

PREVALENCE OF GESTATIONAL DIABETES, RISK FACTORS AND ITS OUTCOME IN A TERTIARY HOSPITAL

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ABSTRACT

Gestational diabetes mellitus (GDM) is defined as any degree of glucose intolerance with onset or first recognition during pregnancy. GDM increases the risk of adverse maternal and perinatal outcome and increases risk of diabetes in mother and child in the future. Prevalence of GDM is increasing all over the world. This is hospital based cross sectional study done in Department of Obstetrics and Gynecology, Nepal Medical College and Teaching Hospital to find out the prevalence of GDM and to trace maternal and fetal risk factors and adverse outcome. In this study, 600 pregnant women were enrolled during 2016-17. Among them 27 (4.5%) were found to have GDM. Among GDM, four (14.4%) were ≥ 35 years old and six (22.2%) had BMI of ≥ 25 kg/m². Caesarean section was more common mode of delivery in women with GDM than without (51.9% vs 22.2%). Increased prevalence shown in this study necessitates universal screening of GDM.

KEYWORDS

Gestational diabetes mellitus, glucose intolerance, prevalence, perinatal outcome

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INTRODUCTION

Gestational diabetes mellitus (GDM) is defined as any degree of glucose intolerance with onset or first recognition during pregnancy.¹ GDM increases the risk of adverse maternal and perinatal outcome and also increases risk of future diabetes to the mother and their child.² Maternal complications of GDM includes polyhydramnios, pre-eclampsia, prolonged labor, obstructed labor, caesarean section, uterine atony, postpartum hemorrhage and infection. Fetal and neonatal complication includes spontaneous abortions, intra uterine death, stillbirth, congenital malformation, shoulder dystocia, birth injuries, neonatal hypoglycemia and infant respiratory distress syndrome (RDS).^{3,4} To reduce these adverse effects of GDM, it is necessary to diagnose early and treat GDM.

International Diabetes Federation (IDF) in 2017 estimated that in 2017 there were 451 million (age 18-99 years) people with diabetes worldwide. Twenty-one million thirty thousand (16.2%) live births had some form of hyperglycemia in pregnancy. Approximately 18.4 million of these cases were due to GDM. The vast majority of cases of hyper-glycaemia in pregnancy were in low and middle-income countries where access to maternal care is often limited. The prevalence of hyperglycaemia in pregnancy increases with age and is highest in women over the age of 45.⁵

There are ethnic and geographic variation in the prevalence of GDM.⁶⁻¹⁶ GDM prevalence was also higher in Aboriginal women than in non-Aboriginal women.¹³ Prevalence of GDM also varies with screening test.

In a background of prevalence of increasing trend of GDM in the world and it being a condition which brings serious adverse outcome to mother and baby, we conducted this study at our institution to look at the prevalence of GDM in our place. In addition only a few recent researches were done in the field of GDM in Nepal.

MATERIALS AND METHODS

This was a prospective hospital based study. The study was done in Department of Obstetrics and Gynecology, Nepal Medical College Teaching Hospital, a tertiary care hospital situated in Kathmandu. It was done over a period of one year from August 2016 to July 2017.

After approval of proposal by Nepal Medical College Teaching Hospital Institutional Review Committee, all the pregnant ladies coming to the antenatal (ANC) visit at 24 to 28 weeks of gestation were enrolled in the study. Pregnant ladies, with previous known history of diabetes were excluded from the study. After taking consent from these ladies, age, pre-pregnant weight, family history

of Diabetes Mellietes, obstetric history (previous pregnancy loss, macrosomia) were recorded. BMI was calculated with height and pre-pregnancy weight told by patient. BMI was calculated with formula weight in kg/height in meter².

All the enrolled cases were asked to come with nil per orally next day. After confirming of more than 8 hrs of fasting, fasting blood glucose test was done. Seventy-five gm of glucose in 300 ml of water was given orally, to be taken within 5 minutes. Blood glucose test was done again after 2 hrs of ingestion of glucose. If the patient vomits, then the test was repeated next day (both fasting and OGTT).

