International Journal of Clinical Obstetrics and Gynaecology

ISSN (P): 2522-6614
ISSN (E): 2522-6622

www.gynaecologyjournal.com
2021; 5(4): 160-164
Received: 20-07-2021
Accepted: 23-08-2021

Dr. Vidya A Thobbi
Department of OBG, Al Ameen Medical College Vijayapur, Karnataka, India

Dr. Vibhawaree Dandavate
Department of OBG, Al Ameen Medical College Vijayapur, Karnataka, India

Dr. Heena Nousheen
Department of OBG, Al Ameen Medical College Vijayapur, Karnataka, India

Corresponding Author:
Dr. Heena Nousheen
Department of OBG, Al Ameen Medical College Vijayapur, Karnataka, India

The relevance of universal screening for gestational diabetes mellitus with its maternal and fetal outcome

Dr. Vidya A Thobbi, Dr. Vibhawaree Dandavate and Dr. Heena Nousheen

DOI: https://doi.org/10.33545/gynae.2021.v5.i5c.1035

Abstract
Background: Asian women are ethnically more prone to develop glucose intolerance during pregnancy compared to other ethnic groups. Gestational diabetes mellitus is a common medical disorder of pregnancy and is frequently associated with maternal and fetal complications.
Materials and Methods: This was a Prospective study included 500 pregnant women both primigravidae and multigravidae at 11- 14 weeks gestation meeting the inclusion and exclusion criteria in Dept. of OBG, Al-Ameen Medical College, Vijayapur. A detailed history and examination were carried out and Universal screening and diagnosis of GDM was done using DIPSI criteria. The cases which were positive after screening were managed with MNT, Metformin or Insulin accordingly. Cases were followed up till delivery, data was documented and analysed.
Results: Out of 500 patients screened, incidence of GDM was found to be 3.4% out of which 2.7% in those screened at 24-28weeks and 0.7% at 32weeks of gestation. Out of 16 GDM cases 12 cases were managed with MNT alone. 1 was managed with OHA (Metformin) and 3 were put on insulin therapy along with MNT. Total cases of polyhydramnios were 3, GHTN and preterm birth were 1 case each. Total NICU admissions among the GDM patients were 5. They were mainly for hyperbilirubinemia, hypoglycaemia, and shoulder dystocia. There was no maternal or perinatal mortality in our study.
Conclusion: DIPSI's recommendation of 75gm OGCT irrespective of the last meal is a very simple, cost effective and feasible procedure for universal screening and diagnosis of GDM which was carried out in our study and hence early diagnosis and adequate glycemic control in antenatal period reduces maternal and perinatal morbidity and mortality significantly.

Keywords: GDM, DIPSI, OGCT, MNT, Insulin

Introduction

Hyperglycaemia in pregnancy encompasses varied types of glucose dysregulation seen during pregnancy. It includes diabetes in pregnancy (DIP) and Gestational Diabetes Mellitus (GDM). Hyperglycaemia first detected in pregnancy during routine testing (often between 24-28 weeks) that does not meet the criteria for overt diabetes (Fasting plasma glucose ≥7.0 mmol/L or 126 mg/dL and/ or 2-hour 75 g OGTT value ≥11.0 mmol/L or 200 mg/dL or random plasma glucose ≥11.0 mmol/L or 200 mg/dL associated with signs and symptoms of diabetes) is called GDM [1].
Pregnancy is a diabetogenic state because the placenta produces many hormones that are antagonist to Insulin hence unmasks diabetes in latent diabetic subjects.
The prevalence rates of Diabetes in India are between 4.6% and 14% in urban areas and 1.7% and 13.2% in rural areas respectively [2]. Occurrence of GDM parallels the prevalence of impaired glucose tolerance (IGT), obesity, and T2DM in a given population. These conditions are on the rise globally. Thus, more women entering pregnancy have risk factors that make them vulnerable to hyperglycaemia during pregnancy.
The purpose of screening is early detection and treatment of the GDM. The outcome of disorder is better when the treatment is started before rather than after appearance of symptoms [2]. All complications associated with GDM are potentially preventable with early recognition of GDM, intense monitoring and proper treatment thus preventing the vicious cycle of transmitting glucose intolerance from one generation to next generation. Hence, Universal screening in Early Pregnancy is advised.
As Asian women are more prone for developing GDM and are at increased risk of progressing to Diabetes mellitus in future, Universal screening for GDM is definitely superior over selective screening so as not to miss even a single case. GDM women are an ideal group for the primary prevention of Diabetes mellitus.

