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Prevalence of Gestational Diabetes And Risk Factors Among Women Visiting Antenatal Clinic of A Tertiary Health Care Hospital

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Abstract
Introduction: *The prevalence of Gestational Diabetes Mellitus (GDM) varies widely in India and is associated with high morbidities and mortalities among mothers and infants.*
Objectives:
1. *To find out prevalence of GDM.*
2. *To study associated risk factors.*
Materials And Methods: *The study was conducted at the antenatal clinic of a tertiary care hospital. A semi-structured pretested questionnaire was used for data collection. Following DIPSI guidelines, patients with plasma glucose values >140 mg/dl were labeled as GDM. Statistical methods used were OR (CI95%), percentage, Chai square.*
Results: *Out of 506 respondents, 6.72% had GDM. Among all GDM respondents, 64.71% had age more than 30 years, 70.59% had BMI more than 25, 41.18% had gravida more than 3 and p value was significant with regard to age and BMI. P value was found to be significant for risk factors namely positive family history of Diabetes Mellitus, history of big baby and presence of more than one risk factor.*
Conclusion: *GDM is associated with high BMI, early pregnancy loss, family history of DM and previous history of big baby and there could be more than one risk factor. Thus universal screening followed by close monitoring of the pregnant women for early detection of GDM may help improving maternal and fetal outcomes.*

Keywords:*Diabetes Mellitus, GDM, BMI, Gravida*

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I. Introduction

Prevalence of diabetes is increasing globally, particularly in the developing world; China and India being major countries contributing to increasing burden. India is projected to have the highest cases of people with diabetes in the world, by 2030.[1] The rise in prevalence is attributed to ageing population, urbanization, rising obesity, unhealthy diets and physical inactivity, in addition to the genetic predisposition of South Asians to diabetes.Gestational Diabetes Mellitus (GDM) is defined as any degree of glucose intolerance with the onset or first recognition during pregnancy with or without remission after the end of pregnancy.GDM is associated with higher incidence of maternal diabetes mellitus later in life. [2] Poor glycemic control during pregnancy is associated with high morbidities and mortalities among mothers and infants.[3,4] Therefore, appropriate diagnosis and management of GDM will improve maternal and fetal outcome. The prevalence of GDM varies widely in India.[5,6,7]. According to a nationwide survey in India in 2002, prevalence of GDM was estimated to be 16.55 percent.[8] Uttar Pradesh is the largest state in India, with population of 230 million, 4.5million pregnancies every year and has high maternal & Infant Mortality Rate.[9,10] Since not much of information was found in the context of U.P., the present study was carried out with the following objectives.

Objectives:
1. To find out the prevalence of GDM among the study population.
2. To study the associated risk factors.

II. Materials And Methods

This cross sectional study was conducted at the antenatal out-patient clinic of Department of Obstetrics and Gynecology, at a tertiary care hospital located in western Uttar Pradesh. Inclusion criteria: Women with estimated duration of pregnancy between 24 and 28 weeks of gestation, attending the antenatal outdoor clinic. Exclusion criteria: Women having gestation period less than 24 weeks or more than 28 weeks of gestation, women with history of Diabetes Mellitus prior to the onset of pregnancy, multiple pregnancy and major chronic diseases including cancer were excluded. All the women were informed about the nature of the study and those who gave the consent were included in the study. Using semi-structured pretested questionnaire, data was collected which included socio-demographic and personal information such as height, weight, gravida, family history of Diabetes Mellitus, history of pregnancy loss. The sample size for the present study was calculated considering the findings of national wide survey.[8] Assuming the permissible error of 20 percent at level of significance of 95%, a sample of 506 women was required. Following the DIPSI guidelines[11], the participants were given 75 grams of oral glucose irrespective of the meals and their plasma glucose was estimated at 2 hours. Patients with plasma glucose values >140 mg/dl were labeled as GDM and the rest as non-GDM group. All the respondents were investigated for risk factors namely family history of Diabetes, history of big baby (Birth weight more than 3.5 kg) and presence of more than one risk factor.

Statistical analysis:

Results were expressed using SPSS (version 20.0). Odd 's ratio CI at 95% was calculated using cross table analysis among GDM & NGDM groups. Chai square test was applied and p value <0.05 were considered significant.

Results:

A total of 506 respondents were included in the study. The findings of socio-demographic profile of the respondents showed that there were 389 (76.88%) Hindus, 98(19.37%) Muslim and 19(3.75%) belonged to other religion respectively where as 296 (58.50%) respondents were from rural background.

As regards, GDM, 34 (6.72%) respondents were diagnosed to have pregnancy with Gestational Diabetes Mellitus (GDM) of Type 2 variety; whereas 472 (93.28%) did not have Gestational Diabetes (Non GDM). Thus the prevalence of Diabetes Mellitus was 6.72 percent. All the respondents were examined with regard to age, Body Mass Index (BMI), gravida and history of abortion.

