

# Prevalence of Diabetes and Associated Conditions in Women Coming for Delivery in a Tertiary Care Centre of Kumaon Region of Uttarakhand

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## ABSTRACT

**Introduction:** Diabetes in pregnancy either gestational or type 1 or 2 is associated with morbidity for both the mother and fetus. It can lead to a lot of complications during antenatal, peripartum and postpartum period. Increased rate of LSCS, macrosomic fetus, difficulties during delivery (e.g. obstructed labour, shoulder dystocia), congenital anomalies in the baby, stillbirth are very frequently associated with diabetes. This Study was conducted to analyze the prevalence of diabetes (either Gestational or Pre-Gestational) and associated conditions and draw a comparative evaluation in women coming for delivery in the labour room of Govt. Medical college, Haldwani, Uttarakhand.

**Material and methods:** All the women who came for delivery during the period from January 2017 to December 2018 were tested for blood sugar regardless of whether they are follow up patients or coming for the first time and also regardless of their antenatal history. After detailed history and examination GCT with 75gm glucose was done. Depending on the 2-hour glucose level and history, diagnosis of GDM or Pre- Gestational diabetes were made.

**Result:** During the study period total 8228 deliveries occurred in the labour room of Govt. Medical college, Haldwani, Uttarakhand. Of all these women 24(0.3%) were diagnosed with GDM or DM by the history and tests conducted at the time of admission. Of the 24 patients of diabetes 4(16.7%) were associated with Pregnancy induced hypertension, 6(25%) were associated with hypothyroidism and 10(41.7%) had no associated condition. 9(36.7%) patients of the 24 delivered before 36 week of gestational age and 15(73.7%) delivered at gestational age of more than 36 week. The mode of delivery was LSCS in 19(79.16%) patients of the total 24 patients.

**Conclusion:** Any form of diabetes either Gestational or Pre-Gestational is a major cause of increased morbidity and mortality in pregnancy for both mother and fetus. Diabetes can develop any time during pregnancy and so there are chance of missing on the diagnosis of diabetes by mere one time testing of blood sugar. So it is very necessary to keep repeating the sugar testing (glucose challenge test) in a pregnant women at a significant time interval. Even in women coming for delivery irrespective of the history a blood sugar testing should be done not only for diagnosis, but also for assessing the degree of insulin resistance.

**Keywords:** Diabetes and Associated Conditions

a risk factor for diabetes, so the pregnant women are at even greater risk for developing diabetes. Gestational Diabetes Mellitus (GDM) is a form of hyperglycemia. Similar to other form of hyperglycemia, GDM is a disease of the pancreatic  $\beta$  cells, which do not produce sufficient insulin to meet the increased requirements of late pregnancy. Traditionally, it has been thought and taught that GDM develops when  $\beta$  cells fail to keep pace with the increasing insulin resistance that occurs during the second half of pregnancy. The resultant increasing imbalance between insulin demand and supply manifests itself as rising glucose levels, especially during the second half of pregnancy when insulin resistance is the greatest. In this scenario, glucose regulation returns to normal postpartum, only to resurface years later as impaired glucose levels and diabetes mellitus, usually T2DM.

Prevalence in pregnancy is as high as 16.55%.<sup>2</sup> Diabetes in pregnancy can be divided in two categories: overt or pre-existing diabetes (type 1 and type 2) and Gestational Diabetes Mellitus. GDM is defined as glucose in tolerance with onset or first recognition during pregnancy.<sup>3</sup> GDM if not managed can lead to various complications like pre-eclampsia, macrosomia, increased incidence of C- section, complications during delivery like shoulder dystocia, increased risk of birth injuries. Overweight and obesity are known risk factors for diabetes.<sup>4</sup> In case of GDM two generations are at risk of developing Diabetes in the future- both mother and the baby.<sup>5</sup> International Diabetes Federation (IDF) had given data that 20.9 million or 16.2% of live births to women in 2015 had some form of hyperglycemia in pregnancy and 85.1% of these cases were due to GDM.<sup>6</sup> Since India is one of the at risk countries for diabetes during pregnancy, a universal screening is adopted in our country. Therefore, it is very important to assess how successful we are in preventing the adverse effects of diabetes. It is also important to assess the epidemiological differences in

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prevalence. In this study we assess the prevalence of diabetes and associated morbidities in women coming for delivery in a tertiary care centre in kumaon region of Uttarakhand.

## MATERIAL AND METHODS

The study was conducted during the period from January 2017 to December 2018 in the labor room of Dept. of Obstetrics and Gynecology, Govt. Medical College, Haldwani, Uttarakhand. All the women who delivered during this period were included in the study. A detailed history and examination of these patients was done and also their antenatal records analyzed to find out whether they are a known case of Diabetes mellitus or GDM. In all of these women regardless of the fact whether they are follow up patients or coming for the for the first time with no antenatal records or those with no record of blood sugar level, GCT (Glucose Challenge Test) was done, as it is a one step screening and diagnostic procedure. For GCT the patients' were asked to consume 75gm anhydrous glucose powder dissolved in 250 ml water within 5 minutes irrespective of the status of last meal. GDM was diagnosed if 2-h glucose concentration was more than 140 mg/dl. If blood sugar was more than 200 mg/dl diagnosis of overt or pre-gestational or overt diabetes was made. All the old and newly diagnosed patients of DM and GDM were managed accordingly.

