Original Article

Impact of high maternal body mass index on length of gestation and maternal delivery outcomes

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Objective: To evaluate the affect of raised BMI on pregnancy outcome in terms of prolonged pregnancy, need for induction of labor and mode of delivery.

Methodology: Study included 100 overweight/obese and 100 non-obese patients. Ones with pregnancies prolonged beyond their expected date of delivery were induced at 41^{+1} weeks of gestation. Data was analyzed by using SPSS 16. Both groups were compared by using chi-square test.

Results: Among overweight/obese group, 32% had prolonged pregnancy and were induced for labor whereas this percentage among non-obese group was 25%. Among overweight/obese ladies, spontaneous vaginal delivery occurred after induction of labor (IOL) in 59.38% cases, assisted vaginal delivery occurred in 9.38% cases and C-section was done in 31.25% cases, whereas among non-obese ladies, these percentages were 68%, 8% and 24%, respectively. In overweight/obese group 68% had spontaneous onset of labor as compared to 75% among non-obese group. Out of these 68% overweight/obese females, spontaneous vaginal delivery occurred in 60.3% cases, assisted vaginal delivery in 13.2% cases and 26.5% had C-sections. Out of 75% non-obese females, these percentages were 70.7%, 9.3% and 20% respectively.

Conclusion: The risk of cesarean delivery did not increase significantly in overweight/obese group and induction of labor was a safer management option in this group. (Rawal Med J 2013;38:279-282).

Key Words: Obesity, prolonged pregnancy, Body Mass Index.

INTRODUCTION

Obesity is an emerging global public health issue. Worldwide its prevalence (BMI>30) is 15-20%, accounts for 27% of total health care cost. In UK 28% of pregnant women are overweight and 11% are obese,[1] while in USA the incidence is 18.5-38.3%. Obesity is not only risk to general health e.g. HTN, coronary artery disease, thromboembolism and metabolic disorders like diabetes mellitus, but also it has impact on pregnancy resulting in increase maternal, intrapartum and post partum maternal, fetal and neonatal complications. In obese pregnant ladies there is increased chances of miscarriages, hypertensive disorders of pregnancy, gestational diabetes mellitus, thromembolism, infections, sleep apneas, prolonged labor,[5] increased risk of interventions e.g. induction of labor, C-section,[3] postpartum hemorrhage,[2] wound infection,[4] and failure of epidural analgesia.[7]

Perinatal complications seen in overweight pregnant ladies include birth defects especially neural tube defects, IUGR, still births, neonatal deaths[3] and need for intensive care admissions.[3] Thus, it is suggested that all pregnancies in obese ladies should be labeled and managed as high risk and should be evaluated by senior obstetricians and anesthetists for pregnancy and labour.[3]

Obesity is strongly associated with prolonged pregnancy which may be due to increase leptin levels which have physiologic inhibitory effect on uterine contractility leading to postdates pregnancies and dysfunctional labour even when labour starts. NICE recommends induction of labour at 41-42weeks and RCOG at 41^{+1} week of gestation to decrease perinatal morbidity and mortality. However, induction is associated with increased risk of c-section and its associated complications e.g. hemorrhage, infection, thromboembolism, anesthesia related

complications which multiplies if patient undergoing c-sections is obese.[2] The aim of this study was to compare the data of our population with international research work.

METHODOLOGY

This study was carried out at Department of obstetrics and gynecology, CMH, Lahore, Pakistan from May 2011 to July 2012 and included 100 overweight/obese pregnant ladies with BMI of 25-35 kg/m^2 and 100 non-obese ladies with BMI of 18-24.9kg/m^2 at booking. All patients included were booked in first trimester and were followed till delivery. Those who had pregnancies prolonged beyond their expected date of delivery were induced at 41+1weeks of gestation. Patients with BMI of 18-24.9kg/m^2 in non-obese group and with BMI of 25-35kg/m^2 in overweight/obese group with age between 25-35years, parity 1-4 and Height >5feet were included. The BMI was calculated at booking in 1st trimester. Women with late booking >14weeks of gestation, twin pregnancies/multiple pregnancy, pregnancies with medical disorders, placenta previa, APH, preterm labor and those with H/o previous c-section were excluded from the study.

Antenatal records were reviewed at time of admission to labor room including height and weight (at booking) to calculate BMI, any associated medical disorders, past obstetrical history and review of investigation especially booking scan to establish the gestation. Systemic and obstetrical examination was done at 41+1weeks of gestation with vaginal pessary prostaglandin E_2 3mg, 2 doses, 6 hours apart. Mode of delivery recorded in all patients. Data were analyzed using SPSS v 16. Both groups were compared by using chi-square test taking $p \leq 0.05$ as significant.

RESULTS

The mean age of patients was 26.72±4.41years. Among overweight/obese cases, there were 32 (32%) cases who had pregnancy prolonged beyond expected date of delivery (>40weeks of gestation) and were induced for labor while among non-obese cases there were 25% cases who had prolonged pregnancy and were induced (p=0.274).