GDM was diagnosed according to WHO criteria if either the fasting glucose was ≥ 125 mg/dl or the two hours glucose was ≥ 140 mg/dl. Patients who had positive glucose test were sent for the medical management to the Physician. Maternal outcome and fetal outcome were followed and evaluated at regular ANC visits, during delivery and post delivery till discharge. Adverse events like UTI, HTN (defined as BP $\geq 140/90$ mm of Hg) pre-eclampsia and eclampsia were noted for each patient. At the time of delivery, types of delivery and complications were noted. For fetal outcome fetal weight, presence of Neonatal hypo-glycaemia and RDS were recorded. All the data were tabulated and process with software SPSS-16. Fisher's exact test was used for data analysis. Statistical significance was considered as P value ≤ 0.05 .

RESULTS

In this study 600 out-patient pregnant ladies were enrolled from department of Obstetrics and Gynecology, Nepal Medical College Teaching Hospital. Among them, 27 cases (4.5%) were found to have GDM.

Among those with GDM (27), four cases (14.8%) were of 35 years or above, but among non GDM (573) only 12 cases (2.1%) were of 35 years or above (P value = 0.0041). BMI ≥ 25 kg/m² were seen in six (22.2%) GDM patients and 18 (3.1%) in non GDM (P value = 0.0004) (Table 1).

Among 27 GDM pregnant ladies we found significant family history and obstetric history of five cases (18.5%) each, where as among non GDM three (0.5%) cases were with significant family history and 17 (2.9%) with significant obstetric history (P values 0.0001 and 0.002) (Table 1).

In the study, there were three cases (11.1%), which were complicated by Gestational hypertension and pre-eclampsia, one case (3.7%) had Polyhydramnios and six cases (22.2%) developed Urinary tract infections among GDM mothers (Table 2).

Table 1: Risk factors for GDM (Total 600 cases)

Risk factors	Among GDM (27)	Among non GDM (573)	P value
Age \geq 35	4 (14.8%)	12 (2.1%)	0.0041
BMI \geq 25 kg/m ²	6 (22.22%)	18 (3.14%)	0.0004
Previous pregnancy loss	5 (18.5%)	17 (2.9%)	0.0020
Diabetic parents and siblings	5 (18.5%)	3 (0.5%)	0.0001

Fisher's exact test one-tailed P value

Delivery complicated with vacuum delivery was one (3.7%) among GDM and 19 (3.3%) among non GDM (P value = 0.6079). There were 14 cases (51.9%) of GDM and 127 (22.2%) of non GDM had LSCS in the study (P value = 0.0010) (Table 3).

Table 2: Complications of GDM at ANC (Total 27 cases)

Complications	Among GDM (27)
Gestational hypertension/preeclampsia	3 (11.1%)
Polyhydramnios	1 (3.7%)
UTI	6 (22.2%)

Table 3: Delivery complications (Total 600 cases)

Complications	Among the GDM (n=27)	Among non GDM (n=573)	P value
Instrumental delivery	1 (3.7%)	19 (3.3%)	0.6079
LSCS	14 (51.9%)	127 (22.2%)	0.0010

Fisher's exact test one-tailed P value

Table 4: Neonatal complications (Total 600 cases)

Complications	Among the GDM (n=27)	Among non GDM (n=573)	P value
Macrosomia		3 (0.5 %)	
Infant respiratory distress syndrome	1 (3.7%)	4 (0.7%)	0.2063
Perinatal Mortality	1 (3.7%)	6 (1%)	0.2767

Fisher's exact test one-tailed P value

There was no significant increased rate of complications in neonates among GDM as compare to non GDM. Infant RDS was one (3.7%) among GDM and four (0.7%) among non GDM cases (P value = 0.2063). Perinatal mortality was also found non-significantly increased among

GDM as compare to non GDM one (3.7%) six (1%) (P value = 0.2767) (Table 4).