## RESULTS

An analysis of the history, examination and tests of the women coming for delivery in the labour room during the period from January 2017 to December 2018 showed results that were properly calculated and compared. During this period total 8228 deliveries occurred in the labour room of Govt. Medical college, Haldwani, Uttarakhand. Of all these women 24(0.3%) were diagnosed with GDM or DM by the history and tests conducted at the time of admission.

Of the 24 patients of diabetes 4(16.7%) were associated with Pregnancy induced hypertension, 6(25%) were associated with hypothyroidism and 10(41.7%) had no associated condition. 9(36.7%) patients of the 24 delivered before 36 week of gestational age and 15(73.7%) delivered at gestational age of more than 36 week. The mode of delivery was LSCS in 19(79.16%) patients of the total 24 patients.

## DISCUSSION

In the United States of America, prevalence of both pre-existing and gestational diabetes increased from 2000 to 2010.<sup>7,8</sup> In 2016, the crude national prevalence of preexisting diabetes among women with live birth was 0.9% and prevalence of gestational diabetes was 6%. Two studies from Kaiser Permanente health systems in the U.S.A.<sup>9,10</sup> assessed rates in pregnant women of multiple ethnicities after a standardized diagnostic approach for GDM had been applied over 9-10 years periods between 1991 and 2002. In both these studies, incidence rates of GDM rose over time, from slightly less than 4% to more than 6%. In our study the prevalence of GDM or diabetes in pregnancy was found to be 0.3%.

In a study conducted Yogev Y, et al.<sup>11</sup> showed that 65% of patients with severe preterm delivery were in poor diabetic control in comparison to 46% in the non-severe preterm group. In our study 36.7% of the patients with gestational diabetes or pre-gestational diabetes delivered at a gestational age of less than 36 week. In a study conducted by Hajieh Shahbzian et al<sup>12</sup> showed that among 22 patients of GDM, 21 patients (95.5%) had normal thyroid and one patient (4.5%) had subclinical hypothyroidism and among 39 patients with pre-gestational diabetes, 29 cases (74.4%) had normal thyroid function and 10 cases (25.6%) had thyroid dysfunction. In our study 6 (25%) of the 24 patients of GDM or diabetes during pregnancy were associated with hypothyroidism.

According to some studies pre-existing diabetes is a risk factor for preeclampsia. In comparison to the relatively low incidence in a non-diabetic women (2-7%)<sup>13,14</sup> preeclampsia is diagnosed in 15-20% pregnancies in women with type 1 diabetes<sup>15-17</sup> and 10-14% of pregnancies in women with type 2 diabetes.<sup>18,19</sup> A retrospective investigation of 647, 392 pregnancies in the German Perinatal Quality Registry examined the relation between GDM and preeclampsia while controlling for common risk factors. The authors found that the odds of preeclampsia were increased among women with GDM (adjusted odds ratio (aOR): 1.29, 95% CI: 1.19-1.41), even after controlling for age, nationality, job status, smoking, parity, multifetal pregnancy, pre-pregnancy weight status and gestational weight gain.<sup>20</sup> In our study 4 (16.7%) of 24 patients of GDM and pre-gestational were associated with PIH.

In a study conducted in a tertiary care center in North Karnataka<sup>21</sup> the prevalence of LSCS in patients of GDM or diabetes during pregnancy was found to be 70.3% whereas in our study the prevalence of LSCS was estimated to be 79.16%.

## CONCLUSION

Even though there is a high risk for GDM in India in pregnant women but prevalence in our study was less in our study in comparison to other studies. One of the reasons for this could be because in interior regions of Kumaon in Uttarakhand a lot of women don't come to hospitals for delivery. Other reason that can be is food and work habits and also the climate and topography. Pre-obesity and obesity is less women of this region

Studies including our study do show association of GDM or pre-gestational pregnancy with thyroid dysfunction. In our study all associated cases of thyroid dysfunction were of hypothyroidism. Hypothyroidism is common in the hilly areas and also in pregnancy. This can be a potential explanation for this association in our study.

All the data including the one in this study shows that diabetes during pregnancy can itself give rise to other morbid conditions and contributes to complications and difficulty during pregnancy and delivery, which makes it very necessary to be vigilant towards blood sugar of all pregnant women. Any pregnant lady who comes for delivery need to have their blood sugar checked even if previous sugar levels

were normal because insulin resistance can develop at any time during pregnancy even at later stages.

## ABBREVIATIONS

**GCT-** Glucose Challenge Test, **GDM-** Gestational Diabetes Mellitus, **DM-** Diabetes Mellitus, **T2DM-** Type 2 Diabetes Mellitus

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