Study the prevalence of Gestational Diabetes Mellitus (GDM) in women attending a tertiary care hospital in Uttar Pradesh

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ABSTRACT

Background: Gestational Diabetes mellitus (DM) is becoming more common worldwide, particularly in emerging nations like India. Increased urbanization, declining levels of physical activity, alterations in food habits, and an increase in obesity are all factors contributing to the rising prevalence in developing nations. Gestational diabetes increases the risk of complications for both mother and child during pregnancy, childbirth and beyond.

Aim and Objective: The present study was aimed to estimate the prevalence of Gestational Diabetes Mellitus (GDM) in women attending a tertiary care hospital in Uttar Pradesh

Methodology: This prospective cohort study was conducted in the Department of Gynaecology and Obstetrics, Santosh Hospital, Ghaziabad, after receiving ethical clearance from the ethical committee of Santosh University. Pregnant women with singleton pregnancy at 24th to 28th week of gestation coming for routine antenatal check-up were selected in chronological order from January 2012 to June 2013. Women known to have pre-existing diabetes were excluded from the studies.

Result: Only 576 of the 700 women who were recruited for the study returned for the 2-hour, 75-g oral glucose tolerance test (OGTT) and finished the experiment. The participants' ages (mean±SD) were 25.3 ± 3.9. The average age of women who were diagnosed with GDM was 27.1± 4.1. GDM was present in 51 women (8.9%) confirmed by OGTT. In the age group of ≥ 30 years; 14 women (14.6 %) had GDM as compared to 17 women (7.7%) in the age group ≤ 30 years.

Conclusion: Numerous recent research have found that Indian women have a high frequency of GDM. When a woman has gestational diabetes, her risk of problems throughout pregnancy, labor, and beyond increases.

Keywords: Blood glucose, GDM, OGTT, Prevalence.

INTRODUCTION

Gestational diabetes mellitus (GDM) is commonly defined as glucose intolerance first recognized during pregnancy. The prevalence of GDM is increasing, fuel led by advancing maternal age, racial/ethnic shifts in childbearing, and obesity. As a result of the global trend of increased maternal obesity, it is estimated that approximately 15% of all pregnant women worldwide develop GDM [1].

In low- and middle-income countries (LMICs), where maternal and child mortality are highest, GDM is likely to go undetected and undiagnosed because of poor screening standards and resources. Infants born to mothers with GDM are often characterized as large-for-gestational-age (LGA), a condition that includes greater risk for problems during delivery and a higher risk of future obesity and type 2 diabetes for the child, thus perpetuating the cycle of diabetes for another generation.

India has the second largest number of people with diabetes in the world – currently estimated at 63 million. Not surprisingly therefore, the prevalence of GDM in India is also alarmingly high. Indian women are more likely to develop GDM compared to Caucasian women [2]. The prevalence of GDM in India varied from 3.8 to 21% in different parts of the country, depending on the geographic allocations and diagnostic methods used [3,4].

Although genes are there to be blamed, but the primary driver of the epidemic of diabetes is the rapid epidemiological transition associated with

Changes in dietary patterns and decreased physical activity as evident from the higher prevalence of diabetes in the urban population. Estimates of the prevalence for GDM in India vary greatly; from low figures in the northern region of Jammu, [3] to higher figures reported in the southern state of Tamil Nadu [4].These widely ranging statistics may reflect a true variation in GDM prevalence throughout the subcontinent, but may also be partially accounted for by discrepancies in protocols for screening and diagnosis, and access to care or changes in risk factors in different geographic regions. Treatment of GDM improves perinatal as well as maternal outcome [5,6] Whether screening for GDM will result in reduction of maternal and neonatal morbidity remains to be established. The majority of international diabetes association's however, advocate screening for GDM as desirable [7].

Although not supported in clinical guidelines, various other tests are very often used, in our part of world, to screen for GDM like random glucose test (RGT) and Diabetes in Pregnancy Study Group India (DIPSI) procedure. The RGT is a simple, fast and inexpensive test, which measures plasma glucose at a random point in time, irrespective of the time of the last meal and without any specific preparation and is very often performed in European countries and India for screening GDM.

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.

MATERIALS AND METHODS

The present study was conducted on patients in chronological order attending the ante-natal clinics in the Department of Gynaecology and Obstetrics, Santosh Hospital, Ghaziabad, after receiving ethical clearance from the ethical committee of Santosh University. Informed consent was taken from all women. Pregnant women with single to n pregnancy at 24th to 28th week of gestation coming for routine antenatal checkup recruited for the study from January 2012 to June 2013. Out of the 700 women recruited for the study, only 576 women returned for 2-h 75-g oral glucose tolerance test (OGTT) and completed the study. BMI was calculated as weight in kilograms divided by the square of height in meters.

