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ORIGINAL RESEARCH

A Hospital Based Observational Study to Evaluate the Effect of Prelabour Body Mass Index on the Mode of Delivery

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ABSTRACT

Background: Pre-pregnancy obesity is strongly associated with certain pregnancy complications and perinatal conditions. Placental structure and function are important for maternal and fetal health both during and after pregnancy. The aim of this study to evaluate the effect of prelabour body mass index on the mode of delivery.

Materials and Methods: An hospital-based prospective study involving pregnant women at term (33-37 weeks) admitted to gynaecology ward in district hospital Dholpur, Rajasthan, India during one-year period. A total of 120 cases in the age group of 18-40 years included in the study. Patients were classified into 3 categories based on their first trimester BMI. Category I included normal women (BMI 20- 24.9 kg/m^2), Category II included overweight women (BMI 25-29.9 kg/m^2) and detailed history and clinical examination including general physical, obstetrical and systemic examinations. Category III included obese women (BMI >30 kg/m^2). Data were analysed statistically by Chi-square test of the dependence of variables and a p-value of less than 0.05 was considered as statistically significant.

Results: Under anthropometric parameters, the differences in mean age, mean weight, mean height and mean BMI among the three categories women were statistically significant (p<0.001), In this study, it was observed that overweight and obese women were slightly older and short in stature when compared with women with normal BMI. There was increased incidence of antepartum complications in Category III women as compared to Category II and Category I women. The difference in the onset of labour as well as mode of delivery among the three categories was statistically significant (p<0.05*).**

Conclusion: As obesity is a modifiable risk factor all attempts should be made to maintain a normal BMI in women of childbearing age. Pre–pregnancy counselling, health programme and appropriate multidisciplinary management should be done.

Keywords: Obesity, BMI, Pregnancy, Maternal Outcome.

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INTRODUCTION

The incidence of obesity has increased to pandemic proportions over the last 20 years. Obesity is a chronic illness which is associated with metabolic disease, nutritional deficiency, musculoskeletal complications and carcinomas. These obesity-related health issues extent to pregnancy where they are responsible for producing a variety of medical and obstetric complications resulting in an increased incidence of maternal and fetal adverse outcomes.[1]

Obesity constitutes a major public health issue, and can be characterized as an epidemic, that does not discriminate gender, age or socioeconomic status.[2] It can be seen as the first wave of non-communicable diseases called 'new world syndrome' creating an enormous socioeconomic and public health burden in developed and also in developing countries.[3] The World Health Organization has described obesity as one of the most blatantly visible, yet most neglected, public health issue and as per 'WHO' it is a killer disease at par with HIV and malnutrition.[4] This is a global concern, as excess body weight is 6thimportant contributing factor worldwide and increased level of obesity may result in a decline in life expectancy in the future.[5] The proportion of pregnant women suffering from a high BMI has also increased rapidly during the same time period. Obesity is a growing problem in the Asian subcontinent with Indians having increased propensity of developing obesity related complications like diabetes and hypertension later in life, notably at much lower levels of BMI than western countries.[6]

Lifestyle modifications over the years have led to a more sedentary life style. Obesity in pregnancy is associated with an increased risk of a number of serious adverse outcomes including miscarriage, fetal congenital anomaly, thromboembolism, gestational diabetes, pre-eclampsia, dysfunctional labour, increase caesarean-section rate, post-partum haemorrhage, wound infection, still births, neonatal deaths and lower breast feeding rate.[7] 2 to 3 fold increased risk of caesarean delivery for both primi and multi gravidas is reported in India.[5] It is one of the most common risk factor for maternal and fetal morbidity and mortality. As the obstetrical outcome is significantly altered due to obesity, we can improve maternal outcome by overcoming obesity.

