

## Universal V/S Selective Screening and Single Step GTT as Screening Procedure for GDM (Gestational Diabetes Mellitus)

Sonam Kunjam<sup>1\*</sup>, Meenakshi Samariya<sup>2</sup>, Kavita Tanwar<sup>1</sup>

<sup>1</sup>PG Student, <sup>2</sup>Assistant Professor,  
Department of Obstetrics & Gynaecology, JLN Medical College, Ajmer, Rajasthan, India.

### ABSTRACT

**Objective:** To study reliability of the one step procedure as screening and diagnostic procedure for gestational diabetes mellitus and comparison of selective screening with universal screening for detection of more cases.

**Method:** A prospective study was conducted on randomly selected 500 female in 2<sup>nd</sup> and 3<sup>rd</sup> trimester were included. They underwent GCT (glucose challenge test) with 50 gm load which was followed by GTT (Glucose tolerance test) with 75 gm recommended by WHO after 72 hrs of GCT irrespective of result of GCT.

**Results:** Out of 500 pregnant women 27 (5.4%) women are diagnosed as GDM. Women with gravid  $\geq 3$ , age  $> 25$  yr and with positive family h/o of diabetes had high prevalence of GDM. Out of all GDM patients 18.5% women not had risk factors associated. PIH/preeclampsia and recurrent infections are most common antenatal complication seen in GDM group.

**Conclusion:** From present study we concluded that universal screening is necessary for GDM and for that single step GTT

should be performed which is more simple, feasible and economical and diagnoses more number of cases.

**Keywords:** Glucose Tolerance Test, Glucose Challenge Test, Screening, Gestational Diabetes Mellitus.


### \*Correspondence to:

**Dr. Sonam Kunjam,**  
PG Student,  
Department of Obstetrics & Gynaecology,  
JLN Medical College, Ajmer, Rajasthan, India.

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### INTRODUCTION

Gestational diabetes mellitus (GDM) is defined as carbohydrate intolerance of varying severity with onset or first recognition during pregnancy.<sup>1</sup> The diagnosis of gestational diabetes is important, because of the increased risk of adverse maternal and foeto-neonatal outcomes. In addition, GDM also confers a future risk of type 2 diabetes to mothers and their fetus.<sup>2</sup>

Gestational diabetes mellitus affects about 7% of all pregnancies worldwide and recent studies have reported an increase in the prevalence in last two decades.<sup>3-7</sup> In India, the prevalence ranges from 6% to 9% in rural and 12-21% in urban areas, with most studies being done in either South or North India.<sup>8-10</sup>

Unfortunately, GDM has no reliable signs or symptoms and can be diagnosed only through the use of laboratory tests. However, for the detection and diagnosis of GDM, controversy concerning optimal strategy still continues. Universal screening for gestational diabetes mellitus (GDM), detects more cases and improves maternal and offspring prognosis. Of all the screening tests, World Health Organization (WHO) procedure is simple and cost effective; the only disadvantage is that the pregnant woman has to come in the fasting state to undergo oral glucose tolerance test (OGTT). Hence, we undertook a study to elucidate a test that is casual and reliable to diagnose GDM and compared with selective

screening, universal screening detects more cases and improves maternal and offspring prognosis.

### MATERIALS AND METHODS

The present study was undertaken in department of obstetrics and gynaecology, J.L. N. Medical College, Ajmer, Rajasthan. 500 pregnant women attending the OPD were randomly selected by systemic random sampling method for the study. Pregnant women with singleton or multiple pregnancies in second and third trimester were included and women with history of pre-gestational diabetes (overt diabetes), intake of drugs that affects glucose metabolism like corticosteroids or progesterone and who refused to undergo screening and diagnostic test were excluded.

### Procedure of Study

Pregnant women under study underwent detailed clinical evaluation including evaluation of risk factors for GDM. They were given 50 gm glucose load for glucose challenge test (GCT) and the venous blood samples were collected after 1hr. All of them irrespective of the glucose value after the GCT, were instructed to come back after 3 days on an empty stomach for the 75gm oral glucose tolerance test (GTT) recommended by WHO and venous blood sample was collected after 2 hrs.

As per WHO diagnostic criteria, pregnant women having 2 hr plasma glucose >140 mg/dl were served as cases and those not diagnosed as GDM served as controls for study.

