

## Comparison of single step versus double step screening for GDM

Rony Chakravarty<sup>1,\*</sup>, Varun Bajaj<sup>2</sup>, KC Singh<sup>3</sup>

<sup>1,3</sup>Classified Specialist & HOD, Dept. of Obstetrics & Gynaecology, <sup>2</sup>Graded Specialist & HOD, Dept. of Pathology, <sup>1,2</sup>Military Hospital, Wellington, Tamil Nadu, <sup>3,6</sup>Airforce Hospital, Coimbatore, Tamil Nadu, India

**\*Corresponding Author:**

Email: ronychakravarty.rc@gmail.com

### Abstract

**Introduction:** There is a lot of debate over what type of screening is needed to be done for GDM, especially with India being touted as the diabetes capital of the world.

**Materials and Methods:** A total of 240 consecutive patients were screened using the two methods in accordance with the laid down procedures and guidelines for the tests with 120 patients in each arm of the study. The positive cases were then followed up till delivery to describe risk of Caesarean section and perinatal morbidities if any were encountered.

**Results:** In the primary outcome it was found that though more cases of GDM were detected with Single Step, maternal and neonatal morbidities were the same and no significant statistical difference was found in either of them.

**Conclusions:** This study shows that both Single step and double step are efficacious though double step seems to be more convenient for maximum number of patients.

**Keywords:** Gestational Diabetes Mellitus, Screening GDM, Diagnosis of GDM.

### Introduction

India is often touted as the diabetic capital of the world with 6.5 crore (5%) Indians suffering from diabetes.<sup>1</sup> The International Diabetes Federation estimates that one in six births are found to have some form of hyperglycaemia.<sup>2</sup> Approximately Gestational Diabetes Mellitus (GDM) complicates 7% of all pregnancies and has a varying prevalence (1-14%) amongst various ethnic groups.<sup>3</sup> In India it is estimated that about four million women are affected by GDM at any given point of time.<sup>4</sup> GDM is associated with higher incidence of maternal morbidity including caesarean deliveries, shoulder dystocia, birth trauma and subsequent development of T2DM. Perinatal and neonatal morbidities also increase, the latter include macrosomia, birth injury, hypoglycaemia, polycythaemia, and hyperbilirubinemia.<sup>5</sup>

Ever since the first systematic evaluation of the oral glucose tolerance test by O'Sullivan and colleagues was carried out in 1964, there has been controversy with respect to the optimal screening and diagnostic criteria to detect GDM. The recently proposed International Association of Diabetes and Pregnancy Study Groups (IADPSG) criteria for GDM though accepted by many, is still debated by several societies. American College of Obstetricians and Gynaecologists (ACOG) still recommends a two step screening.<sup>6</sup> International Federation of Obstetrics and Gynaecology although endorses IADPSG and WHO stand but encourages all countries to develop their own guidelines as per resources available.<sup>6</sup>

### Materials and Methods

This prospective cohort study was conducted in the ante natal OPD of Armed Forces Hospital in Wellington and Coimbatore. Sample size of 240 was

selected. Each study group had 120 participants in all. GDM screening was done at 24-28 weeks. In Single step 2 hr GTT with 75 gm glucose was done. Any one value deranged was labelled as GDM. In the Double Step approach, a GCT with 50gm glucose was done and anyone with a value of more than 140gm/dl was subjected to a 3 hr GTT with 100 gm glucose and if one of the values were found to be deranged then patient was labelled as GDM. Normal values are given in Table 1.

**Inclusion Criteria:** All patients reporting to ANC OPD of these two hospitals. History of GDM in previous pregnancy, previously high birthweight baby, obesity and family history of diabetes mellitus was elicited to establish additional risk factors.

**Exclusion Criteria:** Patients with known diabetes status before pregnancy.

### Results

Total of 240 patients were included in the study after applying the inclusion and exclusion criteria. 120 patients were allotted to each group.

The mean age group of single step group was  $24.41 \pm 3.00$  years and the double step group was  $24.35 \pm 2.95$  years with the  $p$  value of 0.86, which made both the groups comparable. (Table 2)

The parity status was also essentially the same with 53 (44.2%) nulliparous patients in the single step and 49 (40.8%) in the double step group,  $p$  value of parity status of both groups 0.6022 showing no statistically significant difference in the two groups. (Table 3)

Although number of GDM cases detected were more in single step i.e. 20 as compared with double step wherein only 12 cases were detected the  $p$  value was not statistically significant. (Table 4)

The birth weights of the neonates were very similar in both the groups with average of  $2.759 \pm 0.31$  kg in the single step group as compared to  $2.762 \pm 0.030$  in the double step group with a  $p = 0.955$ . (Table 5)

Number of patients undergoing a vacuum assisted or a caesarean section for delivery was more in the double step group however the rates were not statistically significant. The caesarean rate was more in the double step group i.e. 11 patients (9.2%) as

compared to single step group in which only 04 patients (3.3%) underwent caesarean section, which was statistically significant with  $p = 0.033$ . (Table 6). On eliciting the reasons for a caesarean section however none could be attributed to GDM. Our study showed comparable results with Bhavadharini et al<sup>7</sup> and Seshiah et al<sup>8</sup> who have demonstrated the prevalence figures in large study groups in Tamil Nadu.

