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ORIGINAL RESEARCH

Assessment Of Effect Of Body Mass Index On Fetal Outcome In Pregnancy

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ABSTRACT

Background: To assess effect of body mass index on fetal outcome in pregnancy.

Materials and Methods: One hundred ten first trimester women were selected. Parameters such as BMI, gestational age at delivery (in weeks), birth weight (in kg) APGAR Score, meconium- stained liquor, NICU admission etc. was recoded**.**

Results: There were 30 underweight, 40 normal and 40 overweight patients. The difference was non- significant (P> 0.05). The mean APGAR score 1t 1 minute in underweight patients was 6.8, in normal was 6.2 and in overweight patients was 6.4. At 5 minutes was 8.9 in underweight, 8.7 in normal and 8.4 in overweight patients. The difference was non- significant (P> 0.05). 11% underweight and 34% overweight required NICU admission. The difference was significant (P< 0.05). 12% underweight and 38% overweight had meconium- stained liquor. The difference was significant (P< 0.05). 76% underweight, 91% normal and 100% overweight had >36 weeks gestational age. 40% underweight, 50% normal and 45% overweight had 2.5- 3 kgs birth weight. Apgar score at 1 min was seen in 90%, 92% and 88%, NICU admission in 11%, 0% and 34% and meconium- stained liquor in 12%, 14% and 38% underweight, normal and overweight babies respectively. The difference was significant (P< 0.05).

Conclusion: Underweight and obese mothers had increased risk of adverse perinatal outcome.

Keywords: Obesity, body mass index, Pregnancy.

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INTRODUCTION

The increasing incidence of obesity among women worldwide has become one of the most significant public health concerns.[1] High maternal body mass index (BMI) is related to adverse maternal pregnancy outcomes such as pre-eclampsia, eclampsia, pre- and post-term delivery, induction of labor, macrosomia, caesarean section, and postpartum hemorrhage.[2] BMI does not measure body fat directly, but research has shown that BMI correlates to direct measures of body fat, such as underwater weighing and dual energy x-ray absorptiometry (DXA). BMI can be considered an alternative for direct measures of body fat.[3]

The most favourable outcome of pregnancy in terms of low- birth weight infants and perinatal death is associated with a moderate rate of weight gain.[4] This can be accomplished by recording her BMI in her each antenatal visit and regulating her diet and therapeutic supplement as

required. To promote improved pregnancy outcome, low BMI women should be encouraged to obtain their ideal weight for height by proper diet.[5] When they are found to be overweight at their first antenatal visit (booking weight), outcome can be improved by avoiding them to gain adequate weight antenataly by proper diet which will reduce incidence of FGR and preterm labour.[6] We performed this study to assess effect of body mass index on fetal outcome in pregnancy.

MATERIALS & METHODS

One hundred ten first trimester women were selected after obtaining their written consent. Ethical approval from ethical review committee was obtained.

Data such as name, age, gender etc. was recorded. A thorough examination was performed. Weight was measured by digital weighing machine calibrated to the accuracy of ± 50gm. Height was measured by height scale. BMI was calculated using formula: weight / height^2. Parameters such as gestational age at delivery (in weeks), birth weight (in kg) APGAR Score, meconium- stained liquor, NICU admission etc. was recoded. The results were compiled and subjected for statistical analysis using Mann Whitney U test. P value less than 0.05 was set significant.

RESULTS

Table I Patients distribution based on BMI

BMI	Number	P value
Underweight	30	0.82
Normal	40	
Overweight	40	

There were 30 underweight, 40 normal and 40 overweight patients. The difference was non-significant (P> 0.05) (Table I).

Table II Assessment of APGAR score in different BMI groups

APGAR score	BMI	Mean	P value
At 1 minute	Underweight	6.8	0.12
	Normal	6.2	
	Overweight	6.4	
At 5 minutes	Underweight	8.9	0.35
	Normal	8.7	
	Overweight	8.4	

The mean APGAR score 1t 1 minute in underweight patients was 6.8, in normal was 6.2 and in overweight patients was 6.4. At 5 minutes was 8.9 in underweight, 8.7 in normal and 8.4 in overweight patients. The difference was non- significant (P> 0.05) (Table II).

Table III NICU admission

BMI	Yes	No	P value
Underweight	11%	89%	0.04

Normal	0	100%	
Overweight	34%	66%	

11% underweight and 34% overweight required NICU admission. The difference was significant (P< 0.05) (Table III).

Table IV Meconium- stained liquor

BMI	Yes	No	P value
Underweight	12%	88%	0.04
Normal	14%	86%	
Overweight	38%	62%	

12% underweight and 38% overweight had meconium- stained liquor. The difference was significant (P< 0.05) (Table IV).

