI	No. of Patients
Normal	240
Over weight	118
Obese	34
Under weight	68
Total	500

Table 2: Association between BMI and Birth weight

BMI				Total
	Normal	LGA	SGA	
Normal	244	2	34	280
Over weight	100	2	16	118
Obese	20	6	8	34
Under weight	42	0	26	68
Total	406	10	84	500

Discussion

Obesity in women is one of the major public health concerns of the past century due to growing evidence of the negative impact on maternal and fetal outcomes of pregnancy. Our study found similar results to other studies indicating major pregnancy complications due to obesity, including gestational diabetes, hypertension, 10 C/S, fetal macrosomia and increased risk of later childhood obesity. Risks during pregnancy also include stillbirth and congenital anomalies. This study indicates that the incidence of macrosomic babies increased substantially in obese and overweight women, compared to women with a normal BMI. [1,7]

The initial guidelines by the IOM in 1930 recommended that pregnant women should gain 6.8 kg irrespective of weight status. Subsequently, with increasing prevalence of obesity and an increasing trend in birth of macrosomic infants, these guidelines were revised in 1990 and 2009. With overweight and obesity significantly contributing to the growing prevalence of large for gestational age infants and increasing the risk of pregnancy-related complications, the IOM published new guidelines in 2009. [8,9] The age of the subjects in the present study were in the range of 18–40 years. The mean age of the subjects was 25 years. It was seen that 17.4 % of the subjects showed a weight gain of 0 – 7 kg. 53 % of the subjects showed a weight gain of 8 – 13 kg during pregnancy. 29.6 % of the women showed a weight gain of more than 13 kg.

Majority of the women (55.3 %) in the study population belonged to the normal BMI group and the overweight and obese group together comprised as large as 31.2 %. This is of significance as with changing lifestyle, obesity is increasing rapidly especially in urban set ups and may become a major health problem in the future. A similar study done by Ihunnya O Frederick et al [10], observed that obese women gained more weight while underweight women gained less weight in pregnancy $p < 0.001$. In another study by J.E.Brown et al, results suggested that underweight women who gained less weight in pregnancy had a lower birth weight neonate and obese women delivered big babies. Therefore adequate weight gain is of critical importance during pregnancy, the deficiency or excess of which leads to adverse pregnancy outcomes. In the present study, it was seen that maximum percentage of LGA babies were born to obese women (17.6%) compared to women with normal BMI. Likewise maximum percentage of SGA babies were born to women in the underweight group (38.2%) when compared to other groups. Results showed that there was a significant association between lower BMI and low

birth weight and obesity and high birth weight. ($p < 0.001$).

Conclusion

In India, previously the problems during pregnancy were more related to low BMI but with changing lifestyle, obesity is increasing rapidly especially in urban set ups and may become a major health problem in the future. By performing this study it was possible to evaluate the association between BMI and its adverse effect on pregnancy outcome.

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