Original Article

Gestational Diabetes Mellitus and Obesity: An experience at a teaching hospital in Bahawalpur, Pakistan

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Objective: To compare the frequency of gestational diabetes mellitus in second and third trimester in obese and non-obese women.

Methodology: It was a prospective study conducted at Department of Obstetrics and Gynaecology, Bahawal Victoria Hospital Bahawalpur. Sixty two obese and 62 non-obese women with singleton pregnancy were included in the study at their booking visit at ~14-20 weeks of gestation. Women having family history of obesity and chronic ailments and those with age >35 or parity >5 were excluded.

Results: Mean age was 28.12±2.72 years among the group of obese women as compared to 27.89±2.34 years in non-obese group. Commonest parity among the obese women was 3-4 (n=31, 50%) compared to 46.8 % (n=29) in non-obese group. Development of gestational diabetes mellitus was 22.58% (n=14) in obese group which was significantly higher than 6.45% (n=4) in non-obese group (p=0.001).

Conclusion: Gestational diabetes mellitus developed in significantly higher number of obese women as compared to non-obese women. (Rawal Med J 2013;38: 165-168).

Key words: Obesity, gestational diabetes mellitus, Body Mass Index, pregnancy.

INTRODUCTION

The association between obesity and insulin resistance in type 2 diabetes is well recognized. Approximately 3-15% of women develop Gestational Diabetes Mellitus (GDM) during pregnancy. Although many factors are related to this risk, including ethnicity, previous occurrence of GDM, age, parity, family history of diabetes, and degree of hyperglycemia in pregnancy; obesity is an independent risk with a risk of about 20%.[1-2] It has been shown by previous investigators that even minor degrees of carbohydrate intolerance are related to obesity and pregnancy outcome.[3,4] Sebire et al found a twofold increase in the rate of GDM.[5] Kumari comparing obese and non obese patients, found a rate of GDM of 24.5% for the obese and 2.2% for the non obese.[6] Bianco et al reported a threefold increase in GDM for obese patients.[7] A population-based cohort study of 96,801 singleton births reported that not only obese women but also overweight women had a markedly increased risk for GDM.[8] In a study of 6,857 women, Yogev et al found a direct association between glucose-screening categories, obesity, and rate of GDM.[9,] The studies reporting obesity in GDM lack information on the effect of achieving targeted levels of glycemic control and treatment modalities on pregnancy outcome.[11-13] Prevalence of diabetes is high ranging from 7.6-11% in Pakistan.[14-17] Variations according to age, gender, location and urbanization have been noted. Reports from National diabetes survey and National health survey differ both in observations regarding prevalence of diabetes and relative burden of diabetes in various provinces and among males and females.[15,16] Incidence of type 1 diabetes was estimated to be 1.02/100000 per year in Karachi.[18] Rates of GDM in Pakistan range from 3.2-3.5% which is comparable to Western populations but the rates of complications both to mother and fetus were higher, possibly due to poor glycemic control.[19-21] This study was conducted to compare the frequency of GDM in obese versus non-obese women.

METHODOLOGY

This cohort study was conducted at Department of Obstetrics and Gynaecology Bahawal Victoria Hospital Bahawalpur, Pakistan from April to

December 2012. It included 62 subjects in each group (obese and non-obese) using **n**on probability purposive sampling. Women with a singleton pregnancy presenting for booking visit at 1420 completed weeks of gestations having BMI≥30 kg/m^2 were included in obese group and women with a singleton pregnancy having BMI<30 kg/m^2 were included in non obese group. Women having any associated medical disorder like chronic hypertension, diabetes mellitus or clotting disorder, those having family history of obesity, hypertension, diabetes mellitus or thrombo-embolic disease and those having history of GDM, pre-eclampsia or thrombo-embolism in previous pregnancy, those with age more than 35 years, women of parity more than 5 and women having history of smoking, alcohol intake or any other drug abuse were excluded from the study. An informed verbal consent was taken from all participants.

According to their BMI, patients were placed in one of the two groups, BMI ?30 (Obese group), BMI <30 (Non obese group). All were followed up to 42 weeks of gestation or up to delivery. If any patient developed complications, she was admitted to hospital for further management. A separate proforma was used for every patient to record BMI, any antenatal maternal complication, age, parity and period of gestation. BMI was calculated using the pre-pregnancy weight and if it was not known then the first weight measurement at the prenatal care was used. GDM was defined as the fasting serum sugar level of > 5.1 mmol/L, serum sugar levels of > 10.0 mmol/L after 01 hour or serum sugar level of > 8.5 mmol/L after 02 hours of 75-g glucose load given to subjects fasting overnight for 8 hour, between 24 and 28 weeks of gestation.

