A Comparative Study on Outcome between Pregnant Woman with GDM with Obesity and Pregnant Woman with GDM without Obesity

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Abstract

Background: Pregnancy with diabetes is one of the most important medical and endocrine logical disorders encountered in obstetrical practice. Patients when develop carbohydrate intolerance first time during present pregnancy are recognized as Gestational Diabetes Mellitus (GDM). Pregnancy and diabetes affect each other adversely. Obesity is one of the common nutritional problems complicating pregnancy in developed countries. There is a strong association between maternal obesity and gestational diabetes mellitus.

Objectives: To evaluate the maternal and perinatal outcomes of GDM patients at the time of delivery. And to compare maternal and perinatal outcome between obese and non-obese GDM pregnant women.

Methods: This was a analytical cross sectional study conducted in the in department of Obstetric and Gynaecology in Medical College for women and Hospital, Uttara, Dhaka during the period of July 2012 to December 2012. Sixty pregnant women with GDM from 20 weeks onwards, who were on regular antenatal check up, attending in OPD were the study population. Among them 30 patients were obese having BMI $\geq 30kg/m^2$and 30 patient having BMI $< 30kg/m^2$.

Results: This study was conducted to observe the effect of obesity on the pregnancy outcome of GDM patients. Vulvovaginitis was more in the GDM with obese patient than GDM without obesity, which was 23.33% Vs 10% respectively. The rate of caesarean sections was higher in both the diabetic group (GDM with obesity 90%, GDM without obesity 86.7%). The frequencies of both elective and emergency section are almost twice as high for very obese women as it is for women of normal BMI. The incidence of foetal distress is 10% in obese group and 3.3% in non-obese group.

Conclusion: Gestational diabetes is not uncommon and it is often associated with higher incidence of maternal and perinatal morbidity and mortality. The finding of this study indicate that obesity in GDM patients is associated with more pregnancy complications. Thus, pre pregnancy weight reduction and appropriate weight gain during antenatal period in women with gestational diabetes might reduce the pregnancy and labour complications and improve maternal and perinatal outcome.

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Introduction

Diabetes mellitus may be defined as chronic disorders of metabolism effecting carbohydrate, protein, fat, clinically recognized by a relative paucity of insulin, hyperglycaemia, glycosuria and ketoacidosis. Patients when develop carbohydrate intolerance first time during present pregnancy are recognized as Gestational Diabetes Mellitus (GDM).[1] Pregnancy and diabetes affect each other adversely. Pregnancy imposes nutritional demands and increasing insulin resistance that accentuates the metabolic disturbances of diabetes. These women have a significant risk on developing diabetes later in life. Identifying this group of women is important not only preventing prenatal morbidity but also improving long term outcomes for mother and their child.[2] Diabetes increases the risk of maternal morbidity, prenatal mortality and morbidity which are many times higher than that of non-diabetic pregnant women. Hyperglycaemia in early pregnancy disturbs foetal environment and seriously interfere with organogenesis and development. So normoglycemia should be maintained throughout the early pregnancy to reduce the risk of congenital anomaly which is one of the common causes of prenatal morbidity in diabetic mother.[3] Obesity is one of the common nutritional problems complicating pregnancy in developed countries. Maternal obesity has been defined as the maternal body mass index (the weight in kilograms divided by the square of the height in meters) which is above 30. The body mass index (BMI) characterizes pregnant women as lean (BMI less than 18.5), normal (BMI 18.5-24.9), overweight (BMI 25-29.9) or obese(BMI 30 or more). There is a strong association between maternal obesity and gestational diabetes mellitus.[4,5,6] In our country, more and more patient becoming pregnant with gestational diabetes mellitus and it is often associated with higher incidence of maternal and peri natal mortality and morbidity. Obesity is also becoming a problem in our society. There are some studies in this topic, but there is no study in combination of GDM and obesity. This study is made to find out the maternal and perinatal outcome of gestational diabetes mellitus complicated by obesity, within our limited resource.

Method

This was a analytical cross sectional study conducted in the in department of Obstetric and Gynaecology in Medical College for women and Hospital, Uttara, Dhaka during the period of July 2012 to December 2012. Sixty pregnant women with GDM from 20 weeks onwards, who were on regular antenatal check-up, attending in OPD were the study population. Among them 30 patient were obese having BMI $\geq$ 30kg/m^2 and 30 patient having BMI $<$ 30kg/m^2. BMI was calculated by wt (kg)/ht (m)^2. After taking informed written consent, a detailed history was taken from each patient. Thorough general and systemic examination were done. Data was collected in a data collection sheet. It was analysed by SPSS for Windows version 16.0 and probability values of <0.05 was considered as statistically significant for all results.

