Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 6, 2021, Pages. 11496 - 11506
Received 25 April 2021; Accepted 08 May 2021.

Comparison of Single-Step Random 75g Dipsi Criteria with Fasting 75g Iadpsg Criteria Oral Glucose Tolerance Test in Diagnosis of Gestational Diabetes Mellitus

DrIvani Dash[1], DrLeesaMisra[2], Dr KaushikNaik V[3], DrSaumya Nanda[4]

[1]Senior Resident, Department of Obstetrics & Gynaecology,SCB Medical College, Cuttack, Odisha. ivanidash@gmail.com

[2]Associate Professor Department of Obstetrics & Gynaecology,SCB Medical College, Cuttack, Odisha.leesamisra71@gmail.com

[3]Senior Resident, Department of Obstetrics & Gynaecology,SCB Medical College, Cuttack, Odisha. nuthan.kaush20@gmail.com

[4]Associate Professor Department of Obstetrics & Gynaecology,SCB Medical College, Cuttack, Odisha.saumyananda81@gmail.com

Corresponding Author: DrSaumya Nanda, Associate Professor Department of Obstetrics & Gynaecology,SCB Medical College, Cuttack, Odisha. saumyananda81@gmail.com

ABSTRACT

Objective: To compare random 75 g oral glucose tolerance test (OGTT) by the Diabetes in Pregnancy Study Group of India [DIPSI criteria] with fasting 75 g OGTT International Association of the Diabetes and Pregnancy Study Groups criteria [IADPSG criteria] in diagnosing GDM and compare outcomes of patients diagnosed with these two criteria. **Materials and Methods:**Pregnant women with gestational age between 24-42 weeks, attending antenatal OPD were divided into two groups; Group-I[DIPSI criteria] and Group-II[IADPSG criteria]. Two hour glucose ≥140mg/dl [DIPSI] and any one of fasting ≥92mg/dl; one hour ≥180mg/dl and two hours ≥153mg/dl [IADPSG] were diagnosed as GDM and maternal and perinatal outcomes followed in GDM positive cases.**Results:** Three hundred patients (n=150 in each group) were enrolled. There no significant difference in the mean age (p=1.00), multigravida status (p=0.729) or lower socioeconomic status (p=0.726) between two groups but mean gestational age (35.99 vs 35.17 years; p=0.045) and mean BMI (23.95 vs 22.88 kg/m2; p=0.001) were higher in DIPSI group. Incidence of GDM was 18 (12%) and 17 (11.3%) with DIPSI and IADPSG criteria respectively.Seven (38.9%) and five (29.41%) patients in DIPSI and IADPSG criteria had maternal antenatal complications (p=0.854). Fetal antenatal complication rate was three (16.7%) and two (11.8%) in DIPSI and IADPSG groups respectively (p=0.679). Newborn complications rate was two (11.1%) in DIPSI and four (23.5%) in the IADPSG group (p=0.33). **Conclusion:**In our study, there was no significant difference in the rate of diagnosis of GDM or maternal and perinatal outcomes in patients diagnosed with DIPSI and IADPSG method. DIPSI was a suitable, reliable and feasible method for diagnosis of GDM.

Keywords:DIPSI, gestational diabetes mellitus; IADPSG, oral Glucose Tolerance Test (OGTT).

Introduction

Pregnancy is a diabetogenic state characterized by fasting hypoglycaemia and postprandial hyperglycaemia. Pregnancy induced insulin resistance ensures a sustained postpran-

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dial supply of glucose to the foetus. Hormones like progesterone, oestrogen and placental lactogen are insulin resistance mediators.[1]A pregnant woman who is not able to increase her insulin secretion to overcome this insulin resistance develops gestational diabetes. Gestational Diabetes Mellitus (GDM) is defined as "Carbohydrate intolerance with recognition or onset during pregnancy"and resolves postpartum.[2]Its implication is that it affects two generations, both mother and the child, with increased risk of developing type-2 diabetes mellitus in the future. The GDM mother has upto 60% risk of developing DM within 5-15 years of delivery.[3]GDM is associated with adverse maternal and perinatal outcomes. Maternal complications include pre-eclampsia, hydramnios and traumatic delivery. Perinatal problems are intrauterine growth retardation, foetal demise and macrosomia resulting in shoulder dystocia. Neonatal complications include neonatal hypoglycaemia, hyperbilirubinemia, polycythaemia, hypothermia and neonatal intensive care. Prevalence of GDM in India varies from 3.8 - 21%with different demography and diagnostic methods used.[4] It is more prevalent in urban than rural population. Indian women have 11-fold increased risk for GDM than Caucasian women.[5] Prevalence was 16.55% in our country by the WHO criteria of 2-hour plasma glucose ≥ 140 mg/dl.[6]

