A Prospective Comparative Study to Assess the Impact of Maternal Body Mass Index on Obstetric Outcome

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Abstract

Background: The rising rate of obesity is a major public health concern in the developing countries like India very few females come for preconception counselling so estimation of prepregnancy weight record is not available. Women from rural area are not aware of their weights

Methods: Hospital based prospective comparative study was conducted on 75 women in each group including normal, high and low maternal BMI.

Result: The average weight gain during pregnancy in overweight category was 7.38±2.95 kg, in underweight category it was 6.29±3.12 kg while it was 8.31± 2.67 kg in normal BMI category. On comparing the weight gain in all the three groups, the difference was statistically highly significant (p = 0.0001).

Conclusion: Maternal BMI shows strong associations with pregnancy complications. Attempt should be made to prevent obesity in women of childbearing age and encourage weight loss to attain ideal weight before pregnancy.

Keywords: Obesity, weight gain, pregnancy.

Introduction

The rising rate of obesity is a major public health concern in the developing countries like India very few females come for preconception counselling so estimation of prepregnancy weight record is not available. Women from rural area are not aware of their weights.[1] so, considering this factors we decided to conduct this study as correlation of pregnancy BMI with maternal outcome. BMI provides a reliable indicator of body fat for most people and is used to screen for weight categories that may lead to health problems WHO describes obesity as one of the most blatantly visible, yet most neglected, public health problems that threaten to overwhelm both more and less developed countries.

Obesity is a major public health issue and as per WHO, it is a killer disease at par with HIV and malnutrition. Even in countries like India, significant proportion of overweight and obese coexists with the undernourished. Lifestyle modifications over the years have led to a more sedentary lifestyle. This is of global concern, as excess bodyweight is now the sixth important risk

factor contributing to disease worldwide and increased level of obesity may result in a decline in life expectancy in the future.[2]

Low maternal BMI showing imbalance between energy intake and energy expenditure, might be a general marker of minimal tissue reserve. A malnourished mother gives birth to an undernourished infant who fails to thrive.

Material and Methods

Study design: Hospital based prospective comparative study.

Study population: Women attending antenatal OPD in first trimester.

Sample size: 75 women in each group including normal, high and low maternal BMI in the hospital during the above said duration.

Sampling Method: convenience sampling

Inclusion Criteria

1.All pregnant women including those with normal, low and high BMI attending antenatal OPD in first trimester and not coming under exclusion criteria.

2. Singleton pregnancies

3. Patient willing to give consent

Exclusion Criteria

1. Pregnancies with multiple gestation like twins, triplets

2. All cases of pregnancies with chronic medical illness like diabetes, chronic hypertension, bronchial asthma, cancer or patient on any drug therapy.

3. Pregnancies associated with diagnosed congenital malformations and intrauterine dead fetus

Data Collection: After taking written and informed consent and fulfilling inclusion criteria, women attending antenatal OPD in first trimester were included in the study. Their weight was measured (in kilograms) without shoes. Subjects were made to stand erect on the floor barefoot with both ankles together and parallel to each other to note their height (in meters) with the head of the patient held in such a position that the line joining the tragus and outer canthus of eye were in a horizontal plane (Frankfurts Plane) such that the individual was standing straight next to the wall with the heels, buttocks, shoulders and occiput touching the wall. 3 comparative groups of 75 women each were studied.

Underweight group- 75 antenatal patients with low BMI (<18.5kg/m^2)

Normal weight group- 75 antenatal patients with normal BMI (18.5kg/m^2 – 24.99kg/m^2)

Overweight group- 75 antenatal patients with high BMI (equal to or >25kg/m^2)

Data Analysis

To collect required information from eligible patients, a pre-structured pre-tested proforma was used. Data was analyzed with the help of mean, standard deviation and p value was calculated using T test and chi square test using primer software.

