A PROSPECTIVE LONGITUDINAL STUDY ON PREVALENCE AND RISK FACTORS OF GLUCOSE INTOERANCE DURING PREGNANCY AT TERTIARY CARE CENTRE IN NORTH INDIAN POPULATION

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ABSTRACT This study was undertaken to evaluate the prevalence of GGI and GDM using Diabetes in pregnancy study group India (DIPSI) criteria and associated risk factors in pregnant women. Universal screening for glucose intolerance was carried on every antenatal case considering Oral Glucose Tolerance test (OGTT) as gold standard. Patients were categorized based on DIPSI guidelines. Duration of the study was 2 years and 1100 antenatal cases were screened. Prevalence of risk factors like increasing age , BMI ≥25, family history of Diabetes, previous history of GDM were studied in GGI ,GDM and normal patients and results were statistically analyzed. The prevalence of GGI and GDM in this study was 4.36 and 8 % respectively and association risk factors like advanced age, multiparty, high BMI, positive family history of DM and previous history of GDM was found to be statistically significant..

INTRODUCTION

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 with treatment with either diet or insulin. Gestational Glucose intolerance (GGI) is defined as plasma glucose level ≥120 and <140mg/dl and Gestational Diabetes Mellitus (GDM) as levels ≥140 but >200mg/dl after 2hours of Oral Glucose Tolerance Test (OGTT) as per DIPSI guidelines. Glucose intolerance is associated with higher incidence of Type 2 DM later in life and is important in that it poses a risk to the pregnant woman and her baby. Glucose intolerance is a common metabolic abnormality during pregnancy which if untreated may lead to maternal and perinatal complications. Most often glucose intolerance returns to normal values postpartum.Thus reclassification of maternal glycemic status should be performed atleast 6 weeks after delivery.

The prevalence of diabetes is increasing globally and these numbers also include women with Glucose intolerance.Prevalence rate of GDM vary widely by ethnicity. South Asian countries and Indian women have the highest frequency of GDM.

METHODOLOGY

This included all antenatal case attending OPD or IPD in the Department of Obstetrics and Gynaecology at GSVM Medical college, Kanpur, Uttar Pradesh. Duration of the study was around 2 years and 1100 antenatal cases were followed. Study was prospective longitudinal type. All antenatal cases were included in the study irrespective of gravida, parity and period of gestation. Known Diabetics, Polycystic Ovarian disease women who conceived on Metformin and pregnant patients with other medical disorders or any chronic illness, were excluded from the study.

Detailed history and clinical examination of the enrolled women will be carried out and recorded in pre designed proforma.Women were given 75gm oral glucose dissolved in 300ml of water irrespective of their last meal timing .They will be asked to drink it within 5 minutes, time was noted and women were asked to take rest for 2 hours during which they have to avoid physical activity.

If patient vomited within 30 min, test was repeated next day and if vomiting occured after 30 min no repeat test was done. Capillary blood sample was obtained by finger prick at 2 hours and plasma glucose estimation was carried out in the central laboratory using caliberated Glucometer for obtaining the results.OGTT values were classified according to DIPSI guidelines.

All patients included in the study were followed till delivery and regular glucose monitoring was done. They were managed by giving either medical nutrition therapy alone or with metformin or insulin as required.

Statistical Analysis: Data was analyzed using SPSS 22.0.Categorical

variables were analyzed using Odds ratio (OD) and Chi square test. P value <0.05 was significant.

RESULTS

TABLE -1DISTRIBUTION OF TOTAL NO OF SCREENED PATIENTS
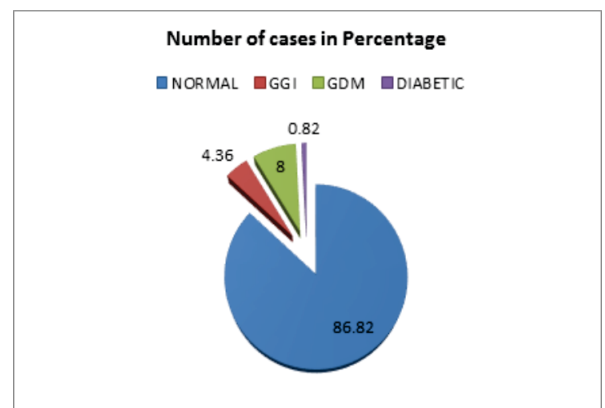
The prevalence of GGI and GDM in the study population is 4.36% and 8.00% respectively.