All the patients were closely followed during antenatal, intrapartum period. Any complications if occurred during this period were recorded in both the groups. The outcomes of pregnancy were recorded in both the groups. A percent wise comparison was made for various parameters between the two groups.

**Table 1: Prevalence of GDM by Age**

Age group	Number	Percentage
<20 yrs	1	3.7%
21 -25 yrs	6	22.2%
26 -30 yrs	9	33.3%
31- 35yrs	9	33.3%
>36 yrs	2	7.5%

**Table 2: Prevalence of GDM According To Gravida**

Gravida	Number	Percentage
1	4	14.8%
2	5	18.5%
3	8	29.6%
>4	10	37.1%

**Table 3: Results of Screening Test (GCT)**

GCT value	Number	Percentage	GTT positive
<140	390	78%	7 (25.92%)
>140	110	22%	20 (74.07%)

**Table 4: Prevalence of Risk Factor in GDM Group**

	Number	Percentage
<b>HISTORICAL RISK FACTOR</b>		
Family H/o DM	14	51.9%
H/O PIH/ Preeclampsia	6	22.2%
H/O still birth	5	18.5%
H/O recurrent abortions	3	11.1%
H/O Unexplained neonatal loss	2	7.4%
H/O congenital anomalies in previous baby	2	7.4%
Past H/O macrosomia	1	3.7%
<b>CLINICAL RISK FACTORS</b>		
Age >25	20	74.1%
PIH	13	48.1%
Obesity	10	37.1%
Recurrent infections (Candidiasis, UTI, vaginitis)	5	18.5%
Polyhydramnios	2	7.4%
<b>MULTIPLE RISK FACTORS</b>	22	81.5%
<b>NO RISK FACTORS</b>	5	18.5%

**Table 5: Antenatal Complications in Study Group**

	GDM group		Control Group	
	Number	Percentage	Number	Percentage
PIH /preeclampsia	13	48.1%	54	11.4%
Recurrent infections	5	18.5%	54	11.4%
Preterm labour	3	11.1%	60	12.7%
Malpresentations	3	11.1%	24	5.1%
Polyhydramnios	2	7.4%	30	6.3%
IUGR	2	7.4%	30	6.3%

**RESULTS**

During the study period from November 2014 to July 2016; among the 500 women in the study group, 27 women who were GTT positive were diagnosed as gestational diabetes mellitus as categorised as GDM group and 473 women were GTT negative served as controls. In the study group, 23 women in GDM group and 415 women in the control group had delivered by the end of this study. 18 women did not come back for follow up in control group. 4 women in GDM group and 40 women in control group are still undelivered by the end of this study and are under follow up. Of those 500 pregnant women; 47.8% women were seen in the age group of 21 - 25 years, 17% were < 20 yr, 24.6% were 26- 30 yrs, 7.8% were 31-35yrs, 2.8% were > 36 yrs. Out of 500 pregnant women; 112 (22.4%) were primigravida, 155 (31%) were second gravid, 134 (26.8%) were third gravid and 99 (19.8%) were fourth gravid and above. In our study group 27 women (5.4%) were diagnosed as GDM as per the WHO diagnostic criteria. The prevalence proportion of GDM increased with age upto 35 years. Prevalence proportion of GDM increased with increasing gravida A total of 500 women underwent both the 50 gm GCT and a subsequent 75 gm GTT. Among them, 110 patients (22%) were positive for the 50 gm GCT and 390 patients (78%) were negative. In our study group, 27 women were diagnosed as GDM as per the WHO diagnostic criteria (2 hour PPG ≥ 140 mg/dl. Out of these 27 who were identified as GDM women, 20 (74%) were GCT positive and 7 (26%) were GCT negative. Among the historical risk factors, family history of diabetes mellitus was the most common risk factor, present in 51.9% of patients. Among the clinical risk factors age >25 yrs was the most common risk factor present in 74.1% patients and 18.5% had no risk factors.

**Table 6: Mode of Delivery in Study Group**

	GDM group		Control group	
	Number	Percentage	Number	Percentage
Vaginal delivery	16	69.6%	319	76.9%
LSCS	7	30.4%	96	23.1%

Thus 18.5% of patient's would have been missed if selective screening has been followed based on risk factors.