As obesity is a modifiable risk factor, pre-conceptional counselling creating awareness regarding health risk associated with obesity should be encouraged and obstetrical complications can be reduced.[8] Obesity in pregnancy is now one of the most important challenges in obstetrical care. Pre pregnancy obesity is strongly associated with certain pregnancy complications and perinatal conditions. Therefore, these complications implicate the need for pre-pregnancy counselling and weight loss in these groups of women.[9]

Birth weight is an important determinant of infant's wellbeing.[10] Several factors such as mother's genetic characteristics, socio-cultural, demographic, behavioral factors, pre pregnancy Body Mass Index and gestational weight gain influence on pregnancy and its outcome.[11] High neonatal mortality being seen in small for gestational age is a major predictor of neonatal mortality and morbidity. Infants too large for gestational age also experience higher perinatal and a long-term health risk.[12]

The BMI is calculated as weight in kilograms divided by the height in meters squared Categories of BMI are as follows: BMI of 20-24.9 kg/m^2 - normal, BMI of 25-29.9 kg/m^2 - overweight, and BMI of >30 kg/m^2 -obese.[13] The obese women when compared with women with a normal BMI have a greater risk of medical diseases during pregnancy.[14] The mechanism appears to be related to the endocrine milieu associated with obesity (increased levels of insulin, androgens and leptin).[15] Additionally, the nonspecific marker of inflammation, C-reactive protein is raised.[16]

Chronic inflammatory process associated with obesity extends to the placenta during pregnancy, with recently described direct adverse fetal effects.[17] Gestational diabetes due to insulin resistance, eclamptic toxaemia, venous thromboembolism, preterm labour and respiratory distress syndrome are all associated with raised markers of inflammation both in maternal serum and placental tissue in obese women.[18]

Placental structure and function are important for maternal and fetal health both during and after pregnancy. Studies have revealed that abnormal placental growth is associated with adverse pregnancy outcomes. Furthermore, abnormal placental weight is correlated with chronic diseases in later life such as cardiovascular disease, hypertension and diabetes. Thus,

placental weight estimation is an important assessment in parturient mother.[19] The aim of this study to evaluate the effect of prelabour body mass index on the mode of delivery.

MATERIALS & METHODS

A hospital-based prospective study involving pregnant women at term (33-37 weeks) admitted to gynaecology ward in district hospital Dholpur, Rajasthan, India during one-year period. A total of 120 cases in the age group of 18-40 years included in the study.

Inclusion criteria

- Primigravida and multigravida
- Singleton pregnancy
- Gestational age (33-37 weeks) admitted to labour ward.
- Longitudinal lie, cephalic presentation.

Exclusion Criteria

- Multiple gestation
- Women<18 years
- Medical complications like, gestational diabetes mellitus, hypertensive diseases, heart diseases and thyroid disorders.

Methods

On admission, routine data such as obstetric, menstrual, medical, surgical, personal and family history noted. Maternal weight, height and pre pregnancy BMI (Based on Antenatal records) calculated. Patients were classified into 3categories based on their first trimester BMI. Category I included normal women (BMI 20- 24.9 kg/m^2), Category II included overweight women (BMI 25-29.9 kg/m^2) and detailed history and clinical examination including general physical, obstetrical and systemic examinations. Category III included obese women (BMI >30 kg/m^2).

Height is measured using a wall mounted digital meter stick to the nearest 0.1cm with women standing erect in her bare feet.

Weight is measured digitally to the nearest 0.1kg with the women in light clothing 0.5kg was excluded because of clothing.

Placental weight is measured by a small weighing machine kept in labour room and operation theatre.

Then labour will be monitored until delivery. The birth outcome will be studied for each group, birth weight and placental weight noted.

Statistical analysis:

Results were expressed in numbers, percentage and mean±standard deviation. Data were analysed statistically by Chi-square test of the dependence of variables and a p-value of less than 0.05 was considered as statistically significant.

RESULTS

In the present study, 120 singleton pregnant women were equally distributed into three categories according to their BMI. In Category I (BMI 20-24.9 kg/m^2), mean age of normal women was 24.38 years; in Category II (BMI 25- 29.9 kg/m^2), mean age of overweight women was 25.12 years; and in Category III (BMI >30 kg/m^2), mean age of obese women was 26.24 years. The difference in the mean age was statistically significant ($p<0.001$**). Similarly, the difference in the mean weight of Category I (55.79 kg), Category II (63.24 kg) and Category III (75.82 kg) women was statistically significant ($p<0.001$**). Even the

difference in mean height of women in Category I (154.70 cm), Category II (153.45 cm) and Category III (152.82) was statistically significant ($p<0.001$*). The difference in mean BMI of women in Category I (23.24 kg/m^2), Category II (27.52 kg/m^2) and Category III (33.25 kg/m^2) was also statistically significant ($p<0.001$**) [Table 1].