DISCUSSION

According to the International Diabetes Federation in 2017, 16.2% of live births had some form of hyperglycemia in pregnancy and an estimated 85.1% were due to GDM.⁵ This is very high prevalence. Our study showed the prevalence of GDM in our hospital is 4.5%, and this prevalence rate is not low. Similar result was found in the study done in Turkey by Erem et al where prevalence of GDM was found 4.8%.¹⁷ In contrast to these Nwaokoro *et al* found the prevalence of GDM 19%, where the sample size was small with only 100 cases.¹⁸

The prevalence of GDM in India varies in different parts of the country, depending on the geographical locations and diagnostic methods used. The prevalence of gestational diabetes has been reported to range from 7.8% in Kashmir,¹⁹ 9.5% in Western India,²⁰ and 18.9% in Chennai.²¹ In more recent studies, using different criteria, prevalence rates as high as 35% from Punjab,²² and 41% from Lucknow have been reported.²³ The geographical differences in prevalence have been attributed to differences in age and/or socioeconomic status of pregnant women in these regions.

Nepal is a small country with different geographic variations and with different ethnicity. A very few studies have been done with variable results. Prevalence of 4.5% of GDM in our study is quite high in compare to other studies done in Kathmandu. Prevalence of GDM in a study done in Tribhuvan University Teaching Hospital (TUTH) Kathmandu was 0.6%, in Dhulikhel Hospital, it was 0.75% and in Kathmandu Medical College, it was 1.58%.²⁴⁻²⁶ In all these studies screening test was done with 50 gm GCT and confirmation done with 75 gm OGTT. These studies were done long time back as compared to our study. This may be the cause for less prevalence of GDM in these studies.

Prevalence of GDM was high in a study done in Terai region of Nepal. In the study done in National Medical College Birgunj, using GCT and OGTT the prevalence was 8.29%.²⁷ The reason may be due to geographical difference and ethnic variation compared to Kathmandu. Such ethnic and geographic differences in the prevalence of GDM also seen in other studies.⁶⁻¹⁶ Another study done in similar climatic region and similar ethnical group in Nepal, done by Yadav et al showed the prevalence of 4.8%.²⁸ Total number of GDM positive in the study done by Thapa et al was 2.5% according to WHO criteria and 6% according to IADPSG criteria.²⁹ Thapa et al did the study in three different rural districts of Nepal with different geographical area and different ethnical groups, but there were non-significant difference

in GDM prevalence by district and ethnic group. This type of difference was seen in the study done by Ferrara A.¹¹ GDM is in increasing trend world wide,^{7,12,14,15} and same can be seen in Nepal.²⁴⁻²⁹

Maternal age is strongly associated with GDM. In many studies it was reported that prevalence of GDM is increased with maternal age.^{4,5,17,25} In our study prevalence of GDM is also significantly increasing with maternal age. Prevalence of GDM ≥ 35 years was 14.8%, whereas age less than 35 was 2.9%. Type II diabetes mellitus is usually occurred in elder people. This may be the reason of increase prevalence of GDM in ≥ 35 years pregnant ladies.

Obesity is another risk factor for GDM. Most of the studies showed that high BMI had more prevalence of GDM than low BMI.^{4,6,7,10,16,17} In our study like other studies significant risk of GDM was seen with increased BMI.

Significant positive obstetric and family history was important risk factors for GDM in this study. Previous pregnancy loss was found in 18.5% among the GDM whereas only 2.9% among non GDM. This may be due to uncontrolled hyper glycaemia in previous pregnancy. Similar result also found related with positive family history. Family history is the main risk factor for Diabetes II and GDM is also one of the future risks for Diabetes II. This may be the reason for possibility of type II Diabetes in future and is shown by

several studies.^{10,18}

The maternal complications of GDM are hypertension, preeclampsia, urinary tract infection, polyhydramnios, increased operative intervention during delivery and future Diabetes Mellitus.³ All the diagnosed GDM cases were well treated with diet, insulin and termination of pregnancy done when required.

There was no significant difference in instrumental deliveries, but LSCS was significantly high, 51% among GDM and 22.2% among non GDM. Similar finding was seen in a study done by Siribaddana et al.³⁰

Fetal complications were not significantly increased among GDM in the study. This may be due to appropriate treatment done at time during pregnancy.

Prevalence of GDM is increasing even in Nepal, so universal screening is necessary. Accurate diagnosis and treatment at right time reduces fetal and maternal complications. It is necessary to go for better way of screening, to make it affordable for universal screening.

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