Results

This study was conducted to observe the effect of obesity on the pregnancy outcome of GDM patients. Comparative data collected from GDM patients with obesity and GDM patients without obesity are presented below in tabulated manner.

Table I: Selected antepartum complications of mother between two groups

Variables	GDM with obesity (n=30)		GDM without obesity (n=30)		P value
	No	%	No	%	
Preeclampsia	4	13.3	1	3.3	0.728 (NS)
Vulvovaginitis	7	23.3	3	10	0.016 (S)
UTI	2	6.7	1	3.3	0.366 (NS)
Polyhydramnios	1	3.3	1	3.3	1.00 (NS)

n : Number of GDM patients
NS : Non Significant
S : Significant

Table I shows vulvovaginitis was more in with obesity group than without groups which was 23.33% vs 10% respectively. The difference was statistically significant between two groups (P<0.05). But PET, UTI and polyhydramnios were statistically not significant between two groups (P>0.05).

Table II: Selected antepartum complications of foetus between two groups

Variables	GDM with obesity (n=30)		GDM without obesity (n=30)		P value	
	No	%	No	%		
Large for date	7	23.3	3	10	0.016	(S)0.366
Congenital anomaly	1	3.3	0	00	(NS)	
IUGR	2	6.7	1	3.3		
IUD	1	3.3	0	00		

n : Number of GDM patients
NS : Non Significant
S : Significant

Table II shows 23.3% were large for date, 3.3% were congenital anomaly, 6.7 were IUGR and 3.3 were in obesity group. On the other hand in without obesity group 10% were large for date, 3.3% were IUGR and had no congenital anomaly and IUD. Large for date were statistically significantly difference between two groups (P<0.05). The rest of all variables were statistically not significant difference between two groups (P>0.05).

Table III: Mode of delivery between two groups

Mode of delivery	GDM with obesity (n=30)		GDM without obesity (n=30)		P value
	No	%	No	%	
Vaginal	3	10	4	13.3	0.688 (NS)
Caesarean section	27	90	26	86.7	

n : Number of GDM patients
NS : Non Significant
S : Significant

Above table III shows the difference was statistically not significant between obesity group and without obesity group (P>0.05).

Table IV: Labor outcome between two groups

Outcome	GDM with obesity (n=30)		GDM without obesity (n=30)		P value
	No	%	No	%	
Pre term	3	10	2	6.7	0.640 (NS)
Term	27	90	28	93.3	0.640 (NS)

n : Number of GDM patients
NS : Non Significant
S : Significant

About table shows labour outcome were statistically not significant between two groups (P>0.05).

Table V: Selected intrapartum complications of mother between two groups

Variables	GDM with obesity (n=30)		GDM without obesity (n=30)		P value
	No	%	No	%	
Prolong labor	2	6.7	1	3.3	0.366 (NS)
Obstructed labor	1	3.3	0	00	-
Complete perineal tear	0	00	0	00	-
Cervical tear	2	6.7	1	3.3	0.366 (NS)

n : Number of GDM patients
NS : Non Significant
S : Significant

Table V shows both prolong labor and cervical tear were 6.7% in obese group and 3.3% in non obese group. Both variables were not statistically significant (p>0.05).

Table VI: Selected intrapartum complications of foetus between two groups

Variables	GDM with obesity (n=30)		GDM without obesity (n=30)		P value
	No	%	No	%	
Foetal distress	3	10	1	3.3	0.109 (NS)
Shoulder dystocia	0	0	0	0	-
Still birth	0	0	0	0	-

n : Number of GDM patients
NS : Non Significant
S : Significant

Table VI shows foetal distress in obese and non obese groups were 10% and 3.3% respectively. Differences were not statistically significant (P > 0.05). There was no still birth or shoulder dystocia in the study.

Table VII: Selected postpartum complications of mother between two groups

Variables	GDM with obesity (n=30)		GDM without obesity (n=30)		P value
	No	%	No	%	
PPH	4	13.3	1	3.3	0.728 (NS)
UTI	1	3.3	1	3.3	
Abdominal wound infection	2	6.7	1	3.3	

n : Number of GDM patients
NS : Non Significant
S : Significant

Table VII shows incidence of PPH was 13.3% in obese group and 3.3% in non obese group, and UTI was 3.3% in both groups, abdominal wound infection was 6.7% and 3.3% in obese and non obese group respectively, differences were not statistically significant (P > 0.05).