The distribution of continuous variables is reported as means ±SD. Categorical data were compared by using Fisher's exact test to get two-sided (two-tailed) P value. Data were analyzed using Medcalc(Version12.6.0).

RESULTS

Out of the 700 women recruited for the study, only 576 women returned for 2-h 75-goral glucose tolerance test (OGTT) and completed the study. Data from 576 women were used for further analysis. The Age (mean±SD) of the participants was 25.3±3.9. The Age (mean±SD) of women diagnosed having GDM was 27.1±4.1.

Table1: Socio-demographic data distribution of the subject.

Socio-demographic data distribution		Number (%) n=576
Age Group (Years)	15-19	13(2.26%)
	20-24	251 (43.58%)
	25-29	216 (37.5%)
	30-34	90 (15.63%)
	≥ 35	6 (1.04%)
Education	Professional/ Postgraduate/Graduate	70 (12.2%)
	Intermediate/ High school/ Middle school	205 (35.6%)
	Primary School	190 (33%)
	Illiterate	111 (19.3%)
Economic Class	Upper	72 (12.2%)
	Upper Middle	188 (32.6%)
	Lower Middle	115 (20%)
	Upper Lower	40 (6.9%)
	Lower	161 (27.6%)
BMI (kg/m2)	16.9-24.9 (Normal weight)	490 (85.07%)
	25-29.9 (Over weight)	84 (14.58%)
	≥30 (Obesity)	2 (0.35%)
Family History of Diabetes	Yes	88 (15.28%)
	No	488 (84.72%)

Table I, presented patient's characteristics. Among all majority 43.58% women were from the age group 20-24 then from the age-group 25-29, 37.5%. Only 12.2% women were Professional/ Postgraduate/Graduate. 32.6% women were from Upper Middle class while 20% were from the Lower Middle class. 85.07% had normal weight. Among the all women 88 (15.28%) had family history of diabetes as compared to 488(84.72%) don't had family history of diabetes.

Table2: Prevalence of Gestational Diabetes Mellitus (GDM).

Prevalence of Gestational Diabetes Mellitus (GDM)	Number (%) n=576

	Present	Absent	Total
	51 (8.85%)	525 (91.15%)	576 (100%)

As shown in Table 2, Out of 576 patients, only 51 (8.85%) had Gestational Diabetes Mellitus (GDM).

Table 3: Associated risk factor regarding Gestational Diabetes Mellitus (GDM).

Associated risk factor regarding GDM		Gestational Diabetes Mellitus (GDM)n=576		
		Present (n=51)	Absent (n=525)	p value
Age Group (Years)	15-19	1 (1.96%)	12 (2.29%)	p = 0.0464
	20-24	15 (29.41%)	236 (44.95%)	
	25-29	21 (41.18%)	195 (37.14%)	
	30-34	13 (25.49%)	77 (14.67%)	
	≥ 35	1 (1.96%)	5 (0.95%)	
	Mean±SD	27.1±4.1	25.1±3.8	
Education	Professional/ Postgraduate/Graduate	20 (39.2%)	50 (9.5%)	
	Intermediate/ High school/ Middle school	15 (29.4%)	190 (36.2%)	
	Primary School	10 (19.6%)	180 (34.3%)	
	Illiterate	6 (11.8%)	105 (20%)	
Economic Class	Upper	14 (27.5%)	58 (11%)	
	Upper Middle	8 (15.7%)	180 (34.3%)	
	Lower Middle	9 (17.6%)	106 (20.2%)	
	Upper Lower	9 (17.6%)	31 (5.9%)	
	Lower	11 (21.6%)	150 (28.6%)	
BMI(kg/m^2)	16.9-24.9 (Normal weight)	31 (60.78%)	459 (94.29%)	
	25-29.9 (Over weight)	19 (37.25%)	65 (12.38%)	
	≥30 (Obesity)	1 (1.96%)	1 (0.19%)	

According to Table 3, Out of 576 women in study population GDM was present in 51 women (8.9%) confirmed by OGTT. In the age group of ≥ 30 years; 14 women (14.6 %) had GDM as compared to 17 women (7.7%) in the age group ≤ 30 years.

Prevalence of GDM was highest (39.2%) among women who were graduate or more, followed by29.4% women who were having education up to Intermediate/High school/ middle school level compared to women who were illiterate(11.8%) or had education up to primary school (19.6%) level only. Prevalence of GDM was highest (27.5%) among women belonging to upper class, followed by 21.6% women belonging to lower class.