**Table 1: Glucose Tolerance Test Values in the two methods**

	GTT with 75gm Glucose (mg/dl)	GTT with 100gm Glucose (mg/dl)
Fasting	92	95
One hour	180	180
Two hours	153	155
Three hours	-	140

**Table 2: Comparison of age**

Parameters	Single Step	Double Step	p Value
	(Mean $\pm$ SD)		
Age (years)	24.41 $\pm$ 3.00	24.35 $\pm$ 2.95	0.862

Unpaired t test is applied.  $p$  value is significant if  $< 0.05$

**Table 3: Comparison of parity status in both groups**

Parity	Group N (%)		p Value
	Single Step	Double Step	
1	53	49	0.6022*
	44.2%	40.8%	
2	55	59	
	45.8%	49.2%	
3	11	11	
	9.2%	9.2%	
4	1	1	
	0.8%	0.8%	
Total	120	120	

\*Comparison is made in percentage of primi and multi para deliveries between two groups. Chi Square test is applied to compare the difference statistically. This difference is not statistically significant.

**Table 4: Comparison of number of GDM detected**

Parameters	Single Step	Double Step	p Value
Number Screening positive	20	12	0.161

“N-1” Chi square test for comparison of proportions

**Table 5: Comparison of birth weight in both groups**

Parameters	Single Step	Double Step	p Value
	(Mean $\pm$ Sd)		
Birth weight (kgs)	2.759 $\pm$ 0.31	2.762 $\pm$ 0.30	0.955

Unpaired t test is applied.  $p$  value is significant if  $< 0.05$

**Table 6: Comparison of mode of delivery in both groups**

Mode of Delivery	Group N (%)		p Value
	Single Step	Double Step	
NVD	110	105	0.151
	91.7%	87.5%	
VACUUM	6	4	
	5.0%	3.3%	
LSCS	4	11	
	3.3%	9.2%	
Total	120	120	

Chi Square test is applied.  $p$  value is significant if  $< 0.05$

## Discussion

This study does suggest that there is not much significant difference in the two methods. If resources are available and patient is motivated a two-step approach may be more acceptable for patients. ACOG till date recommends two step approach and ADA though earlier advocating Single step approach has in 2017 recognised both to be equally effective.<sup>9</sup> In the Indian context a more elaborate study with more number of participants at various centres around the country will be more prudent before deciding best screening method for diagnosis of GDM where resources may not be a problem. Though Diabetes in Pregnancy Study Group in India (DIPSI) guidelines<sup>10</sup> are ideal for a low resource setting also suffer from disagreement from international societies and are not incorporated in the national guidelines offered by Ministry of health and family welfare. Hence a more elaborate and internationally recognised and standardised screening method should be offered to absolve the variations and the differences in the methodology for detection of GDM.

## Declarations

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**Conflict of interest:** None declared

**Ethical approval:** The study was approved by the Institutional Ethics Committee

## References

1. Abajobir, Amanuel Alemu, et al, "Global, regional, and national comparative risk assessment of 84 behavioural, environmental and occupational, and metabolic risks or clusters of risks, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016" *The Lancet* 390.10100 (2017):1345-422.
2. Wendland, Eliana M., et al, "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 and childbirth* 12.1 (2012):23.
3. American Diabetes Association. "Position statement" *Diabetes Care* 2003, 26;1: s103-105
4. Mithal A, Bansal B, Kalra S, "Gestational Diabetes in India: Science and study" *Indian J Endocrinol Metab* 19(2015):701-4.
5. Hod, Moshe, et al, "The International Federation of Gynecology and Obstetrics (FIGO) Initiative on gestational diabetes mellitus: A pragmatic guide for diagnosis, management, and care" *International Journal of Gynecology & Obstetrics* 131.S3 (2015).
6. ACOG Practice Bulletin 180 : Gestational Diabetes Mellitus *Obstet Gynecol* 2017;130:e17–31
7. Bhavadharini, B., Mahalakshmi, M.M., Anjana, R.M. et al, "Prevalence of Gestational Diabetes Mellitus in rural and urban Tamil Nadu" *Clin Diabetes Endocrinol* (2016) 2:8.
8. Seshiah V, Balaji V, Balaji MS, Paneerselvam A, Arthi T, Thamizharasi M", Prevalence of Gestational Diabetes

- Mellitus in South India- A community based study" *J Assoc Physicians India*. 2008 May;56:329-33.
9. American Diabetes Association. "Standards of medical care in diabetes—2017 abridged for primary care providers." *Clinical Diabetes* 35.1 (2017):5-26.
10. Divakar, Hema, Shelly Dutta, Thanawala U, "The current practices for testing for hyperglycaemia in pregnancy (hip) in the medical college institutions in India." *Journal of Evidence Based Medicine and Healthcare* 4.30 (2017):1786-90.