



MISSED OUT GESTATIONAL DIABETES MELLITUS ON SCREENING BY FIRST TRIMESTER NORMAL FASTING BLOOD SUGAR

Obstetrics & Gynaecology

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ABSTRACT

Objective: To estimate the number of antenatal patients with normal first trimester fasting blood sugar (FBS) develop gestational diabetes mellitus subsequently in pregnancy when diagnosed with Oral Glucose Tolerance Test (OGTT). **Method:** It is a prospective cohort study conducted over a span of 6 months from November 2022 to May 2023 in antenatal OPD of a tertiary medical college and hospital in Kolkata, India. All the patients with normal first trimester Fasting blood sugar were included in the study and followed longitudinally. Patients were tested for Gestational Diabetes Mellitus by 75 grams Oral Glucose Tolerance Test at 24-26 weeks and again at 32-34 weeks gestation. Statistical Analysis was done by Absolute Risk and percentage of development of Gestational Diabetes Mellitus later in pregnancy in patients having had normal first trimester Fasting blood sugar. **Results:** 128 patients (11.8%) out of 1076 cases with normal first trimester blood sugar developed gestational diabetes mellitus later in pregnancy as diagnosed by 75 grams OGTT. Out of these 58 (45.3%) were diagnosed at 24-26 weeks of gestation and 70 (54.3%) were made at 32-34 weeks of gestation. **Conclusion:** Screening of gestational diabetes mellitus solely by first trimester fasting blood sugar leads to a number of undiagnosed cases. Patients should be followed up by OGTT at 24-26 weeks and 32-34 weeks of gestation.

KEYWORDS

gestational diabetes mellitus, first trimester screening, fasting blood sugar

INTRODUCTION

Gestational diabetes is glucose intolerance that occurs in pregnant women and is characterized by onset or detection during pregnancy¹. The clinical effects of gestational diabetes mellitus ranges from asymptomatic to severe hyperglycaemia. The disease is thought to arise due to insulin resistance by pregnancy hormones which is not adequately compensated by pancreatic beta cells. There are multiple modifiable and non modifiable factors for such conditions, non modifiable factors being obesity, diet, lifestyle, BMI, etc. Data from multiple studies have shown that the prevalence of gestational diabetes has increased over past decades specially in Asian continents. Gestational diabetes pose threat to both mother and fetus like preeclampsia², increased operative interference³, stillbirth⁴, macrosomia, neonatal hypoglycaemia, development of type 2 DM⁵ and cardiovascular disorders⁶, fetal growth restriction, prematurity, increased NICU stay.

Glucose intolerance usually develops in second half of the pregnancy. So women may be euglycaemic or hypoglycaemic in first half of pregnancy but may later develop gestational diabetes mellitus.

International Association of Diabetes and Pregnancy Study Group (IADPSG) has given the diagnostic criteria for Gestational Diabetes by 75 gram OGTT as Fasting > 92 mg/dl, 1hr > 180mg/dl, 2hr > 153mg/dl. American Diabetes Association (ADA) has given the similar criteria.

Asian countries have high prevalence of metabolic syndrome and diabetes mellitus. Hence relying solely on first trimester FBS values may be misleading and lead to under diagnosis of gestational diabetes.

This study is aimed at detecting the percentage of euglycaemic women in first trimester who develop Gestational Diabetes later in pregnancy as diagnosed by 75 gram OGTT at 24-26 weeks and again at 32-34 weeks of gestation.

MATERIALS AND METHODS

It is a prospective cohort study conducted over a span of 6 months from November 2022 to may 2023 in antenatal OPD of a tertiary medical college and hospital in Kolkata, India.

Ethical clearance was given by Institutional Ethics Committee ECR/35/Inst/WB/2013/RR-19 on 15th of September, 2022.

Patients with normal first trimester blood sugar value were enrolled in the study after proper consent. Patients having glucose intolerance in previous pregnancy or a known case of type 1 or type 2 diabetes

mellitus were excluded from the study. Nulliparous women aged more than 34 years and obese women with BMI more than 30kg/m² were excluded as well.

1160 patients were enrolled in their first trimester and followed longitudinally throughout the pregnancy. 84 patients were lost to follow up due to change in the site of primary contact with the health care worker, distant location, early second trimester fetal loss and unwilling to share details. Hence 1076 patients were tested for GDM by 75 grams OGTT at 24-26 weeks and again at 32-34 weeks of gestation.[figure1]

Data analysis was done based on OGTT at 24 – 26 weeks and 32 -34 weeks of gestation. Any participant with 1hr 75 grams OGTT > 180mg/dl or 2hr 75 grams OGTT > 153 mg /dl at 24-26 weeks or at 32-34 weeks or both was considered case of gestational diabetes mellitus.

Statistical analysis was done by absolute risk and percentage of development of gestational diabetes mellitus later in pregnancy in patients having had normal first trimester fasting blood sugar.

RESULT

A total of 1160 patients were enrolled in the study in their first trimester having normal fasting blood sugar value. 84 of them were lost to follow up. 1076 patients with normal first trimester fasting blood sugar were evaluated at their respective 24 – 26 weeks and 32 – 34 weeks of gestation with 75 grams OGTT.