TABLE NO 2 BASIC CHARACTERISTICS OF THE STUDY POPULATION

CHARACTERISTICS	SUBGROUPS	NORMAL (n=95)	GGI (n=48)	GDM (n=88)
AGE	<20	3.15(3)	0	0
	20-24	41.05(39)	27.08(13)	38.37(33)
	25-29	36.85(35)	54.17(26)	41.86(36)
	30-34	12.65(12)	18.75(9)	18.18(16)
	>35	6.30(6)	0	3.49(3)
SOCIO ECONOMIC CLASS	UPPER	22.10(21)	16.67(8)	29.55(26)
	MIDDLE	31.57(30)	39.58(19)	36.68(27)
	LOWER	46.33(40)	43.75(21)	39.77(35)
RESIDENCE	URBAN	36.84(35)	60.42(29)	56.82(50)
	RURAL	63.16(60)	39.58(19)	43.8(30)

As seen in the above table 54.17%(26) of GGI and 41.86%(36) of GDM cases were in the age group of 25-29 years while most patients in normal group were in age group of 20-24 years. Thus, most of the patients in the GGI and GDM group belonged to the age group of 25-29 years. Most of the patients in the study group belonged to lower socioeconomic status. Majority of the patients belonged to urban area in both groups. Thus, urban population has relatively more prevalence of GDM than rural population.

TABLE NO 3 RISK FACTORS

RISK FACTOR	SUBGROUPS	NORMAL (n=95)	GGI (n=48)	Odd's ratio/ p value	GDM (n=88)	Odd's ratio/ p value
PARITY	PRIMIGRAVIDA	47.36(45)	21.59(19)	2.01/0.03	21.59(19)	1.72/0.07
	MULTIGRAVIDA	52.64(50)	78.41(69)		60.42(29)	
BMI	<25	84.21(80)	79.16(38)	1.40/0.45	68.18(29)	2.48/0.01
	>25	15.79(15)	20.84(10)		31.82(28)	
FAMILY HISTORY	PRESENT	2.10(2)	6.25(3)	3.1/0.22	7.95(7)	4.01/0.04
PREVIOUS HISTORY OF GDM	PRESENT	1.05(1)	93.75(45)	6.22/0.11	15.90(14)	17.7/0.006

In both groups, most of the patients were multigravida. There is atleast 1.72 times increased risk of glucose intolerance in multipara as compared to primigravida. 20.84%(10) of GGI and 31.82%(28) of GDM had BMI >25. There is statistically significant association (p Value<0.01) of GGI and GDM with BMI >25.6.25%(3) . 6.25% (3) of GGI and 7.95%(7) of GDM cases had positive family history of Diabetes.The Odds ratio is 4.01 which means that in the present study ,there is approximately 3.1 times increased chance of having glucose intolerance in patients with positive family history. This association is, therefore, statistically significant (p<0.04).6.25%(3) of GGI and 15.90%(14) of GDM cases had previous history of GDM.Odds ratio is 17.7 which means that in the present study,there is approximately 17 times increased risk of having glucose intolerance in patients with previous history of GDM. This association between glucose intolerance and previous history of GDM is statistically significant(p<0.006).