A single step screening cum diagnostic test recommended by Diabetes in Pregnancy Study Group of India (DIPSI), Oral Glucose Challenge Test (OGCT) at first antenatal visit is easy, feasible and cost effective for Indian population. FIGO also recommends single step test for universal screening for GDM. Universal screening for GDM is necessary and will help to fulfil the goal of India becoming ―the world's diabetes care capital‖ instead of ―diabetes capital of the world [4].

Hence a study was conducted to know the prevalence of GDM, benefits of early screening in pregnancy and its maternal and fetal outcome.

Aims and Objectives

1. To screen the women for Gestational Diabetes mellitus by using Oral Glucose Challenge Test and to study the benefits of early screening with the maternal and fetal outcome in Gestational Diabetes mellitus patients.
2. To study the incidence of GDM in and around Vijayapur, Karnataka.

Methods

This was a prospective cross sectional study carried out in Dept. of OBG, Al-Ameen Medical College, and Vijayapur, India from December 2018 to August 2020. Written informed consent was taken from the patients. A total of 500 patients were included.

Inclusion criteria

Pregnant women with estimated gestational age of 11 to 14 weeks, attending antenatal OPD at Al-Ameen Medical College Hospital Vijayapur, Karnataka, were included in the study.

Exclusion criteria

Pregnant women beyond 14 weeks of gestation. Pregnant women with Type-I and Type-II Diabetes Milletus. Universal screening for GDM was done in 500 pregnant women with estimated gestational age of 11 -14 weeks to exclude patient with type I and type II diabetes. They were given 75 grams of oral dextrose monohydrate dissolved in 300ml of plain water and asked to consume in 5 to 10 minutes irrespective of last meals. Venous sample was taken after 2 hours. During those 2 hours patient was not allowed to move around or to consume anything. Plasma glucose estimation was done by glucose peroxidase method. Diagnosis of diabetes was done according to the Diabetes in Pregnancy Study Group of India criteria, if 2 hr plasma glucose was ≥140mg/dl. If plasma glucose was <140mg/dl among the screened pregnant women then the test was repeated at 24-28 weeks. If normal, then the test was again repeated at 32 weeks. If plasma glucose was <140 mg at 32 weeks, then they were classified as non –GDM group. If the OGCT value at any time during gestation was ≥140mg/dl to 199mg/dl then they were diagnosed as GDM and were advised MNT for 2 weeks and followed up with 2hours PPBS. If the plasma blood glucose after 2hours PPBS was <120mg/dl then they were advised to continue MNT, and followed up every fortnightly. If this 2hours PPBS value was >120mg/dl then they were given medical treatment with either oral hypoglycemics or insulin depending on the FBS and PPBS values along with MNT. If at first visit OGCT value was >200mg/dl (DM), such women were excluded from the study.

If patient had vomiting after consuming 75g of dextrose monohydrate solution within 30 minutes then the test was repeated on next day. If the patient vomited after 30 minutes of consumption of the solution the test was continued and plasma glucose levels were measured.

Detailed history of the patient along with the routine examination were done. The necessary investigations that are done were recorded. Cases were followed up till delivery and the maternal and fetal outcome was documented.

Results

Out of 500 pregnant women enrolled the maximum that is 261(52.2%) were between 21 to 25 years of age, 33 patients (6.6%) were above 30 years of age (Table 1).

Table 1: Distribution of cases according to age

Age (Years)	N(number of patients)	Percent
18-20	108	21.6
21-25	261	52.2
26-30	98	19.6
>30	33	6.6
Total	500	100

In initial screening of 500 women at 11-14 weeks, none had GDM. After rescreening at 24-28 weeks, 13 women had GDM out of 479 women, as 7 women were lost to follow-up and 14 aborted accounting for 2.7% incidence of GDM at 24-28 weeks of gestation. Incidence of GDM at 32 weeks accounted for 0.7%, out of 451women (Excluding abortions 14, lost to follow-up 22 and GDM cases 13 diagnosed at initial screening). In this study, the overall GDM incidence is 3.4% using the DIPSI criteria (Table 2).