Any participant with 1hr 75 grams OGTT > 180 mg / dl or 2 hr 75 grams OGTT > 153 mg / dl at 24 – 26 weeks or at 32 – 34 weeks or both was considered case of gestational diabetes mellitus.

128 (11.8 %) of patients with normal first trimester fasting blood sugar developed gestational diabetes mellitus later in pregnancy as diagnosed by 75 grams OGTT.

Out of these 58 patients (45.3 %) were diagnosed at 24 – 26 weeks. 70 patient (54.3 %) were diagnosed at 32 – 34 weeks of gestation.

DISCUSSION AND CONCLUSION

Gestational diabetes mellitus is the glucose intolerance that is first developed or diagnosed in pregnancy. Hyperglycaemia in high risk women usually sets in or aggravates in second trimester. In this study we tried to explore the percentage of euglycaemic and low risk women in their first trimester develop gestational diabetes mellitus subsequently later in pregnancy.

Mothers in their first trimester with normal fasting blood sugar ($<92\text{mg}\%$)⁷ were included in the study. Women with high risk factors like age > 34 years, obesity ($\text{BMI} > 30\text{kg}/\text{m}^2$), strong family history of diabetes mellitus, glucose intolerance in previous pregnancy, macrosomia in any previous pregnancy, any history of glycosuria were excluded from the study⁸. Their demographic features were documented [table1]. A total of 1160 patients were recruited in the study from antenatal OPD of a tertiary medical college [figure1]. Unfortunately 84 were lost to follow up, so 538 patients were followed longitudinally. They were tested for development of gestational diabetes mellitus by performing 75 grams OGTT at 24 – 26 weeks and again at 32 – 34 weeks of gestation.

128 (11.8%) patients out of 1076 who had normal first trimester fasting blood sugar developed gestational diabetes mellitus when tested with 75 gram OGTT at 24 – 26 weeks of gestation and again at 32 – 34 weeks of gestation. Out of these 128 patients, 58 (45.3%) were diagnosed at 24 – 26 weeks and rest 70 patients (54.6%) were diagnosed at 32 – 34 weeks of gestation.

Prevalence of diabetes mellitus has rampantly increased over last few decades especially in Asian continents⁹. The same trend follows for gestational diabetes mellitus. Most of the gestational diabetes mellitus go undiagnosed since most obstetricians prefer first trimester solely as a screening test for diabetes in pregnancy. And if fasting blood sugar in the first trimester is in normal level, physicians as well as the patients are usually reluctant to follow up with OGTT later in pregnancy owing to economical crisis, multiple hospital visits, and lack of knowledge about increasing prevalence of diabetes. Multitudes of mothers are not followed with standard guide lines to screen gestational diabetes mellitus by OGTT. Hence major populations of mothers are undiagnosed and ultimately present with complications of gestational diabetes mellitus.

Under diagnosis of gestational diabetes mellitus causes multitude of complications in mothers, fetus and eventually in newborn. The complications include pre-eclampsia, early delivery, increased operative interference, shoulder dystocia and birth injuries, intensive neonatal care, neonatal hypoglycaemia, neonatal hyperbilirubinaemia, increased birth weight. The long term complications in mother include development of diabetes mellitus, metabolic syndrome, and cardiovascular events. The long term effects on offsprings might be type 1 diabetes mellitus, type 2 diabetes mellitus, obesity, change in appetite towards positive caloric balance and metabolic syndrome¹⁰. To prevent complications of gestational diabetes mellitus to the mother, fetus and the offspring all mothers should be screened with OGTT at 24 – 26 weeks of gestation and again at 32 – 34 weeks of gestation irrespective of their first trimester blood sugar values.

Table1: Demographic Features Of The Patients And Respective Mean Value At The Time Of Recruitment

Demographic feature	Mean value at recruitment
Age	22 years
BMI	24 kg/m^2
Fasting blood sugar in first trimester	86.5 mg/dl

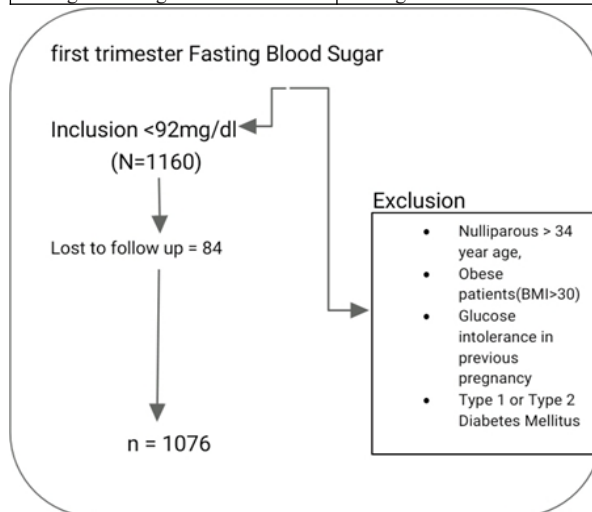


Fig. 1 : data collection with inclusion and exclusion criterias

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