

FREQUENCY OF IMPAIRED GLUCOSE TOLERANCE TEST IN OBESE PREGNANT WOMEN

Asma Tariq,¹ Shahid Mahmood²

ABSTRACT

Background: Gestational Diabetes Mellitus (GDM) is defined as any degree of glucose intolerance with onset or first recognition during pregnancy. The diagnosis of Gestational diabetes mellitus, can be made by oral glucose tolerance test. **Objective:** To determine the frequency of impaired glucose tolerance test in obese pregnant women attending outpatient department of Lahore General Hospital. **Subjects and Methods:** It was hospital-based, descriptive study. This study was conducted in out patient department and Gynae & Obstetrics, Unit II, Lahore General Hospital, Lahore. Newborn babies were followed in Children Hospital, Lahore. This study was conducted from 7th July, 2011 to 6th July 2012. Obese pregnant women having BMI (Body Mass Index) more than 30, at 20 to 28 weeks of gestation were included in the study. Gestational age was calculated by dating scan. Age of the obese pregnant women was between 20-40 years. Body mass index was calculated by dividing weight in kilogram by height in meter square. Oral glucose tolerance test (OGTT) was performed after 8 hours of fasting. After 100gm of glucose load, four blood samples were taken and were checked for abnormal oral glucose tolerance test (OGTT), according to American Diabetes Association Criteria, 2004(i.e. fasting blood sugar > 5.3mmol/L, 1 hour value > 10mmol/L, 2 hour value > 8.6 mmol/L, 3 hour value > 7.8mmol/L). Oral glucose tolerance test were considered impaired if any two of the above readings were impaired. Every newborn baby was examined by the pediatrician and followed in Children Hospital, Lahore, for any complication. **Results:** There were 74 (24%) pregnant women who had impaired oral glucose tolerance test and there were 236 (76%) pregnant women who did not show impaired oral glucose tolerance test. On follow up of newborn babies every fifteen days for three months, all the babies were found to be normal. **Conclusion:** It is concluded from this study that 24% obese pregnant women have impaired oral glucose tolerance test. Gestational diabetes mellitus can be diagnosed early in pregnancy by doing oral glucose tolerance test (OGTT). After early diagnosis of gestational diabetes mellitus, early treatment can be started and the newborn babies can be saved from any complication of gestational diabetes mellitus.

Key Words: Oral glucose tolerance test, Gestational diabetes mellitus, Obese women, Children.

INTRODUCTION

Gestational diabetes mellitus (GDM) prevalence varies widely depending on the study population, commonly, it has been reported to range between 2% and 7% in the United States.^{1,2,3}

Gestational diabetes mellitus is defined as any degree of glucose intolerance with onset or first recognition during pregnancy.⁴ In a study conducted in 2010, Asian women had the highest (6.8%) rate of Gestational diabetes mellitus.⁵

In a study by Chu and colleagues reported that obese or severely obese pregnant women increases the risk of gestational diabetes mellitus by a factor 3.6 and 8.6, respectively.⁶ With increasing rates of gestational weight gain, the

risk of Gestational diabetes mellitus (GDM) is doubled.⁷ It is reported that obese pregnant women have high rate of Gestational diabetes mellitus (GDM) that is 28%.⁸ A study by Stuebe et al, found that gestational diabetes mellitus and impaired glucose tolerance during pregnancy are associated with persistent metabolic dysfunction at 3 years after delivery, separate from other clinical risk factors.⁹ A study by O'Reilly et al, concluded that gestational insulin use, non-European ethnicity, a family history of type 2 diabetes mellitus, and an elevated Body Mass Index (BMI) were factors associated with persistent dysglycemia in women who have had gestational diabetes mellitus. The study also concluded that breastfeeding may provide beneficial metabolic effects in women with gestational diabetes mellitus and should be recommended.¹⁰

Because glucose travels across the placenta (through diffusion facilitated by GLUT3 carriers), the fetus is exposed to higher glucose levels. This leads to increased fetal levels of insulin (insulin itself cannot cross the placenta). The growth-stimulating effects of insulin can lead to excessive growth and a large

1. Department of Gynae And Obstetrics Lahore General Hospital, Lahore University of Health Sciences Lahore.

2. Children Hospital Lahore

Correspondence: Dr. Shahid Mahmood, Senior Registrar
Children Hospital Lahore.

