



Research Article

**PREVALENCE OF GESTATIONAL DIABETES MELLITUS IN NATIONAL MEDICAL
COLLEGE & TEACHING HOSPITAL, BIRGUNJ, NEPAL**

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Abstract: *Backgrounds:* Gestational diabetes mellitus (GDM) is a common metabolic disorder that occurs during pregnancy. It can cause significant problems, including maternal and prenatal complications, and metabolic disorders in offspring of mothers with GDM. *Objectives:* The study was conducted to determine the prevalence and outcomes of gestational diabetes mellitus (GDM). *Methodology:* A cross-sectional study involving 871 women between 24 weeks to 28 weeks gestation who visited gynecology OPD of National Medical College, Birgunj for their antenatal care were performed glucose challenge test (GCT) and oral glucose tolerance test (OGTT) for the confirmation of gestational diabetes. *Results:* The present cross-sectional hospital-based study showed the prevalence of GDM as 8.29%. Our results showed that significantly increase in BMI, blood glucose level measured by OGTT at 0, 1, 2 & 3 hrs respectively fulfilling the standard criteria for the confirmatory diagnosis of GDM ($P < 0.001$). *Conclusion:* GCT followed by OGTT is one of the best methods to determine prevalence and screening of gestational diabetes.

Key words: Gestational diabetes, Glucose challenge test, Oral glucose tolerance test

Introduction

It is one of the emerging serious public health problems occurring during pregnancy¹. Gestational diabetes is defined as carbohydrate intolerance of variable severity with onset or first recognition during pregnancy², existed as a concept as early as 1946³ and was invoked to explain high perinatal mortality rates in pregnancies of women who subsequently developed diabetes. Pregnancy is associated with relative carbohydrate intolerance and insulin resistance. Pregnancy is a diabetogenic condition characterized by insulin resistance with a compensatory increase in β -cell response and hyperinsulinemia. Insulin resistance usually begins in the second trimester and progresses throughout the remainder of the pregnancy. Insulin sensitivity is reduced by as much as 80%. Placental secretion of hormones, such as progesterone, cortisol, placental lactogen, prolactin, and growth hormone, is a major contributor to the insulin-resistant state seen in pregnancy⁴.

GDM affects ~ 7% of all pregnancies, resulting in > 200,000 cases per year⁵. Depending on the population sample and diagnostic criteria, the prevalence may range from 1 to 14%^{5,6}. Of all pregnancies complicated by diabetes, GDM accounts for ~ 90%⁷. It can cause significant problems, including maternal complications, perinatal complications, and metabolic disorders in offspring of mothers with GDM. Gestational diabetes mellitus has been recognized as a risk factor for a number of adverse outcomes during pregnancy, including excessive fetal growth, an increased incidence of birth trauma, cesarean delivery, macrosomia and neonatal metabolic abnormalities such as polycythemia, hyperbilirubinemia, hypoglycemia,

hypocalcemia, hypertension, preeclampsia, diabetic retinopathy and diabetic nephropathy⁷.

Untreated gestational diabetes mellitus (GDM) was demonstrated to have increased perinatal mortality rate up to fourfold compared with that of control⁸.

The traditional and most often reported risk factors for GDM are high maternal age, weight and parity, previous delivery of a macrosomic infant, and family history of diabetes⁹.

Early identification of gestational diabetes during pregnancy may reduce the risk of adverse birth outcomes and increase the likelihood that glucose levels might be managed through diet and exercise, and therefore eliminate the need for medications¹⁰.

About 40 percent of all women diagnosed with gestational diabetes will develop diabetes within 20 years of their pregnancies. Infants born to mothers with diabetes (gestational as well as pre-existing) during pregnancy tend to have compromised beta cells, making these offspring more vulnerable to developing diabetes and probably obesity during childhood¹¹.

Material and Methods

This study was conducted in the Department of Biochemistry in National Medical College, Birgunj, involving pregnant women between 24 to 28 weeks gestation for 1 year. Women who are known to have diabetes prior to index pregnancy, urinary tract infection (UTI), major chronic diseases like carcinoma, tuberculosis and diseases leading to accumulation of fluid and

appearance of protein in urine like congestive cardiac failure (CCF), renal failure and advanced liver failure were excluded while pregnant women between 24th to 28th week of gestation were included in present study.

