



A Prospective Comparative Study to Assess the Impact of Maternal Body Mass Index on Obstetric Outcome at SMS Medical College Jaipur, Rajasthan

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Abstract

Background- The prevalence of obesity is increasing steadily even in developing countries as economic prosperity has increased. In developing countries like India, overweight and obesity often co-exist with undernutrition.

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 was 7.36 kg in overweight category, 8.45 kg in normal weight category and 6.46 kg in underweight category. Postpartum complications like PPH were insignificantly higher in overweight category.

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- BMI, Obese, Maternal out come.

Introduction

Obesity has become a worldwide phenomenon cutting across regional and economic barriers. 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”.¹

Obesity is a “killer disease” at par with HIV and malnutrition according to WHO. The WHO estimates that in 2014, approximately 1.9 billion people worldwide were overweight and atleast 600 million adults were obese.²

The prevalence of obesity is increasing steadily even in developing countries as economic prosperity has increased. In developing countries like India, overweight and obesity often co-exist with undernutrition.³

Comparison of two major studies conducted by NFHS-2 (National Family Health Survey) in 1998-1999 and NFHS-3 in 2005-2006 shows that the prevalence of obesity among Indian women has elevated from 10.6 to 12.6%.⁴

The Body Mass Index (BMI) is the most commonly used measure for monitoring prevalence of obesity at population level. BMI or Quetelet index is a measure of human body fat based on an individual's weight and height which was devised between 1830 and 1850 by the Belgian polymath Adolphe Quetelet during the course of developing “social physics”.⁵

BMI ≥ 30 is defined as obesity according to WHO & NIH.⁶

Overweight and obesity in pregnant women are associated with increased risk of miscarriages, gestational diabetes, thromboembolism, hyperlipidemia, gestational hypertension and preeclampsia, recurrent infections and prolonged pregnancy.

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: Random 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 ($<18.5\text{kg/m}^2$)

Normal weight group- 75 antenatal patients with normal BMI ($18.5\text{kg/m}^2 - 24.99\text{kg/m}^2$)

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

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. Distribution of cases according to weight gain during pregnancy

Weight Gain during Pregnancy (kg)	Overweight	Normal Weight	Underweight
Mean	7.36	8.35	6.46
SD	2.94	2.72	3.00
p value	0.01 (Significant)		

Table no. 1 shows that in overweight category, average weight gain during pregnancy was 7.36 ± 2.94 kg, in underweight category it was 6.46 ± 3.00 kg while it was 8.35 ± 2.72 kg in normal BMI category. On comparing the weight gain in all the three groups, the difference was statistically highly significant ($p = 0.01$).

Table 2. Distribution of cases according to incidence of preeclampsia

Preeclampsia	Overweight		Normal Weight		Underweight	
	No.	%	No.	%	No.	%
Present	13	17.33	6	8.00	2	2.67
Absent	62	82.67	69	92.00	73	97.33
Total	75	100	75	100	75	100.00
p value	0.001 (Highly significant)					

Table no. 2 shows that preeclampsia complicated 17.33% of overweight pregnancies while it was 2.67% in underweight group and 8.00% in normal weight group. The difference was statistically highly significant (p = 0.001).

Table 3. Distribution of cases according to mode of delivery

Mode of Delivery	Overweight		Normal Weight		Underweight	
	No.	%	No.	%	No.	%
Normal Vaginal Delivery	45	60.00	59	78.67	66	88.00
LSCS	30	40.00	16	21.33	9	12.00
Total	75	100	75	100	75	100
p value	0.001 (Highly Significant)					

Table no. 3 shows that 60% patients in overweight group, 78.67% patients in normal weight group and 88% in underweight group had normal vaginal delivery. LSCS rate was higher in overweight group 40.00% as compared to 21.33% and 12% in normal weight and underweight group respectively. The difference was statistically highly significant (p=0.001).

Table 4. Distribution of cases according to 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 was 7.36±2.94 kg in overweight category while it was 8.35 ±2.72 kg in normal weight category and 6.46±3.00 kg in underweight category. The difference was statistically highly significant (p=0.01). 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 ^{7,8}

Preeclampsia was more common in overweight group (17.33%) as compared to normal (8.00%) and underweight group (2.67%) in our study. The difference was statistically significant (p=0.001). 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,⁹ 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 instrumental 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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