Phone: +92-03366741496

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body (macrosomia). After birth, the high glucose environment disappears, leaving these newborns with ongoing high insulin production and susceptibility to low blood glucose levels (hypoglycemia).¹¹ This study was conducted to determine the frequency of impaired oral glucose tolerance test in obese pregnant women attending outdoor patient department of Gynae & obs, at Lahore General Hospital.

SUBJECTS AND METHODS

This study was conducted in out patient department and ward of Gynae & Obstetrics Unit II, Lahore General Hospital, Lahore and newborn babies were followed in Children Hospital, Lahore. It was a hospital-based, descriptive study. Sample size of 310 cases was calculated with 95% confidence level, 5% margin of error and taking expected percentage of impaired glucose tolerance test of 28% in obese pregnant women for gestational diabetes mellitus. This study was conducted from 7th July, 2011 to 6th July 2012.

Sample technique used was non-probability, purposive sampling. Obese pregnant women having BMI (Body Mass Index) more than 30, at 20 to 28 weeks of gestation were included in the study. Gestational age was calculated by dating scan. Age of the obese pregnant women was between 20-40 years. Body mass index was calculated by dividing weight in kilogram by height in meter square. Pregnant women who were known case of diabetic mellitus were excluded from the study.

The participants were selected on the basis of inclusion and exclusion criteria from out patient department and obstetrics ward of Gynae & Obstetrics Unit II, Lahore General Hospital, Lahore. The study protocol was approved by the Medical Ethics Review Committee of Lahore General Hospital, Lahore. Informed consent was taken from all participants and their demographic data was obtained.

All selected pregnant women were advised especially not to have any dietary or physical restriction for at least 3 days prior to glucose tolerance test. Oral glucose tolerance test (OGTT) was performed after 8 hours of fasting. After 100gm of glucose load, four blood samples were taken and were checked for abnormal oral glucose tolerance test (OGTT), according to American

Diabetes Association Criteria, 2004 (i.e. fasting blood sugar > 5.3mmol/L, 1 hour value > 10mmol/L, 2 hour value > 8.6mmol/L, 3 hour value > 7.8mmol/L). Oral glucose tolerance test was considered impaired if any two of the above readings were impaired. Pregnant women having impaired oral glucose tolerance test were given treatment in the form of insulin and regular follow up was done.

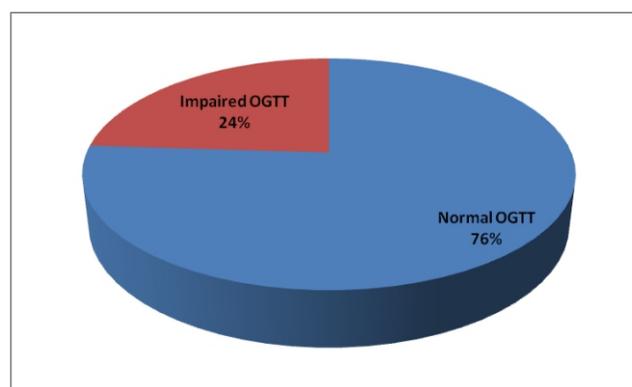
Every delivery was attended by the pediatrician and the newborn babies were followed every fifteen days for three months in Children Hospital Lahore, for any complication. All the data was entered and analyzed by SPSS version 10 computer base software programme. Quantitative data of patients was presented as means = S.D, like age and BMI. Frequency and percentage was calculated for impaired oral glucose tolerance test (OGTT).

RESULTS

The mean age of the obese pregnant women was 31±5 years. There were 154 (49.6%) women in the age range of 21-30 years and 156 (50.4%) of 31-40 years. Pregnant women with BMI more than 30 were selected for study and mean BMI was 34±2.

There were 74 (24%) obese pregnant women who had impaired oral glucose tolerance test and there were 236 (76%) obese pregnant women who did not show impaired oral glucose tolerance test.

Figure I: Frequency of Impaired oral glucose tolerance test among obese pregnant woman.



