Section: OBG

Original Research Article

SCREENING OF ANTENATAL CASES IN SECOND TRIMESTER OF PREGNANCY FOR GESTATIONAL DIABETES MELLITUS

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Abstract

Background: To study incidence of gestational diabetes mellitus in Antenatal patients and its impact on feto maternal outcome. This is a prospective observational study and techniques used are clinical and noninvasive. **Materials and Methods:** The prospective observational study was conducted on 890 antenatal subjects attending antenatal clinic at tertiary care hospital during their second trimester of pregnancy. The study was conducted from 1st march 2021 to 31st august 2022.DIPSI criteria recommended by FOGSI and FIGO (2020) for GDM was used. Single step test was used irrespective of last meal and cutoff value of> 140 was used [after 2 hours] to diagnose GDM. All the subjects were followed till delivery, maternal and perinatal outcome was compared between GDM and NON-GDM group. Data was analysed using IBM- Statistical Package for Social Sciences (SPSS) version 23.0. Frequency distribution, percentages and Chi square test and spearson correlation test was used for statistical analysis. P value <0.05 was considered significant. **Result:** Out of 890 cases ,84 cases were screened positive. Hence incidence of GDM in present study was 9.4%. Cesarean section rate and operative vaginal delivery rate were slightly higher among GDM group as compared to non GDM. All 11 babies weighing>4kg belong to mother of GDM group. More newborn of GDM mothers required NICU admission. **Conclusion:** In Indian context, screening for GDM is essential in all pregnant women as the Indian women have 11 fold increased risk of developing glucose intolerance during pregnancy compared to Caucasian women. Simple test which is economical, feasible, does not require long stay or frequent visit to hospital is and causes least disturbance to pregnant women's daily activities is required. DIPSI as a diagnostic tool for GDM is simple, one step, low cost and very convenient. An early diagnosis is always better as it gives enough time to correct and prevent complications.

INTRODUCTION

Although type 2 diabetes mellitus during pregnancy (DIP) causes hyperglycemia in pregnancy (HIP), it is gestational diabetes mellitus (GDM) that remains the major cause of HIP.[1] DIP, either antedating or detected during pregnancy, is the more hazardous form of HIP, producing severe hyperglycemia early in pregnancy, which persists postpartum. On the other hand, GDM causes mild hyperglycemia late in pregnancy, which usually disappears after delivery. As normal pregnancy advances, it causes insulin resistance. The resulting hyperglycemia is compensated for in healthy women by pancreatic beta cell hyperplasia, which can meet the additional metabolic demands. However, in GDM, there is an inadequate compensation, due to multiple genetic and environmental factors, causing hyperglycemia.[2] Its prevalence is raised depending on diagnostic criteria and the presence of different risk factors such as maternal age and body mass index (BMI); prevalence of overt diabetes; population ethnicity; genetic, social, and environmental factors.[3–6]

The etiology of GDM is multifactorial and has not been completely understood. However, GDM carries a serious risk of feto-maternal, neonatal mortality and morbidity,[7] and the lifelong risk of obesity, type 2 diabetes mellitus and cardiovascular diseases in the mother and child later in life.[8–11]

The most important risk factors are maternal overweight and obesity, age greater than or equal to

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35 years at delivery, hypertension, metabolic syndrome, nonwhite ethnicity, family history of diabetes mellitus, prior unexplained stillbirth, prior infant with congenital anomaly (if not screened during that pregnancy), prior macrosomic infant, history of gestational diabetes, chronic use of steroids, glycosuria, and known impaired glucose metabolism.[12]

Therefore, it is critical for all countries to align themselves to the latest research on every aspect of GDM, from screening to management, and the critical long-term follow-up after delivery. The lack of a uniform global approach to GDM remains one major roadblock plaguing GDM and our prospects of turning the tide on the T2DM epidemic.[13,14] Present study was conducted with the aim to know the incidence of gestational diabetes mellitus in Aantenatal women attending the tertiary care hospital and its impact on fetomaternal outcome.

MATERIALS AND METHODS

This was a prospective observational study, conducted in the OPD of Obstetrics and Gynaecology dept at tertiary care hospital. All procedures followed were in accordance with the ethical standards of the Institutional Committee. Informed consent was obtained from all patients for being included in the study. All antenatal women coming to OPD at 24-28 weeks of gestation were taken for testing, met inclusion criteria's (excluding known cases of diabetes).

Simple random sampling was done to do OGTT for antenatal women coming to OPD. Before doing OGTT, women were briefed about the study and those who given consent regarding study were included. Single step testing using 75 gm anhydrous glucose and measuring blood sugar 2 hours after ingestion was used by DIPSI criteria.