The present study was conducted in 871 pregnant subjects visited Gynaecology OPD of NMCTH, Out of 871 subjects, 105(8.29%) were diagnosed as GDM. The subjects were categorized as following;

Group 1: Normal healthy non-diabetic pregnant subjects as Control

Group 2: Gestational Diabetes Mellitus

5 ml of venous blood was collected and initial screening was performed for serum glucose concentration

after 1 hr of 50gm oral glucose load via Glucose challenge test [GCT] irrespective of their fed state. If the concentration of blood glucose exceeds 140mg/dl in GCT, only for those experimental subjects final OGTT was done for the conformation of gestational diabetes mellitus.

The OGTT test was done after another 3 days of normal diet for which subjects were given 75gm Oral Glucose load and Glucose Tolerance Test (GTT) was performed respectively on 0 hr, 1 hr, 2 hrs & 3 hrs consecutively.

Statistical analysis were done by student T – Test via SPSS version 16.0.

Table No1: Showing physiological parameter in group 1 and group 2 subjects.

Parameters	Group 1(Control,N=698)	Group 2(Test,N=173)
Age(year)	25-35	25-35
BMI(kg/m ²)	23.44±2.27	28.36± 2.02*
SBP(mmHg)	115±5.00	126±3.36 ^{NS}
DBP(mmHg)	75±3.00	80±5.00 ^{NS}

Table showing values expressed in the form of Mean ± SD, * Showing significant at P<0.001 in group 1 and group 2 subjects, NS: Non Significant

Table No 2: Showing OGTT in group 1 and group 2 subjects in 0 hr,1 hr,2 hr &3 hr respectively.

OGTT	Group 1(Control,N=698)	Group 2(Test,N=173)
0hr(mg/dl)	80 ± 4.37	95±5.00*
1hr (mg/dl)	160 ± 5.23	190±6.52*
2hr (mg/dl)	135 ± 6.02	165±5.45*
3hr(mg/dl)	115 ± 3.5	143±7.29*

* Showing significant at P<0.001 in group 1 and group 2 subjects.

Results

The results of the table 1 shows that only BMI was significantly increased in Group 2 subjects as compared with Group 1 subjects (P<0.0001). The blood pressure (SBP&DBP were insignificant in both Group I & Group II subjects. The results of the table 2 shows OGTT at 0 hr, 1 hr, 2 hrs & 3 hrs consecutively were significantly increased in Group II as compared with Group I subjects (P<0.0001). OGTT test was performed for only those subjects who answered GCT >140mg/dl.

Discussion and Conclusion

Gestational diabetes (GDM) is defined as carbohydrate intolerance that begins or is first recognized during pregnancy. Diabetes mellitus is an epidemically explosive problem which is increasing at an unstoppable pace. Our findings of this study are largely at tandem with those of literature at the national as well as international level. The present cross sectional hospital-based study, which was the first of its kind to be undertaken in Birganj, National Medical College, showed the prevalence of GDM as 8.29%. GDM prevalence has been reported variably from 1.4 to 14% worldwide and differently among racial and ethnic groups.

Classical risk factors for developing gestational diabetes are: Polycystic Ovary Syndrome, a previous diagnosis of gestational diabetes or prediabetes, impaired glucose tolerance, or impaired fasting glycaemia, a family history revealing a first-degree relative with type 2 diabetes, being overweight i.e obesity, previous poor obstetric history, certain polymorphism which are associated with an increased risk of gestational diabetes, most notably TCF7L2.

Our results are showing significantly increase in BMI, blood glucose level measured by OGTT at 0, 1 2 & 3 hrs respectively fulfilling the standard criteria for the confirmatory diagnosis of GDM (P<0.001). The reason for GDM this area may be due to high maternal age, weight and parity, previous delivery of a macrosomic infant, and family history of diabetes. The number of fetuses in multifetal pregnancies may influence the incidence of GDM owing to the increased placental mass and, thereby, the increase in diabetogenic hormones. Our results are in consistent with Ben-Haroush et al.2003.

Finally our study concludes that universal screening using 50g glucose challenge test and OGTT after 3 days of GCT is superior to risk-based screening in detecting gestational diabetes mellitus and is a feasible strategy for use in a Nepalese population.

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