Prevalence of GDM was highest (50%) among women who were obese before conception, and followed by 22.6% women who were overweight before conception compared to women with ideal BMI (6.3%).

DISCUSSION

In The present study population of 576 women GDM was present in 51 women (8.9%) confirmed by 75g 2hour OGTT using the WHO criteri. By DIPSI method (GDM diagnosed as serum glucose greater than 140 g/dl at 2 hours, following a one-step, fasting 75g glucose load GDM was present in 59(10.2%) women.

The DIPSI screening test measured, between 24 and 28 weeks of pregnancy, revealed a sensitivity of 90.2% [95%CI78.6–96.7] and a specificity of 97.5% [95%CI 95.8–98.7] which is quite high for a screening test. Positive predictive values for DIPSI tests was 78% (65.27to87.70) and negative predictive value was 99% (97.76to99.68).

In India, some of the highest and lowest rates of GDM have been documented, reflecting the complexity of generalizing data for such a diverse and large population. Seshiah and colleagues have reported some of the highest rates of GDM in Chennai. Prevalence was estimated at 17.7% in an urban hospital based population in 2001 following a50 gram glucose challenge test and 75g 2hour OGTT using the WHO 1998 criteria [4]. Between 2005 to 2007 this group undertook a population study in Chennai and the surrounding semi-rural and rural areas to determine GDM prevalence [4]. They demonstrated 17.8% of urban women had GDM, diagnosed as serum glucose greater than 7.8 mmol/l at 2 hours, following a one-step, fasting 75g glucose load. Rural and semi-urban women had lower rates of GDM, 9.9% and 13.8%respectively.

Studies using the 3hour oral glucose tolerance test report lower prevalence. In 1992 Ramachadran et al, in Chennai demonstrated a rate of GDM of 0.56% with O'Sullivans criteria [8]. In New Delhi in 2007, Tripathietal, screened 687 women for GDM using a 50 -gram challenge test (threshold 7.8mmol/l). Women positive on screening went on to undergo a 100g 3hour OGTT using the Carpenter Coust an Criteria. Using this method the GDM prevalence was 1.5% [9]. Using the same criteria prevalence was 6.2% in Mysore in 1997-8 [10] and 3.1% in Kashmir from 1999 -2002 [11]. In 2008, a hospital based survey showed a combined prevalence of GDM and IGT to be 21.6% [12]. In our study population of 576 women GDM was present in 51 women (8.9%) confirmed by 75g 2hour OGTT using the WHO criteria.

By DIPSI method (GDM diagnosed as serum glucose greater than 140g/dl at 2hours, following a one-step, fasting 75g glucose load) GDM was present in 59(10.2%) women in our study. The overall prevalence of GDM was found to be 6.94% by Wahi et al.[13] adhering to DIPSI guidelines in the diagnosis. In a study by Balaji et al [14] using DIPSI criterion 13.4% of women were identified as GDM.

In the present study, prevalence of GDM increased significantly with increasing age. A similar association has been seen in earlier studies [4,11,13]. Obesity is an important risk factor in the development of GDM. In the present study prevalence of GDM was highest (50%) among women who were obese before conception, and followed by 22.6% women who were overweight before conception compared to women with ideal BMI (6.3%). Significant difference was noted among those with

normal BMI compared to those who were overweight or obese (P<0.0001). Higher prevalence of GDM in women with higher BMI has also been observed in earlier studies as well [4,12].

Family history of diabetes mellitus has been reported to be associated with higher chances of developing GDM. In our study, a significantly higher percent of women with GDM had positive family history of diabetes mellitus (p<0.02). Seshiah et al [4] observed a significant association between the family history of diabetes mellitus and the occurrence of GDM among pregnant women.

A significantly higher prevalence of GDM was observed with increasing educational level but there was no significant difference in prevalence of GDM among women who belonged to lower-middle class or above as compared to upper-lower and lower class.

CONCLUSION

The prevalence of GDM is high in Indian women as reported by many recent studies. Gestational diabetes increases the risk of complications for both mother and child during pregnancy, childbirth and beyond. Current evidence suggests early detection and management of gestational diabetes improves outcomes for both mother and child. Single test procedures for screening GDM will help in its management. GDM was present in 8.9% women confirmed by 75g 2 hour OGTT using the WHO criteria. Age ≥30 years, BMI ≥25 and family history of diabetes were found to be risk factors for GDM.

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