Table 1. Basic characteristics of study population.

	Overweight/ Obese	Non-obese	P
Number	100	100	
Age, Years (mean±SD)	29.12±3	26.72±4.41	0.002
BMI, kg/m^2 (mean±SD)	28.9±2.01	22.5±1.51	0.000
Prolonged Pregnancy, n (%)	32 (32%)	25 (25%)	0.274
Induction of Labour n (%)	32 (32%)	25 (25%)	0.274
Spontaneous Labour n (%)	68 (68%)	75 (75%)	

Among overweight/obese ladies, spontaneous vaginal delivery occurred after induction of labour (IOL) in 59.38% cases, assisted vaginal delivery in 9.38% cases and C-section in 31.25% cases. Among non-obese ladies, 68% cases had spontaneous vaginal delivery, 8% had assisted vaginal delivery and 24% had C-sections after induction of labour (Table 1).

Table 2. Mode of delivery after induction of labour

	Overweight/ Obese	Non-obese	P
Spontaneous Vaginal Delivery (%)	19/32=59.38%	17/25=68%	0.44
Assisted Vaginal Delivery (%)	3/32=9.38%	2/25=8%	
C-section (%)	10/32=31.25%	6/25=24%	

Table 3. Mode of delivery after spontaneous labor.

	Overweight/ Obese	Non-obese	P
Spontaneous Vaginal Delivery (%)	41/68=60.3%	53/75=70.7%	0.299
Assisted Vaginal Delivery (%)	9/68=13.2%	7/75=9.3%	
C-section (%)	18/68=26.5%	15/75=20%	

Mode of delivery is shown in Tables 2 and 3.

DISCUSSION

Raised maternal BMI has linear association with fetal maternal and neonatal morbidity after

considering all confounding factors. Differences in the results may be due to different threshold values used for defining obesity. In our study we have used globally accepted definitions of overweight and obesity. Globally accepted definition of obesity is BMI > 30 Kg/m^2, overweight is BMI 25-29.9 Kg/m^2; while normal BMI is considered between 18-24.9 Kg/m^2. BMI was calculated in first trimester because mostly our patients do not come for pre-pregnancy counselling so their pre-pregnancy weights are not known. It has been proposed that BMI and nutrition may be involved in timing of onset of labour, possibly operating through endocrine mechanism. Results of our study showed that 32% of ladies had pregnancy prolonged beyond their expected date of delivery in overweight and obese group as compared to 25% of non-obese group (p=0.274).

A total of 57 patients had induction of labor in both groups. Out of which 32 patients (32%) were from obese/overweight group and 25 patients (25%) were from non-obese group. So greater number of patients among obese group had induction of labour than in non-obese group. But the difference was found insignificant between two groups (p = 0.274). This is in contrast to a study that showed a significant association between obesity and induction of labor and the risk increased with degree of obesity. The likely cause of different is that we have excluded morbidly obese patients i.e. BMI > 35 Kg/m^2. The other possible factors could be different criteria for obesity used in different studies.

Independent of the fact that either labour was induced or it was spontaneous onset, 28% patients amongst overweight/obese group and 21% amongst non-obese group had C-sections. So the risk of C-section among two groups is not significantly different. Results of this study are consisten with a study which concluded that obesity is not significantly associated with increased C-section rate. Findings of our study are in contrast to few other studies. A study found that risk of cesarean delivery was 21.76 % for primiparous women, which increase consistently and significantly with increasing BMI (for BMI 20-24.9 Kg/m^2 its 18.44%; for BMI 25-29.9 Kg/m^2 its 24.96% and for BMI 30 Kg/m^2 its 37.6%) . The results of our study are different from above mentioned study possibly because we have not included primiparous women. Barau et al described the linear association between maternal pre pregnancy BMI and risk of C-section in term deliveries.[8] A Canadian study showed BMI >25 Kg/m^2 as an independent risk factor for increased C-section irrespective of age, parity and socio-economic factors. Results of our study are supported by another study which shows that percentage of cesarean deliveries in obese women without obesity related complications is similar to that in control group.

It is important to note that 68% among obese group and 75% in non obese group had spontaneous onset of labor before 41^{+1} weeks of gestation, (p = 0.24) showing that there is no significant difference for the need of induction in both groups. Although it is in contrast to many studies which showed that change in BMI affects the length of gestation.[7] It is also important to note that 72% among obese group had vaginal delivery as compared to 79% in non-obese group. Thus, chances of vaginal delivery is comparable in overweight/obese vs non-obese group. It was noticed that even in patients with induction of labor in obese group vaginal delivery was achieved in 68.7%, while among non obese group 76% had vaginal delivery (p = 0.44).

CONCLUSION

High maternal BMI in 1^{st} trimester did not significantly affect the length of gestation and did not increase the risk of prolonging the pregnancy beyond expected date of delivery and need for induction of labor. Induction of labor, when required, is a safer option for ladies with raised BMI without significantly increasing risk of C-sections. Larger studies are required to further validate the results.

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