

# Prevalence of pre-gestational diabetes in pregnancy

V Ramadevi

Associate Professor, Department of Obstetrics and Gynecology, Fathima Institute of Medical Sciences, Nagaraj palli, Pulivenduma Road, Kadapa-516003, INDIA.

Email: [rama1963@gmail.com](mailto:rama1963@gmail.com)

## Abstract

**Background:** According to the International Diabetes Federation (IDF), the epidemiology of diabetes during pregnancy is unknown in many countries in the world. **Aim:** To determine the prevalence of pre-gestational diabetes among the antenatal women attending a tertiary care center and to study the associated factors. **Materials and methods:** This is a cross sectional study in a duration of 1 year in 350 patients with Gestational age between 24th and 28th weeks attending our antenatal OPD during the study period. **Results:** Prevalence of pre-gestational diabetes was 3.4% in our study group. Family history of diabetes, history of GDM in previous pregnancy, history of IUD, History of abortion, Thyroid disorder and candidiasis were found to have significant association with diabetes. **Conclusions:** As diabetes in pregnancy is a major public health problem, it is mandatory to establish national guidelines for the screening and management of GDM and pre-GDM

**Key Words:** pre-gestational diabetes, pregnancy.

## \*Address for Correspondence:

Dr. V. Ramadevi, Associate Professor, Department of Obstetrics and Gynecology Fathima Institute of Medical Sciences, Nagaraj palli, Pulivenduma Road, Kadapa-516003, INDIA.

Email: [rama1963@gmail.com](mailto:rama1963@gmail.com)

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## INTRODUCTION

India is the diabetes capital of the world with 41 million Indians having diabetes. Every fifth diabetic in the world is an Indian.<sup>1</sup> Hence relatively pregnant population is at greater risk for developing diabetes in India and the prevalence is as high as 16.55%. The increasing prevalence in developing countries is related to increasing urbanization, decreasing levels of physical activity, changes in dietary patterns and increasing prevalence of obesity.<sup>2,3,4,5</sup> As women with gestational diabetes mellitus (GDM) and their children are at increased risk of developing diabetes mellitus in future, special attention should be paid to this population especially in developing countries. GDM is defined as glucose intolerance of varying degree with onset or first recognition during pregnancy.<sup>3</sup> Prevalence of gestational diabetes mellitus

varies widely. Depending on the population studied and the diagnostic test employed, prevalence may range from 2.4 to 21 per cent of all pregnancies.<sup>2,6</sup> In India it is difficult to predict any uniform prevalence levels because of wide differences in living conditions, socio-economic levels and dietary habits. The data regarding prevalence of GDM and the number of women affected are important to allow for rational planning and allocation of resources and the preventive strategies that may be undertaken in future. Because widely different prevalence rates have been observed in studies in different regions of India, multiple regional studies in different subtypes of populations are needed for quantifying prevalence data as well as risk factors associated with it. The present study was to determine the prevalence of pre-gestational diabetes among the antenatal women attending a Our hospital to study the associated factors.

## MATERIALS AND METHODS

This is a cross sectional study conducted in Obstetrics and Gynecology, OP in the Department of Obstetrics and Gynecology, -----, The study duration was 1 year. 350 patients are included in study with Gestational age between 24th and 28th weeks attending our Antenatal OPD during the study period. All women were informed about the nature of study and those who consented were included in the study. The study protocol was approved by the institutional ethics committee. Women who were

known diabetics or who were suffering from any chronic illness were excluded. The proforma containing general information on demographic characteristics, parity and family history of diabetes and/ or hypertension in first degree relatives were filled up for each woman. GCT (Glucose Challenge Test) was done for all women, as it was one step screening and diagnostic procedure, easy to perform and economical in our setting. All participants were subjected to GCT with 75g anhydrous glucose powder dissolved in 250 ml water were asked to consumed within five minutes. Time was counted from the start of the drink. Plasma glucose levels were estimated by glucometer after 2 hours. Anthropometry (weight, height, BP, etc.) was done after GCT. GDM was diagnosed if 2-h glucose concentration was more than 140 mg/dl. All patients diagnosed with GDM were further admitted for 3 days in hospital and regular blood sugar monitoring was done. All patients were further put for treatment and advised either dietary control or insulin therapy. They were further followed up till final delivery and posted for normal vaginal delivery, elective or emergency caesarean sections 350 women attending the obstetric OP in their first.

## RESULTS

The mean age of the study population was 27.5 years. 65% of patients belonged to rural area. 70% patients were unemployed, 64.3% had higher secondary education. 95% were belonged to low socio economic status group 7 % of overt diabetes belong to higher socio economic group compared to 5.7% in the non-diabetic group. The mean BMI of the study population was 24kg/m<sup>2</sup> 43% of patients in this study had BMI more than 25. 45% had family history of diabetes. 74% were having sedentary

lifestyle. 25% had family history of hypertension. 33% were primi gravid.