75 gm of anhydrous glucose was given orally after dissolving in approximately 300 ml water whether the pregnant women comes in fasting or nonfasting state, irrespective of last meal. The intake of solution ensured to be completed within 5-10 minutes. Venous sample had been taken after 2 hours of ingestion of solution and sent for blood sugar testing. The threshold blood sugar level > 140 mg/dl (more than or equal to 140) was taken as cutoff for diagnosis of gestational diabetes mellitus. Those who were screened positive, had been managed as per guideline. (MOHFW)

Statistical Analysis

Data was analysed using IBM- Statistical Package for Social Sciences (SPSS) version 23.0. Frequency distribution, percentages and Chi square test and spearson correlation test was used for statistical analysis.

RESULTS

Total 890 subjects in the second trimester of pregnancy fulfilling the inclusion criteria and who consented to participate were screen for GDM. Total 84 subjects were diagnosed as GDM by using DIPSI test, hence incidence of GDM is 9.4% in our study. There was more proportion of GDM cases(42.64%) in age group above 30 years as compared to other age group subjects that was statistically highly significant.GDM cases are more among overweight and obese patients(45 cases).In overweight subjects 56.89 percentage had GDM and in obese patients 100 percent subjects had GDM ,which is statistically highly significant. Out of 890 study subjects 66 were lost to followup, total 824 subjects were followed up till delivery. Out of 84 GDM mothers only 2 required oral hypoglycemic agent and rest showed controlled blood sugar levels with MNT. All the 84 GDM mother delivered between 37 to 40 weeks of gestation. Vaginal mode of delivery was the most common mode of delivery in GDM and non GDM group. Cesarean section rate was almost similar in GDM and NON-GDM group, slightly higher in GDM group. All the babies with birth weight >4 kg(n=11) were of GDM mothers. None of the GDM mother had baby weighing<1.5 kg. Total 39.33% neonate of GDM mothers required NICU admission, but there was no IUFD, stillbirth or neonatal deaths observed in present study.

Table 1: Incidence of GDM by DIPSI Criteria

SN	Cases	Incidence	Percentage
1	No of GDM cases	84	9.4% [P value<0.05]
2	Non GDM subjects	806	90.06%
	Total	890	100%

Table 2: Sociodemographic characteristics of GDM and NONGDM subjects

Sn	Sociodemographic Characteristics	GDM Cases		NONGDM Subjects		P Value
		N	%	N	%	
1	Age(Years)					0.001
	18-24 (N=455)	23	5.05	432	94.94	
	25-29(N=367)	32	8.71	335	91	
	>30(N=68)	29	42.64	39	57.35	
2	Residential Address					0.01
	Rural(N=498)	36	7.22	462	92.77	
	Urban(N=392)	48	12.24	344	87.75	
3	Gravida					0.03
	G1(N=349)	28	8.02	321	91.97	
	G2(N=389)	33	8.4	356	91.51	

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	G3(N=126)	15	11.90	111	88.09	
	G4(N=23)	7	30.43	16	69.56	
	G5(N=3)	1	33.33	2	66.66	
4	Education					0.009
	Illiterate(N=443)	34	7.6	409	92.32	
	Upto Primary School(N=337)	31	9.19	306	90.80	
	Upto Matrix(N=100)	16	0.16	84	0.84	
	Graduated And Above(N=10)	3	30	7	70	
5	Occupation					0.007
	Housewives(N=797)	68	8.53	729	91.46	
	Labourer(N=85)	13	15.29	72	84.70	
	Business And Salaried(N=6)	2	33.33	4	66.66	
	Professional And Others(N=2)	1	50	1	50	
6	Booking Status					0.193
	Booked (N=874)	84	100	790	98	
	Unbooked(N=16)	0	0	16	2	
7	Ses					0.013
	Upper(N=8)	3	37.50	5	62.50	
	Middle(N=216)	24	11.11	192	88.88	
	Lower(N=666)	57	8.55	609	91.44	
8	Dietary Habits					0.047
	Veg(N=841)	75	8.91	766	91.08	
	Nonveg(N=3)	0	0	3	100	
	Mixed(N=46)	9	19.56	37	80.43	
9	Lifestyle					0.109
	Sedentary(N=824)	73	86.9	751	93.2	
	Moderate(N=61)	10	11.9	51	6.3	
	Heavy(N=5)	1	1.2	4	0.5	
10	BMI					0.001
	<18(N=25)	1	4	24	96	
	18-24.9(N=795)	38	4.77	757	95.22	
	25-29.9(N=58)	33	56.89	25	43.10	
	>30(N=12)	12	100	0	0	