There was increased incidence of antepartum complications in Category III women as compared to Category II and Category I women. The difference in the occurrence of pre-eclampsia among the three categories was statistically significant ($p<0.05$*). Similarly, the differences in the incidence of eclampsia as well as that of gestational diabetes mellitus among the three categories was statistically significant ($p<0.05$* for each) [Table 2].

The difference in the onset of labour as well as mode of delivery among the three categories was statistically significant ($p<0.05$*) as shown in [Table 3 & 4].

Table 1:The comparison of mean value of demographic variables in between groups

Demographic variables	Category I(BMI 20- 24.9 kg/m^2) (N=40)	Category II(BMI 25-29.9 kg/m^2) (N=40)	Category III(BMI>30 kg/m^2) (N=40)	P-value
Age (yrs) (Mean±SD)	24.38±4.27	25.12±5.68	26.24±4.77	<0.001**
Weight (kg) (Mean±SD)	55.79±9.33	63.24±10.57	75.82±12.23	<0.001**
Height (cm) (Mean±SD)	154.70±15.24	153.45±16.33	152.83±13.40	<0.001**
BMI (kg/m^2) (Mean±SD)	23.24±1.58	27.52±1.97	33.25±1.66	<0.001**

Table 2: Antepartum complications in three categories

Antepartum complications	Category I (BMI 20- 24.9 kg/m2) (N=40)	Category II (BMI 25-29.9 kg/m2) (N=40)	Category III (BMI >30 kg/m2) (N=40)	P-value
Pre-eclampsia	1	5	8	<0.05*
Eclampsia	0	0	2	<0.05*
GDM	0	1	2	<0.05*

Table 3: Onset of labour in three categories

Onset of labour	Category I (BMI 20- 24.9 kg/m^2) (N=40)	Category II (BMI 25-29.9 kg/m^2) (N=40)	Category III (BMI >30 kg/m^2) (N=40)	P-value
Spontaneous	31	29	24	<0.05*
Induced	8	10	15	
Elective LSCS	1	1	1	

Table 4: Onset of labour in three categories

Mode of delivery	Category I (BMI 20- 24.9 kg/m^2) (N=40)	Category II (BMI 25-29.9 kg/m^2) (N=40)	Category III (BMI >30 kg/m^2) (N=40)	P-value
Vaginal	32	26	22	<0.05*
Caesarean	7	13	15	
Instrumental	1	1	3	

DISCUSSION

Under anthropometric parameters, the differences in mean age, mean weight, mean height and mean BMI among the three categories women were statistically significant ($p<0.001$**), In this study, it was observed that overweight and obese women were slightly older and short in stature when compared with women with normal BMI. The results were consistent with Bhushan N et al,[20] compared the association of maternal age with BMI with pregnancy outcomes. It was found that more than 30 years with over-weight and obesity are related to adverse obstetric outcome.

In the present study the risk of pre-eclampsia increased significantly with the increase in BMI ($p=0.001$). Sahu et al, Hincz et al and Srivastava R et al also found that obese women had a significant risk for pre-eclampsia ($p=0.004$, $p<0.05$ & $p<0.001$ respectively).[21-23]

Risk of eclampsia increased significantly with the increase in BMI ($p<0.05$) in the present study with a respective incidence of 5%, 0% and 0% in obese, overweight and normal BMI categories. Jared et al found the incidence of eclampsia to be 1.2%, 0.8% and 0.5% in obese, overweight and normal BMI women respectively.[24]In the present study, the risk of induction of labor increased significantly with the increase in BMI ($p=0.01$). Kiran et al also found an increased risk of induction of labor in obese women (OR 1.6; CI 1.3-1.9).[25] Sahu et al also found a significantly higher incidence of induction of labor in obese women ($p<0.05$).[21]

In the present study, the risk of caesarean sections and instrumental deliveries increased significantly with increase in BMI ($p<0.05$*). Sahu et al,[21] and Hincz et al,[22] also reported a significantly higher risk for caesarean delivery in these women ($p=0.01$).[20,21] Similarly, Srivastava Ret al. found a significant risk of caesarean and instrumental deliveries in obese women.[23]

CONCLUSION

As obesity is a modifiable risk factor all attempts should be made to maintain a normal BMI in women of childbearing age. Pre–pregnancy counselling, health programme and appropriate multidisciplinary management should be done. A general awareness regarding weight control, food habits and lifestyle modification is required as there are increasing trends of being overweight and obese both in developing as well as developed nations.

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