Table 1: Distribution of respondents with regard to age, BMI and Gravida

Variable		GDM n=34 (100)*	Non GDM n=472 (100)*	OR	95%CI	Chai Sq value	P value Significance
Age	>30 Years	22(64.71)	221(46.82)	2.08	1.00-4:30	4.06	Significant at 0.05
BMI	>25	24(70.59)	244(51.69)	2.24	1.05-4.79	4.45	Significant at 0.05
Gravida	>3	14(41.18)	152(32.20)	1.47	0.72-2.99	1.17	Not significant at 0.05
* Figures in parenthesis indicate percentage							

Table 1 shows distribution of respondents with regard to Odd's Ratio (OR), Chai value and significance based on p value for GDM, Non GDM group with variables namely age, BMI, and Gravida. OR and 95% CI were found to be significant with regard to age [2.08 (1.00-4.30)], BMI [2.24 (1.05-4.79)]. There were 288 (56.92%) respondents who did not have any history of abortion as against 218 (43.08%) respondents who had one or more abortions. Average no. of abortions was 1.07.

Table 2: Distribution of respondents with regard to risk factors from history

Variable	**GDM**	**Non GDM**	**OR**	**95%CI**	**Chai Sq value**	**P value Significance**
	n=34 (100)*	**n=472 (100)***				
Positive History of	7 (20.59)	171	0.46	0.19 to 1.07	3.40	Not Significant at

early Pregnancy Loss		(36.23)				0.05
Positive family history of DM	12 (35.29)	48 (10.17)	2.12	1.01 to 4.41	4.08	Significant at 0.05
Positive History of big baby	3 (8.82)	12 (2.54)	3.71	0.99 to 13.84	6.40	significant at 0.05
Presence of more than one risk factor	6 (17.65)	36 (7.63)	2.6	1.01 to 6.68	4.18	Significant at 0.05
* Figures in parenthesis indicate percentage						

Table 2 shows distribution of respondents with regard to risk factors from history namely history of early pregnancy loss, family history of DM, history of big baby in previous pregnancy and presence of more than one risk factor. OR and 95% CI were found to be significant with regard to positive family history of DM [2.12 (1.01 to 4.41)], Positive History of big baby [3.71 (0.99 to 13.84)] , presence of more than one risk factor [2.6 (1.01 to 6.68)]. The p value was significant for all the risk factors except history of early pregnancy loss.

III. Discussion

The variation in the prevalence of GDM in India could be due to local, cultural context. In addition, other factors that could influence the variation of GDM prevalence could be technical issues such as sample drawn from urban or rural part, ethnicity, higher education higher BMI and obesity diagnostic methods used [6,15]. High prevalence of GDM among Indian population could be due to trend towards older maternal age, decrease in physical activity and adoption of modern lifestyles, and increasing prevalence of obesity in urban area.[15] Wahi et al found higher prevalence of GDM with regard to higher education, higher BMI.[6]The findings of the present study are in agreement with the findings of Wahi et al, with regard to high prevalence associated with BMI more than 25.Wide geographical variation has been observed in prevalence of GDM in by some authors [5,6,7] in different parts of India. In the present study in U.P. the prevalence of GDM was 6.72 percent. However, corresponding figure in a study in Gujarath, by Parikh Pallav et al[12]the prevalence was 13.79 percent. The variation could be due to the socio-geographical differences as documented in other studies. The GDM prevalence was found to be 3.8 % in Kashmir [13], 6.6% in Rajasthan[14], 13.9% in Haryana.[15]

In the present study, the association of age and diabetes was found to be statistically significant. However, Verma et al[16] did not find it to be significant. It could be due to a different study design which was limited to rural population of Jammu. Significant association was found with regard to BMI in GDM. Similar observation has been noted in the other studies.[12,17] in India. Since BMI is a modifiable risk factor for prevention of maternal / fetal complications associated with gestational diabetes mellitus, advice on life-style modifications even during pre-pregnancy and pregnancy period would be highly beneficial.

Association of family history of Diabetes Mellitus and history early pregnancy loss among women with GDM was in agreement with the study undertaken by PikeeSaxena et al [18] in a tertiary level hospital in north India. In the present study, there was no association of presence of GDM and history of early pregnancy loss. It could be due to the fact that pregnancy loss could be due to many other reasons such as accident, stress, infections. In the context of rising and varied prevalence of GDM in India, it is important to note the association of various risk factors while examining the pregnant women. Early diagnosis and timely treatment of gestational diabetes not only improve the maternal and foetal outcome pregnancy but also will facilitate prevention of morbidities and mortalities of mothers and infants.

IV. Conclusion

The study highlights importance of taking cognizance of various risk factors such as BMI, history of early pregnancy loss, family history of DM and previous history of big baby. Thus , universal screening considering all risk factors especially while taking history of the patient, followed by close monitoring and management of the pregnant women may facilitate early detection of GDM and help improving maternal and fetal outcome in India and U.P. in particular.

Conflict of interest: Nil.
Ethical approval: It was taken for this study from the Institutional Ethics Committee. Limitations of the study: Since it was a cross sectional study, the other maternal / pregnancy outcome related risk factors such as vaginal candidiasis, abruption placenta, Intrauterine death, macrosomia, still birth etc. were not studied.
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