**Table 1: Demographic Distribution of pre-gestational diabetes in the present study**

| Presence of Diabetes              | Frequency | Percentage |
|-----------------------------------|-----------|------------|
| Present                           | 12        | 3.4        |
| Absent                            | 338       | 96.6       |
| Total                             | 350       | 100        |
| <b>Age Distribution in Years</b>  |           |            |
| 18-25                             | 52        | 15         |
| 26-33                             | 202       | 58         |
| 33-40                             | 96        | 27         |
| <b>History of abortion</b>        |           |            |
| With diabetes patients            | 5         | 42         |
| Without diabetes patients         | 61        | 18         |
| <b>Family History of diabetes</b> |           |            |
| Yes                               | 9         | 75         |
| No                                | 3         | 25         |

Prevalence of overt diabetes in the study group is 3.4%. Among this all 12 overt diabetic patients (100%) were having type II diabetes mellitus. The mean age of the study population was 27.5 years . 85% of patients with overt diabetes were in the age group of more than 25 years compared to 15% in the age group <25 years. The observed difference is statistically significant. Patients in the age group of more than 25 years have 4.9 times more risk of overt diabetes than women in the age group of less than 25 years. 42% of patients with overt diabetes had history of abortion whereas only 18% of patients without diabetes. The observed difference is statistically significant. Patients with overt diabetes have 4 times more risk of abortion than those without overt diabetes. 75% of overt diabetes have family history of diabetes whereas only 25% in non-diabetic. Hence this is statistically significant.

**Table 2: Association of history of IUD in previous pregnancy**

| IUD     | Present |    | Overt Diabetes |      | Total |    |
|---------|---------|----|----------------|------|-------|----|
|         | N       | %  | N              | %    | N     | %  |
| Present | 4       | 33 | 24             | 7.1  | 28    | 8  |
| Absent  | 8       | 67 | 314            | 92.8 | 322   | 92 |

P < 0.001 OT = 8.840: 95% CI for OR = 2.93 – 26.68

People with overt diabetes have 8 time more chance of having IUD in previous pregnancy than non-diabetes. 33% of overt diabetes had history of IUD compared to 7.1% in non-diabetic. The observed difference is statistically significant. Women with overt diabetes had 8 times more chance of having IUD.

**Table 3: Frequency of history of gestational diabetes in previous pregnancy**

| GDM in previous pregnancy | Present |    | Overt Diabetes |      | Total |      |
|---------------------------|---------|----|----------------|------|-------|------|
|                           | N       | %  | N              | %    | N     | %    |
| Present                   | 9       | 75 | 87             | 25.7 | 96    | 27.4 |
| Absent                    | 3       | 25 | 251            | 74.3 | 254   | 72.6 |

P = 0.002 OR = 4.71: 95% CI for OR = 1.64- 13.59

75% of overt diabetes had history of GDM in previous pregnancy compared to 25% in non-diabetic group. The observed difference is statistically significant.

**Table 4:** Frequency of hypo-thyroidism

| Thyroid disorder | Overt Diabetes |    |        |      |       |      |
|------------------|----------------|----|--------|------|-------|------|
|                  | Present        |    | Absent |      | Total |      |
|                  | N              | %  | N      | %    | N     | %    |
| Present          | 7              | 58 | 157    | 46.4 | 170   | 48.5 |
| Absent           | 5              | 42 | 181    | 53.6 | 254   | 51.5 |

P = 0.048

58% of overt diabetes had history of thyroid disease compared to 46% in non-diabetic. The observed difference is statistically significant. Overt diabetics have 2 times more chance of thyroid disease.

**Table 5:** Association of candidiasis and overt diabetes

| Candidiasis | Overt Diabetes |    |        |      |       |      |
|-------------|----------------|----|--------|------|-------|------|
|             | Present        |    | Absent |      | Total |      |
|             | N              | %  | N      | %    | N     | %    |
| Present     | 3              | 25 | 6      | 1.8  | 9     | 2.8  |
| Absent      | 9              | 75 | 332    | 98.2 | 341   | 97.4 |
| UTI         |                |    |        |      |       |      |
| Present     | 8              | 66 | 3      | 0.8  | 11    | 3.1  |
| Absent      | 4              | 34 | 335    | 99.2 | 339   | 96.9 |

P &lt; 0.001 OR 18.70

Overt diabetic patients have 18.7times more chance of candidiasis than nondiabetics. 25% of overt diabetes had candidiasis whereas only 1.8% in non-diabetic. The observed difference is statistically significant. 66% overt diabetes and 34 % of non-diabetics had UTI which is not statistically significant.

