Original Article

Gestational Diabetes

Gestational Diabetes in Patients with Obesity

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ABSTRACT

Objective: To determine the frequency of Gestational Diabetes in obese patients.
Study Design: Cross sectional study
Place and Duration of Study: This study was carried out at Obstetrics and Gynaecology Department, Shahina Jamil Hospital, Abbottabad from April 2013 to September 2013.
Materials and Methods: Total 111 patients were included in this study. After an overnight fast (8 hrs) fasting plasma glucose was taken. 75 gm glucose in one glass of water was given to patient. After 2 hours, another plasma glucose test was taken. Gestational Diabetes was diagnosed on basis of fasting plasma glucose level of > 126 mg / dl, 2 hours post-prandial plasma glucose level of more than 199.8 mg / dl.
Results: Mean age of patients was 27.7 + 3.3. Gestational Diabetes was found in 21 patients (19.0%). Mean Body Mass Index (BMI) of patients was 30.80 + 0.44. 24 patients (21.6%) were primigravida and 87 patients (78.4%) were multigravida.
Conclusion: The results of present study indicate that obesity is an independent risk factor for adverse obstetric outcome and is significantly associated with an increased gestational diabetes rate.
Key Words: Gestational Diabetes Mellitus, Obesity, Body Mass Index (BMI)

INTRODUCTION

Obesity is a common disorder which has become prevalent in whole world over the past 10 years[1]. Body Mass Index (BMI) is the most widely accepted measure of obesity in adults[2]. BMI of more than 30 kg / m^2 is considered as obesity[3]. It is well recognized that maternal obesity is associated with an increased risk of maternal, peripartum and neonatal complications[4]. Obesity increases th risk of gestational Diabetes, pre-eclampsia, macrosomia and caesarean delivery[5]. Gestational Diabetes mellitus is defined by American Diabetes Association as any degree of glucose intolerance with onset or first recognition during pregnancy[6]. The association of obesity, insulin resistance, glucose intolerance, hypertension, characteristic dyslipidemia is called Metabolic Syndrome. All of the features of Metabolic Syndrome are closely related to elevated BMI[7].

Overweight is a risk factor for impairment of carbohydrate tolerance in non-pregnant state and during pregnancy. Fasting and post-absorptive plasma insulin concentrations are higher in obese pregnant women than in non-obese pregnant women. Weight excess clearly increases the risk of overt impairment of carbohydrate tolerance in pregnant women. Even in moderately over weight subjects (BMI 25-30) or weight 120-150 % of ideal body weight) the incidence of gestational diabetes is 1.8 to 6.5 times greater than that in normal weight subjects[8]. Gestational Diabetes is found in 17 % of women with obesity, in a study conducted in obesity unit, Hudding University Hospital, Sweden[9]. Findings of Chu et al also indicate that high maternal weight is associated with a substantially high risk of Gestational Diabetes Mellitus[10].

There is a strong correlation between obesity and gestational diabetes mellitus, therefore, it is pertinent to identify women at risk of developing gestational diabetes in relation with elevated BMI as gestational diabetes mellitus increases the risk of hypertensive disorders, chromosomal defects, macrosomia, caesarean delivery and high risk of developing type 2 diabetes mellitus.

The aim of the study was to determine the frequency of gestational diabetes in obese pregnant females to help in early diagnosis of gestational diabetes and its management to prevent maternal and fetal complications.

MATERIALS AND METHODS

Study was carried out at Obstetrics and Gynaecology Department, Shahina Jamil Hospital Abbottabad from April 2013 to September 2013. Sample size was calculated using formula taking 5 % margin of error and 95 % confidence level. Anticipated population proportion is 17 % of gestational diabetes mellitus[9]. Thus sample size was of 111 patients. Inclusion criteria were women with singleton pregnancy with BMI of > 30 kg/m^2 between 24 weeks to 34 weeks of gestation. Exclusion criteria was pre-existing diabetes, multiple pregnancy, hypertension and any other medical disorder.

Subjects were selected from pregnant ladies visiting antenatal clinic fulfilling the inclusion criteria in the department of Obstetrics and Gynaecology, Shahina Jamil Hospital, Abbottabad. They were informed about

risks and benefits of the study and informed consent was taken on Proforma. They were included in the study with permission of Ethical Committee of the institution. Patients with pre-existing diabetes were excluded from the study.

To diagnose gestational diabetes, history regarding her personal data, symptomatology was taken. Examination was performed. Patients were referred for oral glucose tolerance test to central laboratory Shahina Jamil Hospital, Abbottabad. OGTT was performed between 24 weeks to 34 weeks of gestation according to WHO criteria. After an overnight fast(8 hours) fasting plasma glucose was taken. 75 gram glucose in one glass of water was given to patient. After 2 hours, another plasma glucose test was taken. Gestational diabetes was diagnosed on basis of fasting plasma glucose level of >126 mg/dl, 2 hours post prandial plasma glucose level of > 199.8 mg/dl . all information was recorded in a specifically designed proforma.

Data was analysed by using statistical package for social science (SPSS) version 10. Descriptive statistics was applied to analyse the data. Mean and standard deviation was calculated for age and BMI. Frequencies and percentages were calculated for presence of gestational diabetes in obese. Data was in tabular form. Effect modifiers were controlled through stratification of age, BMI, parity and gestational age to see the effect on outcome.

RESULTS

Total 111 patients were included in this study carried out over a period of 6 months from April 2013 to September 2013 in the department of obstetrics and gynaecology Shahina Jamil Hospital Abbottabad.

