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### Risk factors of Gestational Diabetes in Karnataka

T.Gangadhara Goud<sup>1</sup>, K.Pavan Kumar<sup>2</sup> and K.Ramesh<sup>3\*</sup>

<sup>1</sup>Professor and Head, Department of Community Medicine, VIMS, Bellary, Karnataka, India

<sup>2</sup>Post graduate student (Junior Resident), Department of Community Medicine, VIMS, Bellary, Karnataka, India

<sup>3</sup>Assistant Professor, Department of Community Medicine, VIMS, Bellary, Karnataka, India

\*Corresponding author

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#### A B S T R A C T

Gestational diabetes affects 3-14% of pregnancies, depending on the population studied. Indian ethnic groups have shown to have an escalating incidence of GDM. Glucose intolerance during pregnancy predisposes the offspring for increased risk of developing glucose intolerance in the future in addition to various other complications like cardiac problems. A case control study was conducted among pregnant ladies admitted in VIMS Hospital. 45 cases and 90 controls were selected and interviewed with a structured questionnaire. Data was statistically analyzed with Chi-square test for finding association. The strength of association, so found, was estimated with Odds ratio and 95% confidence interval. Logistic regression was also done to remove the effect of confounding. Analysis with binary logistic regression gave the following findings: GDM is significantly associated only with previous history of GDM (P value=0.001, Adjusted OR=17.332), family history of Diabetes mellitus (P value= 0.004, OR=6.249), previous history of Caesarian sections (P value=0.006, OR=5.886). The major risk factors for developing gestational diabetes mellitus in our setup are history of gestational diabetes mellitus in previous pregnancies, family history of diabetes mellitus and history of caesarian sections.

### Introduction

Gestational Diabetes Mellitus (GDM) is defined as carbohydrate intolerance of varying degrees of severity with onset or first recognition during pregnancy<sup>[1][2]</sup>. Gestational diabetes affects 3-14% of d<sup>[3]</sup>. There is a higher prevalence of GDM among Indian ethnic groups.

The 1997 WHO estimates of the prevalence of diabetes in adults showed an expected total rise of > 120% from 135 million in 1995 to 300 million in 2025. These numbers also include GDM, and should alert physicians to the need to direct special attention to this population, especially in developing countries.<sup>[5]</sup>

Glucose intolerance during pregnancy predisposes the offspring for increased risk of developing glucose intolerance in the future. This vicious cycle is likely to influence and perpetuate the incidence and prevalence of glucose intolerance in any population.<sup>[4]</sup> Early case detection and institution of control measures have proven valuable in reducing the complications due to GDM. Information regarding the risk factors of the disease thus is very crucial in preventing the disease morbidity in the community. This study is aimed at finding the risk factors among pregnant women reporting to VIMS hospital, Bellary, Karnataka.

## **Experimental**

A case control study was carried out in Obstetric wards of Vijayanagar Institute of Medical Sciences, Bellary, Karnataka from January 2013 to January 2014 for a period of one year

## **Study Subjects**

**Cases:** Forty five patients diagnosed to have GDM, by an abnormal GTT value, admitted in Obstetric wards of VIMS, during the study period.

**Control:** Ninety patients diagnosed to be normal, by GCT values, but admitted for safe Confinement, in Obstetric wards of VIMS Hospital, during study period.

*Exclusion Criteria:*

## **Hypertensive patients**

Those individuals who were unwilling to participate in the study.

## **Study variables**

Age, age at first conception, socio economic and educational characteristics, parity,

previous history of abortions, GDM, Polyhydramnios, high birth weight babies, caesarean section, duration of breastfeeding by the subject, irregular menses, treatment for infertility, PCOD, endocrine abnormalities, Passive smoking and family history of Diabetes mellitus.

*Study tool:* Interviewer administered Structured Questionnaire.

## **Method of Data Analysis**

Data was analyzed statistically using Chi-square test, for significance. The strength of association was measured using univariate Odd's ratio and its 95% confidence limits. Binary logistic regression analysis was done following a forward stepwise method to eliminate confounders.

## **Ethical considerations**

1. Informed consent obtained from the patient.
2. Confidentiality of personal data of subjects maintained and the data are used only for research purposes.

## **Result and Discussion**

Totally 45 Cases and 90 controls were considered for the study. Among cases, 73.4% were aged more than 25 years whereas among controls, 52.3%. Age at first pregnancy was more than 30 years among 15.6% and 4.5% of cases and controls respectively. There was no much difference between cases and controls in relation to the residence (80% and 83%). Education status of study subjects revealed that among both groups proportion of subjects educated more than SSLC was almost 80%. No significant difference was observed for occupation status between two groups. Nullipara women constituted 37.7% among cases and 33.3% among controls. Statistically

significant difference was observed for bad obstetric history, H/o GDM and Family h/o DM.

From the above data we infer that there is an association between age and development of GDM, in pregnant women. Age groups above 25 years are more prone to GDM. This is in accordance with the various studies conducted across the world, where it is shown that age groups above 30 years are the high risk group<sup>[8] and [12]</sup>. Age at first pregnancy has also an association with onset of GDM. Those conceiving after the age of 30 years are prone to develop GDM, according to our study. Various studies conducted are in accordance with this result<sup>[5] and [12]</sup>.