## DISCUSSION

Prevalence of pre-gestational diabetes in our study population was 3.4%. This is more than the observed prevalence in other studies which is around 1.3%. This difference may be because our population is from a tertiary care center and most of the cases were referred cases. Renji S. R et al study showed 3.8% patients had pregestational diabetes which well correlates with this study. First national study of prevalence of diabetes in India was done by ICMR between 1972 - 1975 reported a prevalence of 2.1% in urban population and 1.5% in rural population. Subsequent studies showed a rising shift in younger age of onset of diabetes prevalence of diabetes in India 4.7% in urban compared to 2% in rural population.<sup>7,8</sup> The increase in preexisting diabetes particularly in young women early in their reproductive years is of concern.<sup>9</sup> 85% of patients with pre-gestational diabetes were in the age group of more than 25 years compared to 15% in the age group <25 years. Women in the age group of more than 25 years have 4 times more risk of overt diabetes than in the age group of <25 years. In study done by Renji S. R et al<sup>10</sup> 86.7% of patients with pre-gestational diabetes were in the age group of more than 25 years compared to 56.6% of women in nondiabetic group. Women in the age group of more than 25 years have 4.9 times more risk of overt diabetes than in the age group of <25 years. This is comparable to other

studies.<sup>9</sup> 7% overt diabetes belonged to higher socioeconomic status compared to 5.7 % of nondiabetics. The difference is not statistically significant. This may be due to the fact that majority of (93%) the study group belonged to low socioeconomic status. High prevalence of diabetes in low socio economic group reported in other studies.<sup>9,11</sup> 43% of pre-gestational diabetes had BMI >25 kg/m<sup>2</sup> compared to 19% in non-diabetics. This is statistically significant. Women with BMI of >25 kg/m<sup>2</sup> had 3.6 times more chance of overt diabetes than those with BMI <25 kg/m<sup>2</sup>. This is comparable to Renji S. R et al<sup>10</sup> and other studies where it was shown that pregnant women with pre-gestational diabetes were older and had higher BMI. In our study 42 % of women with pre-gestational diabetes had history of abortion compared to 18 % of nondiabetics. This association is significant as women in overt diabetes have four times more chance of abortion than those without diabetes In study done by Renji S. R et al<sup>10</sup> study 46.7 % of women with pre-gestational diabetes had history of abortion compared to 17.9 % of nondiabetics. There is significant association between history of IUD and pre-gestational diabetes in our study. Women with pre-gestational diabetes were 8 times more likely to have IUD. This is comparable to other studies which is 8%. Pregestational diabetes increases the risk of fetal death by around 4.5 times compared to those without diabetes and doubles the risk of infant deaths.<sup>12,13</sup> In previous pregnancy- There is significant association between history of gestational diabetes and overt diabetes (p = 0.0002) in our study. This is comparable to Haroush BA et al study.<sup>14</sup> Women with history of gestational diabetes represent a high-risk group with an increased risk of overt diabetes and obstetric complications. Family history of diabetes-75%

of pre-gestational diabetes had given family history of diabetes which is found to be statistically significant in our study. This correlation was demonstrated in previous studies as genes play an important role in development of diabetes. Hyperglycemic intrauterine environment plays an important role in pathogenesis of type 2 diabetes. 58% of overt diabetics had history of thyroid disease compared to 46 % in the non-diabetic group in our study which is statistically significant ( $P = 0.048$ ). Thyroid dysfunction tend to co-exist as both conditions involve a dysfunction of endocrine system. This is documented in Hage M<sup>15</sup> and Kadiyala R<sup>16</sup> studies. In our study 25% of pre-gestational diabetes had candidiasis compared to 1.8% in non-diabetic. It is statistically significant ( $p < 0.001$ ). Overt diabetes patients had 18.7 times of more chance of candidiasis. Renji S. R et al<sup>10</sup> study 20% of pre-gestational diabetes had candidiasis compared to 1.3% in non-diabetic. Overt diabetes patients had 19 times of more chance of candidiasis. This is comparable to Malazy OT<sup>17</sup> and Goswami R et al<sup>18</sup> studies also.

## CONCLUSIONS

Prevalence of pre-gestational diabetes was 3.4% in our study group. Family history of diabetes, history of GDM in previous pregnancy, history of IUD, History of abortion, Thyroid disorder and candidiasis were found to have significant association with diabetes. As diabetes in pregnancy is a major public health problem, it is mandatory to establish national guidelines for the screening and management of GDM and pre-GDM, which will standardize care, improve outcomes, and provide the opportunity for monitoring. Further research should be directed to the investigation of the prevalence of T2DM and prediabetic state following gestational diabetes and to the effects of maternal hyperglycaemia during pregnancy on the infant and the future adult health considering the proven ill effects of these conditions on the future adult.

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