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Original Research Article

A PROSPECTIVE COMPARATIVE STUDY TO ASSESS THE IMPACT OF MATERNAL BODY MASS INDEX ON OBSTETRIC OUTCOME

Dr Gajendra Singh Verma[1], Dr Uma Kumari Meena[2], Dr Sadhna Mathur[3], Dr Komal Yadav[4]

[1]Associate professor, Department of Obstetrics and Gynecology, National Institute of Medical Sciences & Research, NIMS University, Jaipur
[2]Assistant professor, Department of Obstetrics and Gynecology, National Institute of Medical Sciences & Research, NIMS University, Jaipur
[3]Professor & HOD, Department of Obstetrics and Gynecology, National Institute of Medical Sciences & Research, NIMS University, Jaipur
[4]Resident doctor, Department of Obstetrics and Gynecology, National Institute of Medical Sciences & Research, NIMS University, Jaipur

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Corresponding author: Dr Uma Kumari Meena
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Abstract
Background: To assess the impact of BMI on pregnancy outcome.
Methods: Hospital based prospective comparative study was conducted on 50 women in each group including normal, high and low maternal BMI.
Result: Preeclampsia complicated 16% of overweight pregnancies while it was 2.00% in underweight group and 10.00% in normal weight group. The difference was statistically highly significant (p = 0.01).
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 is a significant contributor to maternal deaths and women with a high BMI remain over-represented in all maternal deaths.
Obese pregnant women also have a higher risk of a number of pregnancy complications, including miscarriage, pre-eclampsia, gestational diabetes, fetal macrosomia and stillbirth. [1]

Maternal obesity can have a direct influence on mode of birth and postnatal morbidity. Obese women are more likely to receive medical interventions, including caesarean delivery and general anaesthesia. The rate of induction of labour is reported to be doubled for obese pregnant women, compared to non-obese women. Delay in the first stage of labour is significantly more common, with the risk ranging from 1.5 times to 3 times more likely. Obese women also have a significantly increased risk of caesarean section of between 2-fold to more than 3-fold, with the most common reason for caesarean section being delay during the first stage of labour, even after augmentation with oxytocin.[2]

Caesarean section also carries additional risks for obese women and has a considerable impact on postnatal morbidity, with maternal obesity being an independent risk factor for post-caesarean infections.

The Institute of Medicine recommends the following ranges of weight gain during pregnancy for American women:

- Pregnant women who are underweight (BMI of less than 18.5) should gain 28 to 40 pounds.
- Pregnant women at a normal weight (BMI of 18.5 to 24.9) should gain 25 to 35 pounds.
- Overweight pregnant women (BMI of 25 to 29.9) should gain 15 to 25 pounds.
- Obese pregnant women (BMI greater than 30) should limit weight gain to 11 to 20 pounds.[3]

Material and Methods

Study design: Hospital based prospective comparative study.

Study population: women attending antenatal OPD in first trimester.

Sample size: 50 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 50 women each were studied.

Underweight group- 50 antenatal patients with low BMI (<18.5kg/m^2)
Normal weight group- 50 antenatal patients with normal BMI (18.5kg/m^2 – 24.99kg/m^2)
Overweight group- 50 antenatal patients with high BMI (equal to or >25kg/m^2)

Data Analysis:

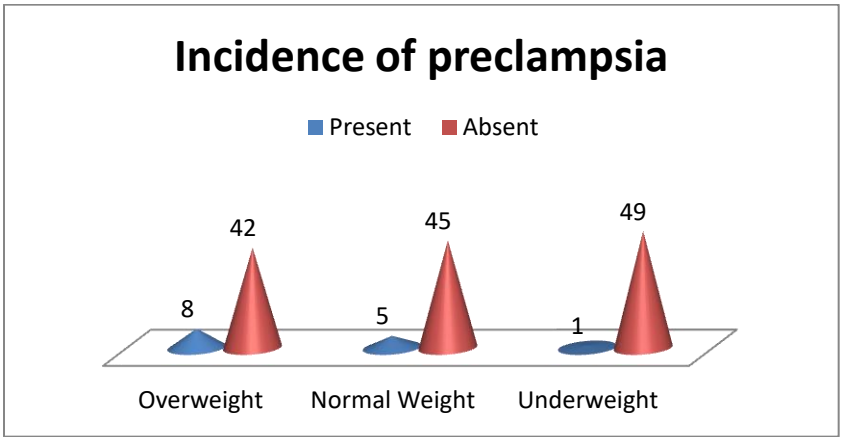
To collect required information from eligible patients, a pre-structured pre-tested proforma was used. Data was analyzed with the help of mean, standard deviation and p value was calculated using T test and chi square test using primer software.

Results

Table 1: Distribution of cases according to weight gain during pregnancy

Weight Gain during Pregnancy (kg)	Overweight	Normal Weight	Underweight	p-value
Mean	7.42	8.31	6.39	0.001
SD	2.98	2.63	3.12	

Table no. 1 shows that in overweight category, average weight gain during pregnancy was 7.42±2.98 kg, in underweight category it was 6.39±3.12 kg while it was 8.31± 2.63 kg in normal BMI category. On comparing the weight gain in all the three groups, the difference was statistically highly significant (p = 0.0001).



Preeclampsia complicated 16% of overweight pregnancies while it was 2.00% in underweight group and 10.00% in normal weight group. The difference was statistically highly significant (p = 0.01).

Table 2: Distribution of cases according to mode of delivery

Mode of Delivery	Overweight		Normal Weight		Underweight	
	No.	%	No.	%	No.	%
Normal Vaginal Delivery	30	60.00	793	78.00	44	88.00
LSCS	20	40.00	11	22.00	6	12.00
Total	50	100	50	100	50	100
p value	0.01 (Highly Significant)					

Significant

Table no. 4 shows that 60% patients in overweight group, 78.00% patients in normal weight group and 88.00% in underweight group had normal vaginal delivery. LSCS rate was higher in overweight group 40.00% as compared to 22.00% and 12% in normal weight and underweight group respectively.

Table 3: Distribution of cases according to incidence of postpartum hemorrhage

Postpartum Hemorrhage (PPH)	Overweight		Normal Weight		Underweight	
	No.	%	No.	%	No.	%
Present	5	10.00	2	4.00	1	2.00
Absent	45	90.00	48	96.00	49	98.00
Total	50	100	50	100	50	100
p value	> 0.05 (Not Significant)					

Table no. 3 shows that percentage of PPH in overweight group is 10.00% as compared to 4.00% in normal weight group and 2.00% in underweight group. The difference was statistically not significant (p> 0.05).

Discussion

Women who are overweight or obese during pregnancy face several possible health risks, including high blood pressure, gestational diabetes, and an increased chance of needing a Cesarean delivery.[4]

The 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. In our study the average weight gain in overweight category, pregnancy was 7.42±2.98 kg, in underweight category it was 6.39±3.12 kg while it was 8.31± 2.63 kg in normal BMI category. On comparing the weight gain in all the three groups, the difference was statistically highly significant (p = 0.0001). Similar results were shown by previous studies [5,6]

In our study preeclampsia complicated 16% of overweight pregnancies while it was 2.00% in underweight group and 10.00% in normal weight group. The difference was statistically highly significant (p = 0.01).

Most common cause of preeclampsia in obesity was low grade inflammation and endothelial activation. Endothelial activation plays an integral role in preeclampsia. In a study conducted by Bhattacharya et al,[7] 14.7% of obese women developed pre-eclampsia.

PPH in overweight group is 10.00% as compared to 4.00% in normal weight group and 2.00% in underweight group. 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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