From our study, according to above results we could not find any association between place of residence and development of GDM. Some studies show a relation of higher risk in rural population while some others come out with an association towards higher socioeconomic, urban groups. Studies in underdeveloped countries showed an association<sup>[19]</sup> but most other studies in India's setup showed prevalence but no significant association<sup>[20]</sup>.

We could not find any association for GDM to educational status of pregnant women, from this study. Here also an association to low educational status was seen in studies conducted among underdeveloped countries<sup>[19]</sup>. In India's setup no significant association was found and also majority had received higher education<sup>[20]</sup>.

From the above data we infer that there were no associations between the occurrence of GDM and employment status of the pregnant women. No significant association

was found in India's setup From the above data we infer that there is no association for GDM to occur in pregnant women in relation to her parity status.

A study that looked into the risks of the older mother who has already had children notes that the risks of the older mom with previous pregnancies are underappreciated. It found a 4.5 times increased risk for GDM in them<sup>[7]</sup>.

In our setting usually the parity status is not so high, usually less than three. That may be the reason for this difference in outcome From the above data we infer that there is an association for GDM to occur in a pregnant woman with previous bad obstetric history. Many studies had shown similar results. Women who have multiple loss history tend to have increased rates of GDM<sup>[4]</sup>.

From the above data we infer that GDM has a strong association towards the history of GDM in the past. Many studies came out with similar result worldwide<sup>[4], [5] and [9]</sup>. There always has a higher risk of GDM recurring in *any* future pregnancy<sup>[4]</sup>.

From the above data we infer that there is no association for GDM towards previous history of Polyhydramnios. According to some, Polyhydramnios is sometimes associated with GDM pregnancies<sup>[4], [5] and [7]</sup>. The lack of Polyhydramnios cases may be a reason, for no association in our study. From the above data we infer that there is no association with PCOD for GDM, to occur. Almost all large studies that took PCOD as a variable concluded of a very significant association of PCOD towards the development of GDM. We could not find a relation in favour of association due to lack of PCOD subjects.

**Table.no1** Univariate analysis

Variables	Study subjects		Odds ratio	P value
	Case (n=45)	Control (n=90)		
<b>Age group</b> <25 years >25 years	12 (26.6%) 33 (73.4%)	43 (47.7%) 47 (52.3%)	0.39	0.01
<b>Age at 1<sup>st</sup> pregnancy</b> <30 years >30 years	38 (84.4%) 07 (15.6%)	86 (95.5%) 07 (04.5%)	0.25	0.02
<b>Residence</b> Rural Urban	36 (80.0%) 09 (20.0%)	75 (83.3%) 15 (16.7%)	0.80	0.63
<b>Education</b> <SSLC >SSLC	09 (20.0%) 36 (80.0%)	16 (17.7%) 74 (82.3%)	1.15	0.75
<b>Occupation</b> Employed Unemployed	07 (15.5%) 38 (84.5%)	16 (17.7%) 74 (82.3%)	0.85	0.74
<b>Parity</b> Nullipara Others	17 (37.7%) 28 (62.3%)	30 (33.3%) 60 (66.7%)	0.60	1.21
<b>Bad obstetric history</b> Yes No	19 (42.2%) 15 (47.8%)	26 (28.8%) 49 (71.2%)	0.41	0.03
<b>Past h/o GDM</b> Yes No	11 (24.4%) 17 (75.6%)	03 (03.3%) 57 (96.7%)	12.29	0.001
<b>H/o polyhydromnios</b> Yes No	08 (17.7%) 37 (82.3%)	13 (14.4%) 77 (85.6%)	1.28	0.61
<b>H/o PCOD</b> Yes No	02 (04.4%) 43 (95.6%)	03 (03.3%) 87 (96.7%)	1.34	0.74
<b>H/o passive smoking</b> Yes No	27 (60.0%) 18 (40.0%)	46 (51.1%) 44 (48.9%)	1.43	0.32
<b>H/o family DM</b> Yes No	27 (60.0%) 18 (40.0%)	14 (15.5%) 76 (84.5%)	8.14	0.001
<b>H/o LSCS</b> Yes No	12 (26.6%) 33 (73.4%)	12 (13.3%) 78 (86.7%)	3.20	0.01

**Table.no2** Multivariate analysis (logistic regression)

Covariates	Unadjusted Odds Ratio	Adjusted Odds Ratio	P value
History of GDM in previous pregnancies	12.294	17.332	0.001
Family history of Diabetes mellitus	8.143	6.249	0.004
History of previous Caesarian sections	3.20	5.886	0.006

From the above data we infer that there is no association for GDM towards A history of passive smoking. But several studies had shown that GDM has a strong association towards active and passive smoking by the pregnant woman <sup>[4]</sup> and <sup>[12]</sup>. From the above data we infer that family history of diabetes is strongly associated with occurrence of GDM, in a pregnant woman. Many studies worldwide are in favour of this risk factor. There is about 11-12%; may be higher chances for developing GDM for those with first-degree family members (parents, siblings) having diabetes <sup>[4]</sup>. Certain other studies also indicated a higher risk of developing GDM <sup>[8]</sup>, <sup>[12]</sup> and <sup>[13]</sup>.

By doing the binary logistic regression, we infer that the factors namely, History of

GDM, Family history of Diabetes mellitus and Previous history of Caesarean sections are significantly associated with manifestation of GDM

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