Among the antenatal complications, PIH/preeclampsia, recurrent infections were more commonly associated with GDM group than with the control group. The incidence of caesarean section was 7 (30.4%) in GDM and 96 (23.1%) in control group.

**DISCUSSION**

Increasing trends in prevalence of GDM has been shown in various studies conducted in different regions of the country. Zargar et al reported prevalence of GDM as 3.8% among Kashmiri women while Verma et al reported 6.7% prevalence in rural area of Jammu. In another community based study Seshiah et al found prevalence of GDM in urban, semiurban and rural area of south

India as 17.8%, 13.8% and 9.9%. In our study prevalence of GDM is 5.4% (WHO criteria).

In the present study, the mean age of the patients was 24 years. This is comparable to the mean age of the pregnant women in the study conducted by Seshiah et al, which was 23±4 years.

Almost all cases of GDM belong to incipient type 2 DM. The usual age for onset of which is age 40 years. It is therefore expected that risk of GDM would increase with age. This was clearly seen in the present study as 33.3% of women with GDM were between 26 -30 years and 40.8% women with GDM were above 30 years of age. This reemphasized that age more than 25, is a strong risk factors for GDM. This was comparable with other studies which also show that the prevalence proportion of GDM increases with age as shown in table below.

**Table 7: Age Distribution of GDM**

Age group	Seshiah et al	Bhattacharya et al.	Jindal et al.	Present study
≤20	14.5%	33.3%	0%	3.7%
21-25	13.7%		2.3%	22.2%
26-30	19.5%	50%	16.4%	33.3%
>30	25%	16.7%	65%	40.8%

In their original report O'sullivan and co-workers reported that 53% of 19 gestational diabetic women had historic risk factors for diabetes compared with 41% of the general population. Similarly, Lavin and co-workers and Marquette and co-workers reported the sensitivity of taking a history to be of 46% and 50% respectively. In a larger study of 6214 universally screened pregnant women, Coustan and his colleagues found that the taking of a history was 56% sensitive for diagnosing gestational diabetes mellitus, whereas 44% the general population manifested such risk factors including age > 25 years. Obesity as well as the usual historic factors and found the history to be 97% sensitive for gestational diabetes mellitus. We found that age > than 25 yrs and family h/o diabetes mellitus were found to be the most significant risk factors for GDM. H/o PIH also seems to be an important risk factors as 22.2% GDM patients had this history in our study and 18.5% of GDM patients had no risk factors. Thus in our study, if selective screening is used 18.5% would not have been diagnosed, emphasizing the need for universal screening, rather than risk factor based screening.

**CONCLUSION**

In present study the mean age of the patient was 24 yrs and the mean age of patients with GDM was 28 yrs .74.1% of GDM patients were more than 25 yrs of age. In our study Single step GTT detects 25% more cases than two step screening procedure (GCT followed by GTT) thus single step GTT is simpler,

economical and feasible screening test. The prevalence proportion of GDM increased with gravidity from 14.8% in primigravida to 37.1% in gravida ≥ 4.

81.5% of patients had risk factors where as 18.5% of GDM patients did not have any risk factors. Age more than 25yrs and family history of diabetes mellitus were found to be the most significant risk factors for GDM, being present in 74.1% and 51.9% respectively. Thus if selective screening is used 18.5% would not have been diagnosed, emphasizing the need for universal screening rather than risk factor based screening.

48.1% of GDM patients had PIH/preeclampsia being the commonest antenatal complications which was significantly more when compared to 11.4% in control group.

The overall incidence of vaginal delivery was 69.6% and LSCS was 30.4% in GDM group. The incidence of LSCS being higher in GDM group than control group (30.4% vs 23%). Therefore from present study it can be concluded that universal screening is necessary for diagnosis of GDM and we suggest a single GTT with a 75gm oral glucose tolerance test as recommended by WHO which is simple procedure, economical and feasible and also identifies a larger number of GDM cases with a greater potential for prevention of complication. With universal screening, early diagnosis, strict monitoring and diet management diabetes mellitus can be controlled, euglycemia can be achieved complications can be minimized and can be managed by timely intervention with good maternal and fetal outcome.