DISCUSSION

There is general consensus that the prevalence of GDM is increasing globally. GDM prevalence has been reported to vary from 1.4% to 14% worldwide and prevalence of GDM in India varies from 3.8% to 21% in different parts of the country depending on geographical locations and diagnostic methods used and differently among rural and ethnic groups. The prevalence is higher among Blacks, Latino, Native Americans and Asian woman than in White women. Ethnically, Indian subcontinent women have high prevalence of GDM and the relative risk of developing GDM is 11.3 times more compared to White women.In our study prevalence of GGI and GDM was 4.36 and 8.00% respectively. **Nilofer AR et al(2012) ,** in Davengere, Karnataka, performed a similar study and found a prevalence rate of 6%.**Samreen Siddiqui et al (2019)** found the prevalence of GDM in Delhi was 14% (14/100), in Bhilai, it was 10.77% (7/65) and lowest in Muzaffarpur, 3.07% (2/65) in a study.In a random survey performed in various cities in India ,prevalence of GDM was found to be 3.8% in Kashmir , 9.5% in Western India , 6.2% in Mysore and 22% in Tamil Nadu.

Table no 2 shows that maximum number of patients in the study belong to the age group 25-29 years. Similarly in the study conducted by **K Sreekanthan et al (2014),** 25-32 years of age was the most common age group. **Rajput et al (2013)** conducted a study and found that the prevalence of GDM was higher in women aged 26-30 and >30 years compared to women aged <20 years and 21-24 years. Most patients in the study group belonged to lower socioeconomic status. This could be due to the fact that most of the patients attending medical college were from lower socioeconomic status, so sample was not uniformly distributed. Similarly study conducted by **Kanika R. Kalyani et al (2014)** in India and **Kerenyi Z, Tabak AG, Stella P et al(2012)** in Italy also showed that most of the patients in the study population belonged to lower socioeconomic status. Similar to our study GDM was detected in 739(17.8%) women in urban, 548(13.8%) in semi urban and 392(9.9%) in rural areas in a study conducted by **T Arthi et al** and **Anjana RM et al**, Thus urban population has relatively more prevalence of GDM than rural.

In our study ,significant proportion of cases (78.41% of GGI and 60.42% of GDM) were multigravida ,similarly in the study conducted by **Tamunopriye Jaja et al(2010)**.Also, in another study conducted by **Kanika R. Kalyani et al (2014),** majority of patients (76%) diagnosed with gestational diabetes were second gravidas and above. Similar to our study,study conducted by **Kanika R. Kalyani et al(2014)** and **Priyankakalra et al (2013)** ,majority of patients (96%) who had gestational diabetes mellitus had BMI>25 with 76% being obese having BMI > 30 ,thereby showing a significant correlation between BMI and gestational diabetes mellitus. 67% cases in GDM group had BMI > 25 also in a study conducted by **K Sreekanthan et al (2014)**, Similar results were also obtained in a study conducted by **Simmons D et al(2011) and Kim SY, England L, Wilson HG et al in(2017)** England. 6.25% of GGI and 7.95% of GDM had family history of Diabetes while 2.10% cases of non GDM had family history

of Diabetes.Similarly in a study conducted by **PriyankaKalra et al (2013)** ,33.33% cases in GDM group while 5.35% patients in non GDM group had family history of Diabetes showing the relationship to be statistically significant.6.25% of GGI and 15.90% of GDM cases had previous history of GDM.Odds ratio is 17.7 .In a similar study conducted by **Lee, K.W., Ching, et al. (2018)** in Asia ,history of previous GDM had 3.5 times odds more likely to develop GDM compared to those without history of previous GDM.

CONCLUSION

Gestational Diabetes Mellitus (GDM) is one of the most common endocrine disorder found during pregnancy. The prevalence of GGI and GDM was found to be 4.36 and 8.00% respectively. To include GGI group in the study proved to be beneficial as it was observed that many risk factors associated with GDM was also the risk factors for GGI. Thus, it can be concluded that even GGI is an important medical illness complicating pregnancy in the similar manner as GDM.

Various risk factors associated with glucose intolerance included increased age , multiparity, urban habitation, BMI>25 ,family history of Diabetes and previous history of GDM. Compared to selective screening, universal screening for GDM detects more case and improves maternal and neonatal prognosis if done early. Hence, universal screening of all antenatal cases should be routinely done at 1st antenatal visit for the earliest detection and timely intervention.

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