Distribution of cases by age shows. 36 patients (32.4%) were 20-25 years of age, 53 patients (47.7%) were 26-30 years and 22 patients (19.9%) were 31-35 years old with mean age of 27.7±3.3 (Table 1)

Table No 1: Distribution of cases by age

Age (years)	Number	Percentage
20-25	36	32.4
26-30	53	47.7
31-35	22	19.9
Total	**111**	**100.0**
Mean ± S.D	**27.7±3.3**	

Table No 2: Distribution of cases by gestational age

Gestational Age (years)	Number	Percentage
24-30	99	89.1
31-34	12	10.9
Total	**111**	**100.0**
Mean±S.D	**27.8±2.3**	

There were 99 patients (89.1%) belonging to gestational age of 24-30 weeks while remaining 12 patients (10.9%) were between 31-34 weeks of gestational age. Mean gestational age was observed 27.8±2.3 weeks (Table 2).

Out of 111 cases 24 patients (21.6%) were primigravida and 87 patients (78.4%) were multi gravida (table 3). Gestational diabetes was found in 21 patients (19.0%) (Table4). Mean BMI of patients was 30.80±0.44.

Table No 3: Distribution of parity

Parity	Number	Percentage
Primigravida	24	21.6
Multigravida	87	78.4
Total	**111**	**100.0**

Table No 4: Frequency of gestational diabetes

Gestational Diabetes	Number	Percentage
Yes	21	19.0
No	90	81.0
Total	**111**	**100.0**

DISCUSSION

Obesity is a global health problem that is increasing in prevalence. The WHO characterizes obesity as a pandemic issue with prevalence in females than males. Obesity during pregnancy is considered a high risk state because it is associated with many complications[11]. Obesity has implications for all aspects of maternal/foetal health and outcome during pregnancy with short and long term ramifications[12].

Obesity is an established risk factor for gestational diabetes. It is known whether this risk might be reduced through weight loss between pregnancies. We sought to determine whether weight loss during pregnancies reduced the risk of gestational diabetes among obese women[13]. In current study gestational diabetes was developed in 19% of obese women.

In a study conducted by Glazer et al, 32% of women lost weight between pregnancies, with a mean weight loss of 23 lbs. Women who lost at least 10 lbs.between pregnancies had a decreases risk of gestational diabetes relative to women whose weight changes by less than 10 lbs. (relative risk = 0.63; 95% confidence interval = 0.38-1.02, adjusted for age and weight gain during each pregnancy). Of 61% of women who gained weight between pregnancies, the mean weight gained was 22 lbs. Women who gained atleast 10 lbs. had an increased risk of gestational diabetes[14].

Based on meta-analysis of the literature, it is estimated that the risk of developing GDM is about two, four and eight times higher among overweight, obese and severely obese women, respectively, compared with normal weight pregnant women. The public health implications for the U.S are significant because of the high prevalence of GDM, and the potential adverse consequences associated with obesity and GDM, including higher risk of adverse infant outcomes, higher

risk of diabetes for the mother later in life, and a higher risk of diabetes and overweight for the offspring[15].

Thorpe and Howard suggest that GDM risk increases substantially with increasing maternal BMI. The increasing prevalence of obesity and related conditions such as GDM and type 2diabetes are already changing predictions of the cost of medical care in the future[16].

Foetal macrosomia is a common adverse infant outcome related to GDM, especially if GDM is unrecognized and untreated[17]. For the infant, macrosomia increases the risk of shoulder dystocia, clavicle fractures, and brachial plexus injury and is also associated with depressed 5-min Apgar scores and increased rates of admission to neonatal intensive care unit. For the mother macrosomia is an increased risk of caesarean delivery; these mothers also have an increased risk of postpartum haemorrhage and vaginal lacerations[18].

Maternal obesity is associated with an increased risk of diabetes, both pre gestational diabetes and GDM[19]. Compared with normal weight women (BMI<25kg/m2), a recent meta-analysis of 20 studies demonstrated that the OR of developing GDM was 2.14 (95% CI, 1.82-2.53), 3.56 (95% CI, 3.05-4.21), and 8.56 (95% CI, 5.07-16.04) among overweight (BMI 25-30kg/m2), obese (BMI>30kg/m2), and severely obese women (BMI>40kg/m2) respectively[20].

A recent study found that weight gain in the 5 years prior to becoming pregnant, even at a rate of 1.1 to 2.2kg per year, increases the risk of developing GDM, and that this was especially true for women who were not initially overweight[21].

In addition to pre pregnancy BMI, a number of other demographic factors affect the incidence of GDM. Hedderson and colleagues found that GDM was more likely in women who were older than 35 years of age and who were of Hispanic or Asian ethnicity[22].

Majority of the above mentioned studies support findings of present study.

CONCLUSION

The results of present study indicate that obesity is an independent risk factor for adverse obstetric outcome and is significantly associated with an increased gestational diabetes rate.

Even moderate changes in pre pregnancy weight can apparently affect the risk of gestational diabetes among obese women. This may offer further motivation for interventions aimed at reducing obesity among women of reproductive age.

Preventing GDM depends on preventing obesity in young women; preventing type 2diabetes in obese women who have GDM depends on effective nutrition and physical activity interventions that produce weight loss. These and other prevention strategies, aimed at both individual and societal levels, are needed to control the growing epidemic of diabetes.

Over weight and obesity should be controlled before, during and after pregnancy by observing following factors.

1. Carbohydrates rich diet should be avoided
2. Fatty diet should be avoided
3. Daily routine work of home should not be avoided
4. Daily walk should not be avoided before and during pregnancy

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