As early diagnosis and control of maternal hyperglycaemia plays a vital role in prevention of those adverse outcomes and universal screening is almost mandatory due to high prevalence, we need a simple economical, feasible test with higher sensitivity to diagnose GDM. Unfortunately, there is a lack of international consistency in the most sensitive and practically approachable diagnostic criteria for GDM. As per Diabetes in Pregnancy Study Group of India (DIPSI) guidelines, Kolkata declaration 2010, diagnosis of GDM was based on two hour venous plasma value of ≥ 140 mg/dl (7.8 mmol/l), done in the non-fasting state after 75g oral glucose load. The DIPSI procedure was approved by Ministry of Health, Government of India, 2014, also recommended by WHO.[7] In 2010, based on the hyperglycaemia and Adverse Pregnancy Outcomes [HAPO] study, the International Association of Diabetes and Pregnancy Study Groups [IADPSG] proposed a criterion which was adopted by WHO also. According to IADPSG criteriaafter 75g of glucose load, diagnosis of GDM was based on any one of the following; fasting ≥ 92 mg/dl; one hour ≥ 180 mg/dl and two hours ≥153 mg/dl in the fasting state.[8] The single step procedure is cost effective, feasible and sustainable for less resource settings like India. Although DIPSI criteria have been recommended by the Ministry of Health, Government of India, it is not being followed in many centres all over the country. Current position of DIPSI remains controversial as few recent studies have reported its poor sensitivity and specificity compared to other tests.

Objective:

The objective of this study was to compare the random 75g OGTT [DIPSI criteria] with the fasting 75g OGTT [IADPSG criteria] in diagnosing GDM in all pregnant women between 24 - 42 weeks of gestational age attending the antenatal OPD at our tertiary care medical college hospital. The maternal and the perinatal outcomes of patients with GDM were followed up.

Material and methods:

In this hospital based, prospective study, pregnant women (18-45 years of age) between 28 - 42 weeks of gestational age attending the antenatal OPD between November 2017, to December 2019 at a tertiary care hospital were included. Patients with pre-gestational diabetes mellitus, those already diagnosed with GDM or in active labour were excluded. Enrolled patients were randomly allocated to one of the two groups; DIPSI criteria and IADPSG criteria. A simple random sampling technique (lottery method) was adopted to

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allocate into these groups. Informed consent was obtained from all study participants. The study was conducted after approval from the human ethics committee. Demographics, socio-economic status, history, clinical findings, diagnosis and summary of investigations of the study group was recorded. After routine antenatal evaluation, 75 g oral glucose solution (75g anhydrous glucose in 250 ml water) was given to the consenting pregnant women for the DIPSI group, irrespective of her timing of last meal and asked to drink it within five to ten minutes. Venous blood sample was drawn after two hours to assess her blood glucose. Those consenting for the IADPSG criteria groups were asked to come following at least three days of unrestricted carbohydrates and exercise, after an overnight fast of at least eight hours and not exceeding 14 hours and then 75 g oral glucose tolerance test (OGTT) was done. The venous blood sample was drawn in the fasting state, and they were asked to drink 75 g oral glucose solution. Venous blood samples were drawn one and two hours after the glucose load. OGTT 75 g and collection of blood samples were carried out by our qualified medical laboratory technicians at the hospital using standard protocols. Value of ≥ 140 mg/dl was diagnosed as GDM for non-fasting [DIPSI Criteria] and any one of the following; fasting ≥ 92 mg/dl; one hour ≥ 180 mg/dl and two hour ≥ 153 mg/dl in the fasting state for IADPSG criteria. Blood results were informed to the pregnant women and managed accordingly. Maternal and perinatal outcomes of the diagnosed GDM women were followed up.