Table V Assessment of fetal outcomes

Parameters	Variables	Underweight	Normal	Overweight	P value
Gestational age at delivery (in weeks)	32	4%	0	0	0.02
	32-34	4%	2%	0	
	34-36	16%	7%	0	
	>36	76%	91%	100%	
Birth weight (in kg)	2-2.5	30%	34%	36%	0.04
	2.5-3	40%	50%	45%	
	>3	30%	14%	19%	
Apgar score at 1 min	<5	10%	8%	12%	0.01
	>5	90%	92%	88%	
NICU Admission	Yes	11%	0	34%	0.05
	No	89%	100%	66%	
Meconium-stained liquor	Yes	12%	14%	38%	0.03
	No	88%	86%	62%	

76% underweight, 91% normal and 100% overweight had >36 weeks gestational age. 40% underweight, 50% normal and 45% overweight had 2.5- 3 kgs birth weight. Apgar score at 1 min was seen in 90%, 92% and 88%, NICU admission in 11%, 0% and 34% and meconium-stained liquor in 12%, 14% and 38% underweight, normal and overweight babies respectively. The difference was significant (P< 0.05) (Table V).

DISCUSSION

BMI provides simple numeric measure of a person's fatness or thinness. Various Studies observed that both being overweight and underweight predisposes women to complicated pregnancies.[7] Obesity has assumed epidemic proportions in the developed world and the UK is leading Europe with 57% of men and 48% of women being overweight.[8] An increased association of morbidity and mortality with obesity is well established in both pregnant and non-pregnant women.[9] Maternal obesity has been reported as a risk factor for various antenatal, intrapartum, postpartum and neonatal complications such as postdates, induction of labour,

macrosomia, shoulder dystocia, prolonged duration of labour, increased blood loss, caesarean section rates and neonatal admissions.[10] We performed this study to assess effect of body mass index on fetal outcome in pregnancy.

Our results showed that there were 30 underweight, 40 normal and 40 overweight patients. Chaudhary R et al[11] found that the mean baby birth weight for whole study group was 2.807 kg. Birth weight found to be related to maternal BMI and mother with low BMI have babies with low birth weight and vice versa.14% of babies born to mothers belonging to underweight BMI group required NICU admission due to reasons like meconium staining, low birth weight, birth asphyxia. 10% babies born to mothers who were overweight were admitted in NICU while 0% of babies born to women with normal BMI got admitted in NICU.

Our results showed that the mean APGAR score 1t 1 minute in underweight patients was 6.8, in normal was 6.2 and in overweight patients was 6.4. At 5 minutes was 8.9 in underweight, 8.7 in normal and 8.4 in overweight patients. Yazdani et al[12] enrolled 1000 pregnant women. Women with an above-normal body mass index had a higher incidence of pre-eclampsia, induction of labor, caesarean section, pre-term labor, and macrosomia than women with a normal body mass index (controls). There was no significant difference in the incidence of post-term delivery between the control group and other groups.

Our results showed that 11% underweight and 34% overweight required NICU admission. Kiran et al[13] assessed the increased risk of adverse outcomes in labour and fetomaternal morbidity in obese women (BMI > 30). They reported an increased risk of postdates, 1.4 (1.2-1.7); induction of labour, 1.6 (1.3-1.9); caesarean section, 1.6 (1.4-2); macrosomia, 2.1 (1.6-2.6); shoulder dystocia, 2.9 (1.4-5.8); failed instrumental delivery, 1.75 (1.1-2.9); increased maternal complications such as blood loss of more than 500 mL, 1.5 (1.2-1.8); urinary tract infections, 1.9 (1.1-3.4); and increased neonatal admissions with complications such as neonatal trauma, feeding difficulties and incubator requirement.

We found that 12% underweight and 38% overweight had meconium stained liquor. We observed that 76% underweight, 91% normal and 100% overweight had >36 weeks gestational age. 40% underweight, 50% normal and 45% overweight had 2.5- 3 kgs birth weight. Apgar score at 1 min was seen in 90%, 92% and 88%, NICU admission in 11%, 0% and 34% and meconium stained liquor in 12%, 14% and 38% underweight, normal and overweight babies respectively. Nohr et al[14] investigated whether, within BMI categories, the GWG with the lowest risks to mother and infant varied with parity and to describe these risks in short (<160 cm), young (<20 y), and smoking women. Of 27,030 primiparous and 31,407 multiparous women with term births was divided into 6 categories (<5, 5-9, 10-15, 16-19, 20-24, and > or =25 kg). Population-based registers provided information about birth outcomes. The risk of SGA decreased with increasing GWG in both parity groups, but SGA risk <10% was reached at 2-3 GWG categories lower in multiparae than in primiparae. An excess risk of LGA was present only in obese primiparae and multiparae, but the PPWR risk increased with increasing GWG irrespective of BMI and parity. Young primiparae had better outcomes than other primiparae. Short women had a higher risk of emergency caesarean delivery that varied minimally with GWG. Smokers had a higher SGA risk and had a PPWR risk similar to that of non-smokers.

CONCLUSION

Underweight and obese mothers had increased risk of adverse perinatal outcome.

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