Results

Table 1: Weight Gain during Pregnancy

Weight Gain during Pregnancy (kg)	Overweight	Normal Weight	Underweight
Mean	7.38	8.31	6.29
SD	2.95	2.67	3.12
p value	0.0001 (Highly Significant)		

Table no. 1 shows that in overweight category, average weight gain during pregnancy was 7.38±2.95 kg, in underweight category it was 6.29±3.12 kg while it was 8.31± 2.67 kg in normal BMI category. On comparing the weight gain in all the three groups, the difference was statistically highly significant (p = 0.0001).

Table 2: Incidence of Preeclampsia

Preeclampsia	Overweight		Normal Weight		Underweight	
	No.	%	No.	%	No.	%
Present	12	16.00	5	6.67	1	1.33
Absent	63	84.00	70	93.33	74	98.67
Total	75	100	75	100	75	100.00
p value	0.009 (Highly significant)					

Table no. 2 shows that preeclampsia complicated 16% of overweight pregnancies while it was 1.33% in underweight group and 6.67% in normal weight group. The difference was statistically highly significant (p = 0.009).

Table 3: Mode of Delivery

Mode of Delivery	Overweight		Normal Weight		Underweight	
	No.	%	No.	%	No.	%
Normal Vaginal Delivery	43	57.33	59	78.67	65	86.67
LSCS	30	40	15	20.00	10	13.33
Instrumental (Forceps/ Vacuum)	2	2.67	01	1.33	0	0.00
Total	75	100	75	100	75	100
p value	0.002 (Highly Significant)					

Significant

Table no. 2 shows that 57.33% patients in overweight group, 78.67% patients in normal weight group and 86.67% in underweight group had normal vaginal delivery. LSCS rate was higher in overweight group 40.00% as compared to 20% and 13.33% in normal weight and underweight group respectively. Instrumental delivery rate was also more in overweight group 2.67% as compared to normal weight 1.33% and 0% in underweight group. The difference was statistically highly significant (p=0.002).

Table 4: Incidence of Postpartum Hemorrhage

Postpartum Hemorrhage (PPH)	Overweight		Normal Weight		Underweight	
	No.	%	No.	%	No.	%
Present	7	9.33	3	4.00	1	1.33
Absent	68	90.67	72	96.00	74	98.67
Total	75	100	75	100	75	100
p value	> 0.05 (Not Significant)					

Table no. 4 shows that percentage of PPH in overweight group is 9.33% as compared to 4% in normal weight group and 1.33% in underweight group. The difference was statistically not significant (p> 0.05).

Discussion

The average weight gain during pregnancy in overweight category was 7.38±2.95 kg, in underweight category it was 6.29±3.12 kg while it was 8.31± 2.67 kg in normal BMI category. On comparing the weight gain in all the three groups, the difference was statistically highly significant (p = 0.0001). Less than or equal to 5 kg weight gain was much more in underweight (46.67%) as compared to normal (18.67%) and overweight (10.67%) group. This could be due to malnourishment, lack of adequate nutrition, minimal body reserves, lack of awareness, poverty, early age marriages which leads to less weight gain during pregnancy in underweight. Majority of women had weight gain in the range of 5.1 to 10 kg. Similar results were shown by previous studies [3,4]

Preeclampsia was more common in overweight group (16%) as compared to normal (6.67%) and underweight group (1.33%) in our study. The difference was statistically significant (p=0.009). It is because obesity is associated with low grade inflammation and endothelial activation. Endothelial activation plays an integral role in preeclampsia. In a study conducted by

sohinee Bhattacharya et al,[11] 14.7% of obese women developed pre-eclampsia.

PPH was more common in overweight group (9.33%) as compared to normal weight (4%) and underweight group (1.33%). The difference was however statistically not significant. This could be due to increased chances of instumental delivery in obese patients causing vaginal laceration as well as atonicity of uterus.

Conclusion

Maternal BMI shows strong associations with pregnancy complications. Attempt should be made to prevent obesity in women of childbearing age and encourage weight loss to attain ideal weight before pregnancy.

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