Table 2: Overall Incidence of GDM

Overall	N	Percent
Non-GDM	448	96.6
GDM	16	3.4
No. of patients rescreened	464	100.0
No. of patients lost to follow-up and abortions	22, 14	
Total	500	-

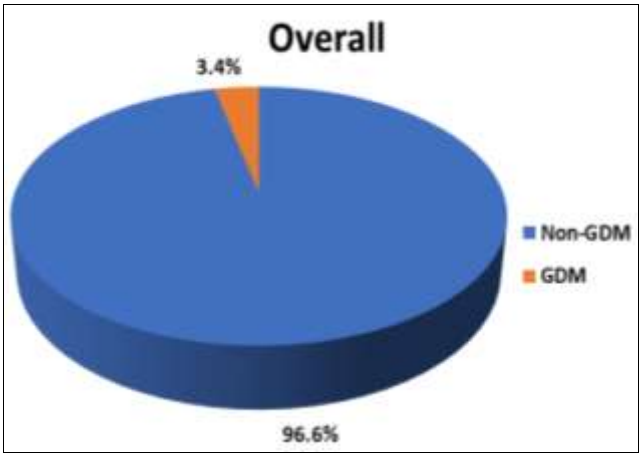

Fig 1: Overall Incidence of GDM

Table 3: Result of screening, rescreening by OGCT and incidence of GDM.

At 11-14wks	No. of cases	Percent
Normal	486	97.2
GGI (Gestational Glucose Intolerance)	14	2.8
GDM	0	0
Total	500	100
At 24-28wks		
Normal	455	95.0
GGI	11	2.3
GDM	13	2.7
No. of pregnant women rescreened At 24-28 WKS	479	100.0
Lost to follow-up and abortions	21	-
Total	500	-
At 32 wks		
Normal	442	98.0
GGI	6	1.3
GDM	3	0.7
No. of pregnant women rescreened at 32wks	451	100.0
Lost to follow-up, abortions and GDM cases diagnosed at 24-28wks	49	-
Total	500	-

Transition of cases to GDM: At 11-14 wks OGCT, 486 pregnant women had normal glucose tolerance and 14 had Gestational glucose intolerance (GGI).

Among 486 Non GDM, 7 developed GDM at 24-28 wks OGCT. Among 14 GGI cases, 6 developed GDM at 24-28 wks OGCT. Total GDM cases at 24-28wks were 13.

Among 455 Non GDM, 1 developed GDM at 32wks. Among 11 GGI cases, 2 developed GDM at 32 wks OGCT. Newly diagnosed cases of GDM at 32 wks are 3 GDM cases (Table 3).

Incidence of GDM among primigravida was 2.9% and among multigravida was 3.7%. There was significant correlation between gravida and incidence of GDM (Figure 2).

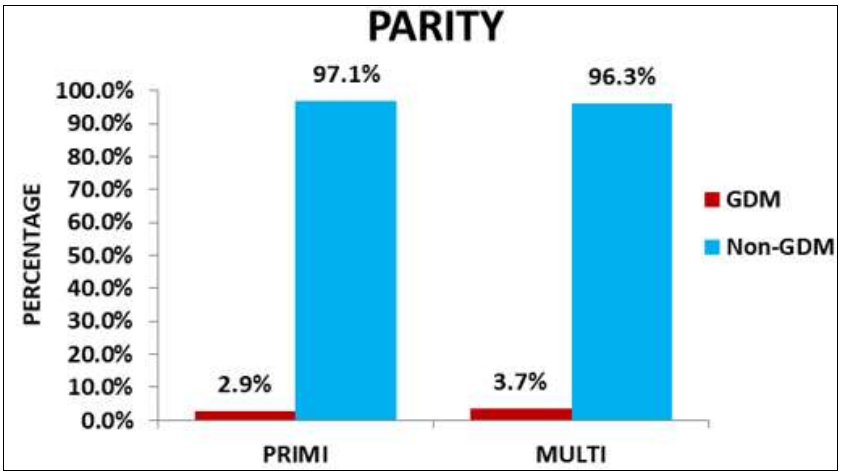

Fig 2: Distribution of GDM and Non-GDM Cases according to Parity.

Out of 6 women who developed gestational hypertension, 1 had GDM. Among 7 patients having polyhydramnios, 3 had GDM.

There was a significant correlation between GDM and developing pregnancy complications (Table 4).

Table 4: Distribution of GDM and Non-GDM Cases according to Pregnancy Complications

Pregnancy complications	Total no. of cases	GDM		Non-GDM		P value
		N	%	N	%	
GHTN	6	1	16.7%	5	83.3%	<0.001*
Polyhydramnios	7	3	42.9%	4	57.1%	
Preterm	10	1	10.0%	9	90.0%	

Note: * significant at 5% level of significance (p<0.05)

Table 5: Distribution of GDM cases according to management

Management	N	Percent
MNT	12	75
MNT+ OHA*	1	6.25
MNT+INSULIN**	3	18.75
Total	16	100

- *OHA (Oral Hypoglycemic Agent) used was Tablet Metformin 500mg twice daily taken with food.
- ** Inj Insulin mixtard was given as fixed dose combination depending on patient blood sugar values.
- Management of GDM: Out of 16 GDM cases, 12 (75%) cases were managed with MNT alone, 1 (6.25%) case with oral hypoglycemic agent and 3 (18.75%) cases required Insulin along with MNT.