DISCUSSION

In 2007, Oldfield and Donley described that the prevalence of gestational diabetes is strongly related to the patient's race and culture.¹² Prevalence rates were higher in black, Hispanic, Native American, and Asian women than in white women. For example, typically, only 1.5-2% of white women

develop gestational diabetes mellitus, whereas Native Americans from the southwestern United States may have rates as high as 15%. In Hispanic, black, and Asian populations, the incidence is 5-8%.¹² In our study, high percentage of gestational diabetes mellitus in obese pregnant women was detected. It was detected that 24% obese pregnant women have gestational diabetes mellitus which was detected by impaired oral glucose tolerance test. While in 2008, Naheed and Kammeruddin described many risk factors for gestational diabetes mellitus. They described that their study may help to diagnose Gestational diabetes mellitus (GDM) in obese pregnant women early in the pregnancy, as obese pregnant women have high rate of Gestational diabetes mellitus (GDM) that is 28%.⁸

In another study, Chu and Callaghan in 2007 described, being overweight, obese or severely obese increases the risk of gestational diabetes mellitus by a factor 2.1, 3.6 and 8.6, respectively.⁶ It is described that gestational diabetes mellitus (GDM) prevalence varies widely depending on the study population; commonly, it has been reported to range between 2 and 7% in the United States.⁶ In a study conducted in 2010 by Caughey and Stotland, Asian women had the highest rate of Gestational diabetes mellitus (GDM) i.e 6.8 percent.⁵ Hedderson and Monique in 2010 described that with increasing rates of gestational weight gain, the risk of Gestational diabetes mellitus (GDM) is doubled.⁷ On the above discussion, it is concluded that gestational diabetes mellitus can be diagnosed early in pregnancy by using oral glucose tolerance test and obese pregnant women have high rate of gestational diabetes mellitus that is 24%. Early diagnosis of gestational diabetes mellitus and early treatment will prevent complications in pregnancy as well as in newborn baby.

CONCLUSION

It is concluded from this study that obese pregnant women have high impaired oral glucose tolerance test frequency. Gestational diabetes mellitus can be diagnosed early in pregnancy by doing oral glucose tolerance test (OGTT).

REFERENCES

1. Papakakis MA. Gestational diabetes. Oral glucose tolerance test. In: Mphée SJ, eds. Current medical diagnosis and treatments. New York: Mc Graw Hill 2007; 782-806.
2. Rockville MD. Screening for gestational diabetes mellitus: Recommendation statement. US Preventive Services Task Force. *Ann Intern Med* 2008;148:759-65.
3. Cheng YW, Caughey AB. Gestational diabetes mellitus: what is the optimal treatment modality. *J Perinatol* 2007;27: 257-8.
4. Fraser R, Farrell T. Diabetes. In: Steer PJ, Weiner CP, Gonik B, eds. High Risk Pregnancy Management Options. 4th ed. Riverport Lane: ELSEVIER saunders; 2011:795-812.
5. Caughey AB, Cheng YW, Stotland NE. Maternal and paternal/ethnicity are both associated with gestational diabetes. *Am J Obstet Gynecol* 2010;202:616.
6. Chu SY, Callaghan WM, Kim SY, Schmid CH, Lau J, England LJ, Dietz PM. Maternal obesity and risk of gestational diabetes mellitus. *Diabetes Care* 2007; 30(8): 2070-6.
7. Hedderson, Monique M, Gunderson, Erica P, Ferrara, Assiamira MD. Gestational Weight Gain and Risk of Gestational Diabetes Mellitus. *J Obstet Gynecol* 2010;115(3):597-604.
8. Naheed F, Kammeruddin K, Haleema A. Frequency of impaired glucose tolerance test in high risk pregnancies for gestational diabetes mellitus. *J Coll Physicians Surg Pak* 2008;18:82-5.
9. Stuebe AM, Mantzoros C, Kleinman K, et al. Gestational glucose tolerance and maternal metabolic profile at 3 years postpartum. *Obstet Gynecol* 2011;118(5):1065-73.
10. O'Reilly MW, Avalos G, Denedy MC, O'Sullivan EP, Dunne F. Atlantic DIP: high prevalence of abnormal glucose tolerance post partum is reduced by breast-feeding in women with prior gestational diabetes mellitus. *Eur J Endocrinol* 2011;165(6):953-9.
11. Kelly L, Evans L, Messenger D. Controversies around gestational diabetes. Practical information for family doctors. *Can Fam Physician* 2005; 51: 688-95.
12. Oldfield MD, Donley P, Walwyn L, Scudamore I, Gregory R. Long term prognosis of women with gestational diabetes in a multiethnic population. *Postgrad Med J. Jun* 2007;83(980):426-30.