## REFERENCES

1. Metzger BE, Coustan DR. Summary and Recommendations of the Fourth International Workshop-Conference on Gestational Diabetes Mellitus. The Organizing Committee. *Diabetes Care*. 1998;21(Suppl 2):B161-7.
2. Bellamy L, Casas JP, Hingorani AD, Williams D. Type 2 diabetes mellitus after gestational diabetes: A systematic review and meta-analysis. *Lancet*. 2009;373:1773-9.
3. Ferrara A, Kahn HS, Quesenberry CP, Riley C, Hedderson MM. An increase in the incidence of gestational diabetes mellitus: Northern California, 1991-2000. *Obstet Gynecol*. 2004;103:526-33.
4. Dabelea D, Snell-Bergeon JK, Hartsfield CL, Bischoff KJ, Hamman RF, McDuffie RS, et al. Increasing prevalence of gestational diabetes mellitus (GDM) over time and by birth cohort: Kaiser Permanente of Colorado GDM Screening Program. *Diabetes Care*. 2005;28:579-84.
5. Montana Department of Public Health and Human Services Chronic Disease Prevention and Health Promotion Program Trends in diabetes in pregnancy among American Indian and White mothers in Montana 1989-2003: An update. 2005;2:1-8.
6. Thorpe LE, Berger D, Ellis JA, Bettgowda VR, Brown G, Matte T, et al. Trends and racial/ethnic disparities in gestational diabetes among pregnant women in New York City, 1990-2001. *Am J Public Health*. 2005;95:1536-9.
7. Zargar AH, Sheikh MI, Bashir MI, Masoodi SR, Laway BA, Wani AI, et al. Prevalence of gestational diabetes mellitus in Kashmiri women from the Indian subcontinent. *Diabetes Res Clin Pract*. 2004;66:139-45.
8. Seshiah V, Balaji V, Balaji MS, Paneerselvam A, Arthi T, Thamizharasi M, et al. Prevalence of gestational diabetes mellitus in South India (Tamil Nadu) – A community based study. *J Assoc Physicians India*. 2008;56:329-33.
9. Verma A, Singh B, Mengi V. Gestational diabetes in rural women of Jammu. *Indian J Community Med*. 2008;33:54-5.
10. Bouhsain S, ElkoChris, Babahabib MA, Hafidi MH, Bouaiti E, Moussaoni MD. Comparing two screening policies of gestational diabetes mellitus: The mohammed V training military hospital of Rabat (Morocco) *Gynecolobstet fertile*. 2014.May; 42(5):317-21. epub 2014 Jan 7.
11. Rani PR, Begam J. Screening and diagnosis of gestational diabetes mellitus, where do we stand. *J Clin Diagn Res*. 2016 Apr; 10(4):QE01-4 Epub2016 Apr1.
12. Purandare CN. Universal screening for gestational diabetes mellitus (GDM): mandatory. *J GynecolIndia* 2012 Apr;62(2):141-3 Epub2012 jul17.
13. Surapaneni T, Nikhatl, Nirmalan PK. Diagnostic effectiveness of 75 gm oral glucose tolerance test for gestational diabetes in India based on the international association of the diabetes in pregnancy study groups guidelines *Obstet med*, 2013 sep;6(3)125-128 Epub2013 may3.
14. Anjalakshi C, Balaji V, Balaji MS, Ashalata S, Suganthi S, Arthi T, et al. A single test procedure to diagnose gestational diabetes mellitus. *ActaDiabetol*. 2009;46:51-4.
15. Karoline Kragelund Nielsen, Peter Damm, Anil Kapur, Vijayam Balaji, Madhuri S. Balaji, Veerasamy Seshiah and Ib C. Bygbjerg. Risk Factors for Hyperglycaemia in Pregnancy in Tamil Nadu, India *Plos one* 2016; 11(3): e0151311.
16. Wendland EM, Torloni MR, Falavigna M, Trujillo J, Dode MA, Campos MA, Duncan BB, Schmidt MI. Gestational diabetes and pregnancy outcomes--a systematic review of the World Health Organization (WHO) and the International Association of Diabetes in Pregnancy Study Groups (IADPSG) diagnostic criteria. *BMC pregnancy outcome* 2012 Mar 31;12:23. doi: 10.1186/1471-2393-12-23.

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