Out of 16 GDM cases, 8 delivered vaginally and 8 delivered by Cesarean section (Table 6).

Table 6: Distribution of cases according to mode of delivery among GDM and non GDM group

Mode of delivery	Total no. of cases	GDM		Non-GDM		P value
		N	%	N	%	
FTND	261	7	2.7%	254	97.3%	0.405
LSCS	192	8	4.2%	184	95.8%	
PTVD	11	1	9.1%	10	90.9%	
Total	464	16	3.4%	448	96.6%	

Table 7: Distribution of GDM and Non-GDM Cases according to Fetal Outcome

Fetal outcome	Total no. of cases	GDM		Non-GDM		P value
		N	%	N	%	
Hyperbilirubinem	5	1	20.0%	4	80.0%	<0.001*
Hypoglycemia	1	1	100.0%	0	0.0%	
Macrosomia	1	1	100.0%	0	0.0%	
RDS	5	0	0.0%	5	100.0%	
Shoulder dystocia	2	1	50.0%	1	50.0%	
SGA	14	1	7.1%	13	92.9%	

Note: * significant at 5% level of significance ($p<0.05$)

Fetal outcome: In the present study, fetal complications required NICU admission were 5(17.8%) in the GDM group and in non GDM group were 23(82.2%). There was a significant correlation between GDM and macrosomia and neonatal hypoglycaemia (Table 7).

Discussion

Of the 500 patients in our study, the incidence of GDM was 3.4%, which was similar to the incidence in studies done by Swain S *et al.* [5] (5%) and Singh A *et al.* [6] (5.7%). Whereas the incidence in the study done by Karla P *et al.* [7] was 6.6%.

Table 8: Of the 500 patients in our study, the incidence of GDM was 3.4%

Authors	Incidence of GDM (%)
Karla P *et al.* [7]	6.6
Singh A *et al.* [6]	5.7
Swain S *et al.* [5]	5
Present study	3.4

Majority of the patients were above 30 years in studies done by Swain S *et al.* [5] (26.5%), Singh A *et al.* [6] (30%) and in our study (10.3%). Only 2.2 % of patients were in the age group of 18-20 years.

Table 9: Majority of the patients were above 30 years in studies

Age groups (years)	Swain S *et al.* [5] (%)	Singh A *et al.* [6] (%)	Present study (%)
18-20	-	-	2.2
21-25	5.76	5.5	2
26-30	5.76	8.3	6.3
>30	26.5	30	10.3

40% of GDM cases had a family history of diabetes mellitus in Swain S *et al.* [5] study. Whereas only 13% and 12.5 % of GDM cases had history of DM in study done by Singh A *et al.* [6] and in our study respectively. 6.25 % of the GDM women in our study had a history of GDM in their previous pregnancy which is similar to study done by Singh A *et al.* [6] ie 4.73%.

Table 10: 40% of GDM cases had a family history of diabetes mellitus

S. No	Family history	Percentage		
		Present study	Swain S *et al.* [5]	Singh A *et al.* [5]
1.	Family history of DM among GDM women	12.5%	40%	13%
2.	Past history of GDM	6.25%	-	4.37%

In the study done by Swain S *et al.* [5] 4.6% of GDM cases were diagnosed at 24-28 weeks of gestation. The incidence of GDM cases in Swain S *et al.*'s[5] study was 0.8% when rescreening was done at 32 weeks which are comparable to our study as in our study group at 24 – 28 weeks of gestation incidence was 2.7% and 0.7% when rescreening was done at 32 weeks. There were no case of GDM detected in the initial screening at 11- 14 weeks.

Table 11: The incidence of GDM cases

Authors	Gestational age	% of cases
Swain S *et al.* [5]	11-14 weeks	-
	24-28 weeks	4.6
	32 weeks	0.8
Present study	11-14 weeks	-
	24-28 weeks	2.7
	32 weeks	0.7

75% and 74.1% of GDM patients were managed by MNT alone in our study and Sunita TH *et al.*'s [4] study respectively. Only 6.25% of patients were put on Metformin. 18.75% patients were treated with Insulin in our study and 24.9% patients in Sunita Th *et al.*'s [4] study.