Statistical analysis:

The baseline data were represented using simple table diagrams. Socio-demographic data were also represented in percentages and Chi-square test was used to test the significance association. Student t test was used to test the significant difference between the two groups. $P < 0.05$ was considered to be statistically significant.

Results

A total of 300 patients were enrolled in the study (n=150 in each group). There was no significant difference in the mean age of the patient between DIPSI and IADPSG criteria. Mean gestational age was slightly more in patients enrolled under DIPSI group as compared to IADPSG group (35.99 vs 35.17 years; Table 1). Mean body mass index (BMI) was higher in patients enrolled under DIPSI criteria. There was no difference in the number of patients with multigravida status in both groups (p=0.729). Similarly, there was no significant difference in the LM, M between two groups (p=0.726)

Table 1: Baseline characteristics of patients tested for GDM with DIPSI and IADPSG criteria

	DIPSI (n=150)	IADPSG (n=150)	P value
Mean (SD) age in years	25.81 (4.2)	25.81 (4.42)	1.00
Mean (SD) gestational age in weeks	35.99 (3.31)	35.17 (3.67)	0.045
Mean (SD) BMI in kg/m^2	23.95 (3.31)	22.88 (2.37)	0.001
Multigravida n (%)	69 (46%)	72 (48%)	0.729
LM, M	85 (43.3%)	88 (41.3%)	0.726

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GDM: gestational diabetes mellitus; DIPSI: Diabetes in Pregnancy Study Group of India [DIPSI]; IADPSG: International Association of Diabetes and Pregnancy Study Groups; SD: standard deviation; BMI: body mass index; LM: Lower socioeconomic status. There was no difference between two groups for the number of patients with age >25 years (p=0.089), history of GDM diagnosis before this pregnancy (p=0.652), patients with history of intrauterine death (IUD) (p=0.99), patients with history of macrosomia (p>0.99) in prior deliveries, polycystic ovarian disease (p=0.16) and family history of diabetes mellitus (p=0.454). Number of patients with BMI more than 25 kg/m^2 were significantly more in patients in the DIPSI group (42% vs 23.3%; p=0.0001; Table 2).

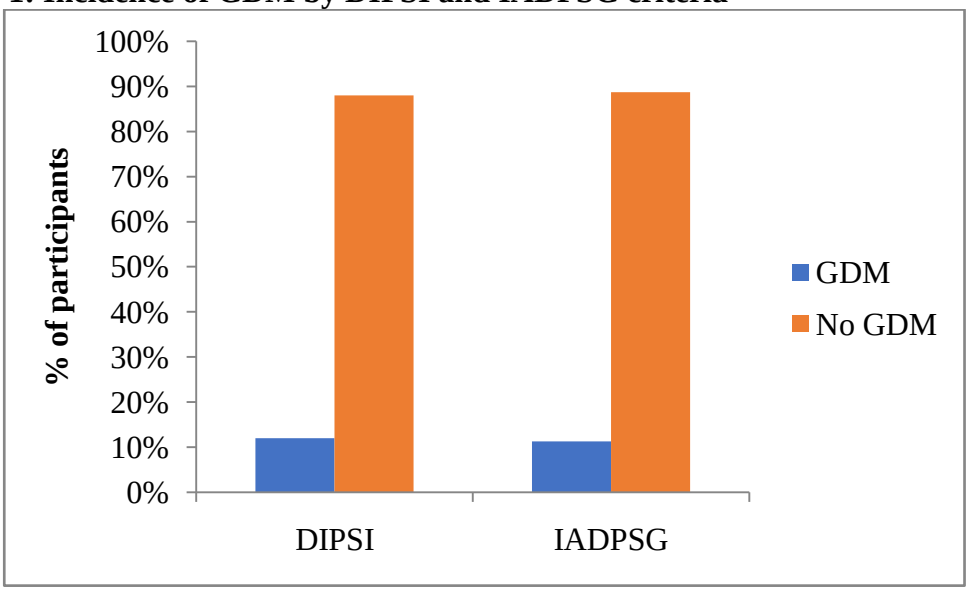
Table 2: Comparison of risk factors for GDM

	DIPSI (n=150) N (%)	IADPSG (n=150) N (%)	P value
Age >25 years	79 (52.7%)	81 (54.0%)	0.089
GDM	2 (1.3%)	3 (2%)	0.652
IUD	3 (2%)	3 (2%)	>0.99
Macrosomia	2 (1.3%)	2 (1.3%)	>0.99
Polycystic ovarian syndrome	0	2 (1.3%)	0.156
Family history of diabetes mellitus	10 (6.7%)	7 (4.7%)	0.454
BMI >25 kg/m^2	63 (42.0%)	35 (23.3%)	0.0001

GDM: gestational diabetes mellitus; IUD: intrauterine death; BMI: body mass index

A total of 18 (12%) and 17 (11.3%) cases were found to be positive for GDM based on DIPSI and IADPSG criteria respectively (Figure 1).