Table VIII: Mode of treatment during pueperium between two groups

Outcome	GDM with obesity (n=30)		GDM without obesity (n=30)		P value
	No	%	No	%	
Diet only	18	60	22	73.3	0.273 (NS)
Diet + Drug	12	40	8	26.7	

n : Number of GDM patients
NS : Non Significant
S : Significant

Table VIII shows 60% treated with diet only and 40% treated with diet+drug in obese group. On the other hand 73.33% treated with diet only and 26.67% treated with diet+drug in non obese group. The difference was statistically not significant between two groups (P>0.05).

Table IX: Selected perinatal complications between two groups

Variables	GDM with obesity (n=30)		GDM without obesity (n=30)		P value
	No	%	No	%	
Macrosomia	6	20	2	6.7	0.012 (S)
Birth asphyxia	2	6.7	1	3.3	0.317 (NS)
hypoglycemia	5	16.6	2	6.7	0.061 (NS)
Hyperblilirubinaemia	4	13.3	2	6.7	0.180 (NS)
Preterm	3	10	2	6.7	0.467 (NS)
RDS	0	0	0	0	-

n : Number of GDM patients
NS : Non Significant
S : Significant

Regarding foetal outcome, macrosomia found 20% in obese group and 6.7% in non-obese group Differences were statistically significant ($P < 0.05$). Incidence of neonatal hypoglycaemia in obese group was higher than non-obese group, 16.6% and 6.7% respectively, but not statistically significant. Preterm delivery, birth asphyxia, hyperbilirubinemia, more in obese group than non-obese group, though differences were not statistically significant ($P > 0.05$).

Discussion

This analytical cross-sectional study has been conducted to observe the effect of obesity on the pregnancy outcome of GDM patients. The incidence of polyhydramnios found in both group (3.3% in each group) are in agreement with that of Baeten et al[7] (3.7%) and but lower than that showed Metzger et al.[8] the lower incidence of polyhydramnios in this study is possibly due to good glycaemic control.

In our study, vulvovaginitis was more in the GDM with obese patient than GDM without obesity, which was 23.33% Vs 10% respectively. The incidence of UTI and vulvovaginitis in both diabetic subjects are conformity with the study done by Metzger.[8]

The incidence of,macrosomia found 20% in obese group and 6.7% in non obese group Differences were statistically significant ($P < 0.05$). Asphyxia, respiratory distress syndrome RDS), hypoglycaemia, hyperbilirubinemia were more common in obese diabetic group than normal weight group but there was no significant difference between groups in these characteristics. Women who were overweight and obese also tended to have higher complication rates than normal weight women. [8]

A study by Andreasen included 20130 women with live births after 20 weeks in central New York State between June, 1994 and May, 1995 concluded that women who are obese are at increased risk for caesarean delivery. The frequencies of both elective and emergency section are almost twice as high for very obese women as it is for women of normal BMI. [9]In a study by Murakami and Ohmichi, 2005, it has been shown that in the obese Japanese, the risks of caesarean delivery are significantly elevated compared with the normal group. All these studies correlated with our study.[10]

In present study, the rate of caesarean sections is higher in both the diabetic group (GDM with obesity 90%, GDM without obesity 86.7%) which correlate with the study shown by Kiran(51.6%)[11]higher than that reported by Morin et a[12] (38.3%)while searching relationship between BMI and mode of delivery, several studies found that induction of labour and deliveries by caesarean section were both more common in obese women in western world, stated by Borfil et al., 1996. An observational study of Bianco et al., 1998 stated that 2nd trimester was 21.97 and 31.63 in obese group which correlate with our study. [13] A population based co-hort study in Washington state based on Birth data (n = 96801) stated that among nulliparous (no previous live birth) women, overweight (BMI 25.0-29.9) and obese women (BMI>30) had significantly increased risk for preeclampsia, which does not correlate with our study.

In our study, 13.3% of the obese group developed Post Partum Haemorrhage (PPH) in compared to only 3.3% in non-obese group. There was no significant difference between the groups in this characteristic. Kiran (2005)[11] showed that the risk of post-partum haemorrhage associated with increasing BMI and about 30% more frequent in women with BMI more than 30 and about 70% more frequent for women with BMI40 or more compared with women of normal BMI. The incidence of preterm delivery in both groups is lower. A recent article by Cnattingius et al.[14] based on a cohort study of 167,750 women reported that obesity increases the frequency of

premature delivery only in nulliparous women but in parous women, obesity was not a significant risk factor for premature deliveries and this study support our study.

In our study, only 6.7% of obese patient had prolong labour in comparison to 3,3% in the non-obese group, but there was no significant difference. In a study by Murakami and Ohmichi (2005) shown that in the obese mother, the risks of prolong labour were significantly elevated compared with the normal group as because of prolongation of head delivery in macrosomic baby, which was not supported with our study. The incidence of foetal distress is 10% in obese group and 3.3% in non-obese group.[10]

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