Table 12: GDM patients were managed by MNT alone in our study

S. No	Management of GDM cases	Percentage	
		Present study	Sunita TH *et al.* [4]
1.	MNT	75%	74.1%
2.	OHA (metformin)	6.25%	-
3.	Insulin	18.75%	24.9%

The most common maternal complication in the GDM cases in our study and Swain S *et al.* [5] study was polyhydramnios accounting to 12.5% and 12% respectively. 24 % of the GDM patients developed gestational hypertension in Swain S *et al.* [5] study, whereas in our study only 6.25% had gestational hypertension which gives us the insight that early screening can lead to prevention of not only GDM but also other co morbid diseases like GHTN. The incidence of preterm labour were similar in both the studies i.e., 8% in Swain S *et al.* [5] study and 6.25% in our study.

Table 13: The most common maternal complication in the GDM cases

S. No	Condition	Percentage	
		Present study	Swain S *et al.* [5]
1.	Gestational hypertension	6.25%	24%
2.	Polyhydramnios	12.5%	12%
3.	Preterm labour	6.25%	8%

The incidence of Macrosomia was highest i.e., 20% in Swain S *et al.* [5] study. In our study it was only 6.25% as early detection and good glycemic control can prevent the incidence of macrosomia because fetal hyperinsulinemia in response to maternal hyperglycemia occurs by 16weeks. The incidence of hyperbilirubinemia, hypoglycemia, shoulder dystocia and SGA was 4% and 6% respectively in a Swain S *et al.*'s[5] study and our present study.

Table 14: The incidence of hyperbilirubinemia, hypoglycemia, shoulder dystocia and SGA

S. No	Condition	Author	
		Swain S *et al.* [5]	present study
1.	Hyperbilirubinemia	4 %	6.25 %
2.	hypoglycemia	4 %	6.25 %
3.	macrosomia	20 %	6.25 %
4.	Shoulder dystocia	4%	6.25%
5.	SGA	4%	6.25%

The incidence of maternal and perinatal morbidity due to GDM is lower in our study as we had initiated screening at an early gestational age of 11-14 weeks. Management of the GDM cases was done effectively for achieving an optimal maternal and fetal outcome.

Conclusion

Universal screening for GDM should be adopted in all antenatal care clinics. The single step procedure recommended by DIPSI is user friendly, simple, feasible and economical for our Indian population. It serves as screening as well as diagnostic test for GDM at the same time irrespective of last meal. As in our study, significant proportion of the cases were detected on repeat OGCT, hence it is emphasized that re-screening at a later gestation of 24-28 weeks or beyond must form an essential component of screening to improve the perinatal outcome and also to identify women at risk of developing diabetes in the future. The post-partum screening should also be at regular intervals to detect the occurrence of diabetes in the future.

References

1. Sheiner E, Kapur A, Retnakaran R, Hadar E, Poon LC, McIntyre HD *et al*. FIGO (International Federation of Gynecology and Obstetrics) Post pregnancy Initiative: Long-term Maternal Implications of Pregnancy Complications—Follow-up Considerations. International Journal of Gynecology & Obstetrics 2019;147:1-31.
2. Anjana RM, Pradeepa R, Deepa M, Datta M, Sudha V, Unnikrishnan R *et al*. Prevalence of diabetes and prediabetes (impaired fasting glucose and/or impaired glucose tolerance) in urban and rural India: Phase I results of the Indian Council of Medical Research–India Diabetes (ICMR–INDIAB) study. Diabetologia 2011;54(12):3022-7.
3. Varija T. Screening for Gestational Diabetes Mellitus (Doctoral dissertation, RGUHS).
4. Sunita TH, Neravi A, Desai RM. Gestational diabetes mellitus diagnosed with single test glucose screening test and its outcome in a tertiary hospital in South India.
5. Swain S, Jena P, Satpathy RN, Mahapatra PC. 2-hour 75 gm OGTT for screening and Rescreening at 32-34 weeks for diagnosing gestational diabetes-evaluation of maternal and neonatal outcomes. International Journal of Reproduction, Contraception, Obstetrics and Gynecology 6(7), 2927.
6. Singh A, Uma B. Incidence of gestational diabetes mellitus and its outcomes in a rural population. Journal of Evolution of Medical and Dental Sciences 2013;2(13):1982-7.
7. Kalra P, Kachhwaha CP, Singh HV. Prevalence of gestational diabetes mellitus and its outcome in western Rajasthan. Indian journal of endocrinology and metabolism 2013;17(4):677.