Table 3: maternal outcome among study subjects

Sn	Outcome	Gdm cases		Nongdm subjects		P value
		N	%	N	%	
1	Delivery outcome					0.015
	VD with episiotomy(n=521)	27	32.14	494	69.09	
	VD without episiotomy(n=60)	30	35.71	30	4.19	
	Assisted VD (n=14)	3	3.57	11	1.53	
	Cesarean section(n=204)	24	28.57	180	25.17	
2	Gestational age at delivery					0.001
	Term(n=763)	84	100	679	94.96	
	Preterm(n=36)	0	0	36	5.03	
3	Complications					0.123
	Perineal tear(n=10)	0	0	10	1.39	
	Pph(n=61)	3	3.57	58	8.11	
	Abruption(n=31)	2	2.38	29	4.05	
	Shoulder dystocia(n=3)	0	0	3	0.41	

Table 4: Fetal and Neonatal Outcome Among Study Subjects

Sn	Fetal And Neonatal Outcome	GDM Cases		NONGDM Subjects		P Value
		N (84)	%	N (740)	%	
1	Birth Weight					0.001
	<1.5 Kg(N=28)	0	0	28	3.78	
	1.5-2.5 Kg(N=618)	48	57.14	570	77.02	
	2.5-4 Kg(N=142)	25	29.76	117	15.81	
	>4 Kg(N=11)	11	13.09	0	0	
2	Newborn Status					0.0001
	Live Birth with NICU Admission(N=100)	33	39.3	60	8.31	
	Live Birth Without NICU Admission(N=688)	51	60.7	637	89.09	
	Intrauterine Death(N=09)	0	0	09	1.25	
	Stillbirth(N=02)	0	0	02	0.27	
	Neonatal Death(N=12)	0	0	12	0.97	

DISCUSSION

The incidence of gestational diabetes mellitus is increasing as a result of higher rates of obesity in the general population and more pregnancies in older women. In our study, out of 890 subjects, 9.4% were found to be OGTT positive. Similar incidence was reported in a cross sectional study done in Pakistan in 2016 at Tertiary care hospitals of two metropolitan cities and shows high frequency of GDM, 11.8 % irrespective of risk factors.[15] A hospital-based cross-sectional study, done in an ante-natal clinic (ANC) at a sub-district hospital

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(SDH), Faridabad district of Haryana, India in may 2022 and found incidence of GDM14.1% according to IADPSG criteria and 6.7% according to DIPSI criteria, respectively.[16]

GDM was found to be significantly higher in age group >30 years as compared to age group between 18-29 years in our study. There was significant correlation between BMI and GDM. Similar results were reported in ametaanalysis done among various countries in 2020.[17] Dr.Rajmani and Dr Urvashi, in a study done at SMS Medical College Jaipur in 2017,concluded that overweight and obese womenwere more prone to develop GDM.[18]

The adverse maternal complications include hypertension, preeclampsia, urinary tract infection, hydramnios, increased operative intervention and future DM. In the fetus and neonates it is associated with macrosomia, congenital anomalies, metabolic abnormalities, RDS, etc. and subsequent childhood and adolescent obesity. Cesarean delivery rate was almost similar in GDM and non GDM group in present study.

The study conducted in women with GDM who delivered in the Academic Centre for Woman's and Neonate's Health in Warsaw Poland over the years 2013 and 2014 and found that Patients with GDM are more likely to undergo cesarean section.[19] In present study out of 84 cases of GDM all subjects delivered at term gestation, none of them delivered preterm and it shows good antenatal visits and counseling. A cohort study done at the Northern California Kaiser Permanente Medical Care Program in 2003 showed that the risk of spontaneous preterm birth increased with increasing levels of pregnancy glycemia.[20] In present study, all the macrosomic babies were of GDM mother (n=11) and none of the GDM mother had low birth weight baby. Similar results were found in A case control study conducted in 2012 and 2013, it concludes that macrosomia was most commonly associated with GDM and high fasting glucose.[21]

In present study, 39.3% babies of GDM mother require NICU admission as compared to nongdm mother (8.31%). Respiratory distress was the most common cause for NICU admission.

CONCLUSION

Screening for GDM is usually done at 24-28 weeks of gestation because, Insulin resistance increases during the second trimester and glucose levels rise in women who do not have the ability to produce enough insulin to adopt this resistance. High incidence of GDM in present study and similar study emphasize the importance of screening universally in all pregnant women. An early diagnosis is always better as it gives enough time to prevent and correct complications.In India, thinking that only elderly and obese women will develop GDM has become a myth. The startling fact was that GDM was seen mostly in women between 25-29 years of age group and even in women with normal or decreased BMI. This is probably the result of urbanization and its associated poor lifestyle and lack of exercise.

Present study has shown the incidence of GDM of 9.4% in antenatal women. But with the global epidemic of diabetes mellitus involving specially our country,the trends will show a rise only.

However, in present scenario most important is to screen all antenatal women for GDM for early diagnosis and better management. This should be a routine practice along with other investigations done during antenatal period.

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