Data were analyzed using SPSS v 16. Chi-square test and independent sample t-test were used as the test of significance for qualitative and quantitative variables respectively. The level of statistical significance was taken as 0.05. Stratification was done with regards to age, parity and period of gestation to see their effect on outcome.

RESULTS

A total of 124 patients were recruited. Mean age was 28.12±2.72 years in obese and 27.89±2.34 years in non-obese group (Table 1). .

Table 1. Age Distribution of study Subjects (n=124)

Age (in years)	Obese (n=62)		Non-Obese (n=62)		p value
	No. of cases	Percentage	No. of cases	Percentage	
20-25	27	43.55	29	46.77	
26-30	23	37.10	24	38.71	> 0.05
31-35	12	19.35	09	14.52	
Total	62	100	62	100	
Mean ±S.D.	28.12±2.72		27.89±2.34		> 0.05

Table 2. Parity of study Subjects.

Para	Obese (n=62)		Non-Obese (n=62)		p value
	No. of cases	Percentage	No. of cases	Percentage	
0-2	17	27.42	21	33.88	
3-4	31	50	29	46.77	>0.05
5	14	22.58	12	19.35	
Total	62	100	62	100	
Mean ±S.D.	3.21±1.43		3.78±1.87		>0.05

Parity was 3-4 in 50% (n=20) in obese and 47.5 % (n=19) in non-obese group (Table 2).

Table 3. Development of Gestational Diabetes Mellitus.

Gestational diabetes	Exposed (n=62)		Non-Exposed (n=62)		p value
	No. of cases	Percentage	No. of cases	Percentage	
Yes	14	22.58	04	6.45	0.01
No	48	77.42	58	93.55	
Total	62	100	62	100	0.01

Development of GDM was 22.58% (n=14) in obese group whereas it was only 6.45% (n=4) in non-obese group. Large proportion of obese population (n=48, 77.42%) and most of the non-obese women (n=58, 93.55%) had no findings suggestive of GDM, as shown in Table 3 (p= 0.01).

DISCUSSION

Gestational diabetes was diagnosed according to American Association of Diabetes' recent criteria of 2012.[22] In our study, gestational diabetes developed in 22.58% (n=14) in obese as compared to only 6.45% (n=4) in non obese pregnant women. Similar results have been reported by many other investigators. Sebire and colleagues found a twofold

increase in the rate of GDM with obesity.[5] Kumari while comparing obese and non obese patients, found a rate of GDM of 24.5% for the obese versus 2.2% for the non obese.[6] Bianco and colleagues reported a threefold increase in GDM for obese patients.[7]

Majority of the patients in both groups were younger i.e. between 20-25 years (n=27, 43.55%) in obese and 46.77% (n=29) in non-obese group. Mean age was 28.12±2.72 in obese and 27.89±2.34 in non-obese group. It is an alarming situation that young women of our society are developing obesity resulting in complicated pregnancies. This fact is also highlighted by the Northern California Kaiser Permanente study which concluded that the prevalence of GDM increased in all age-groups with the highest proportional increase in the youngest group, where the prevalence almost doubled from 1991 (1.4%) to 2000 (2.7%).[23]

The development of complications so early in pregnancy may result in a poor obstetrical outcome in obese patients. It again tells us to have a good weight control of the women entering the pregnancy, so that a better outcome may be achieved by preventing prenatal complications related to obesity.

With these results, the hypothesis of the study that there is increased risk of developing Gestational Diabetes Mellitus in second and third trimester in obese as compared with non obese women stands justified. However, the limitation of the study is that we did not include maternal and perinatal outcome in these patients. The results of the study are helpful to identify the high risk cases prenatally so that we may give better management at proper time and reduce the maternal morbidity and mortality. We can help these patients at early stages for prevention of different morbid states by modifying their life style. They will enter the pregnancy with better health and at the end of pregnancy, they can enjoy a happy life with a healthy child and their family.

CONCLUSION

It is concluded that gestational diabetes mellitus develops significantly more frequently in second and third trimester in obese pregnant women as compared to non-obese pregnant women, as assessed by BMI in early pregnancy.

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