Figure 1: Incidence of GDM by DIPSI and IADPSG criteria



GDM: gestational diabetes mellitus; DIPSI: Diabetes in Pregnancy Study Group of India [DIPSI]; IADPSG: International Association of Diabetes and Pregnancy Study Groups

There was no significant difference in the mean (SD) age of patients [26.28 (3.51) vs 28.06 (4.66);p=0.209] or mean (SD) gestational age of GDM patients [35.28 (3.03) vs 34.47 (3.88) weeks; p=0.496], number of multigravida [10 (55.6%) vs 9 (52.9%); p=0.877] and lower socioeconomic status [8 (44.4%) vs 10 (58.8%); p=0.329)] diagnosed

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with DIPSI and IADPSG criteria. However, mean BMI of patients diagnosed with DIPSI criteria was significantly higher than those diagnosed IADPSG criteria [27.44 (2.31) vs 23.76 (2.71) kg/m^2; p=000; Table 2].

Table 2: Demographic characteristics of GDM patients

	DIPSI (n=18)	IADPSG (n=17)	P value
Mean (SD) age in years	26.28 (3.51)	28.06 (4.66)	0.209
Mean (SD) gestational age in weeks	35.28 (3.03)	34.47 (3.88)	0.496
Mean (SD) BMI in kg/m^2	27.44 (2.31)	23.76 (2.71)	0.000
Multigravida n (%)	10 (55.6%)	9 (52.9%)	0.877
LM, M n (%)	8 (44.4%)	10 (58.8%)	0.329

GDM: gestational diabetes mellitus; DIPSI: Diabetes in Pregnancy Study Group of India [DIPSI]; IADPSG: International Association of Diabetes and Pregnancy Study Groups; BMI: body mass index; SD: standard deviation; LM: lower socioeconomic status

There was no significant difference in the number females with age >25 years in patients [eight (44.4%) vs 11 (64.7%); p=0.229], history of GDM [two (11.1%) vs three (17.6%); p=0.581], IUD [two (11.1%) vs one (5.9%); p=0.581], history of prior delivery of baby with macrosomia [two (11.1%) vs two (11.8%); p=0.952), polycystic ovarian syndrome [None vs one (5.9%)] or number of patients with family history of diabetes mellitus [six (33.3%) vs two (11.8%); p=0.129] diagnosed with DIPSI and IADPG criteria. Number of patients with BMI >25 kg/m^2 were significantly higher in DIPSI criteria as compared to IADPSG criteria [16 (88.9%)vs seven (41.2%); p=0.003; Table 3].

Table 3: Comparison of risk factors in GDM cases

	DIPSI (n=150) N (%)	IADPSG (n=150) N (%)	P value
Age >25 years	8 (44.4%)	11 (64.7%)	0.229
GDM	2 (11.1%)	3 (17.6%)	0.581
IUD	2 (11.1%)	1 (5.9%)	0.581
Macrosomia	2 (11.1%)	2 (11.8%)	0.952
Polycystic ovarian syndrome	0	1 (5.9%)	0.298
Family history of diabetes mellitus	6 (33.3%)	2 (11.8%)	0.129
BMI >25 kg/m^2	16 (88.9%)	7 (41.2%)	0.003

GDM: Gestational diabetes mellitus; IUD: intrauterine deaths; BMI: body mass index

GDM was controlled with insulin therapy and nutrition alone in 11(61.1%), and five (27.8%) in patients diagnosed with DIPSI and ten (58.8%), and seven cases (41.2%) diagnosed within IADPSG criteria respectively (figure 2). There was no difference between two groups for the treatment of insulin (p=0.89) and nutrition (p=0.404)

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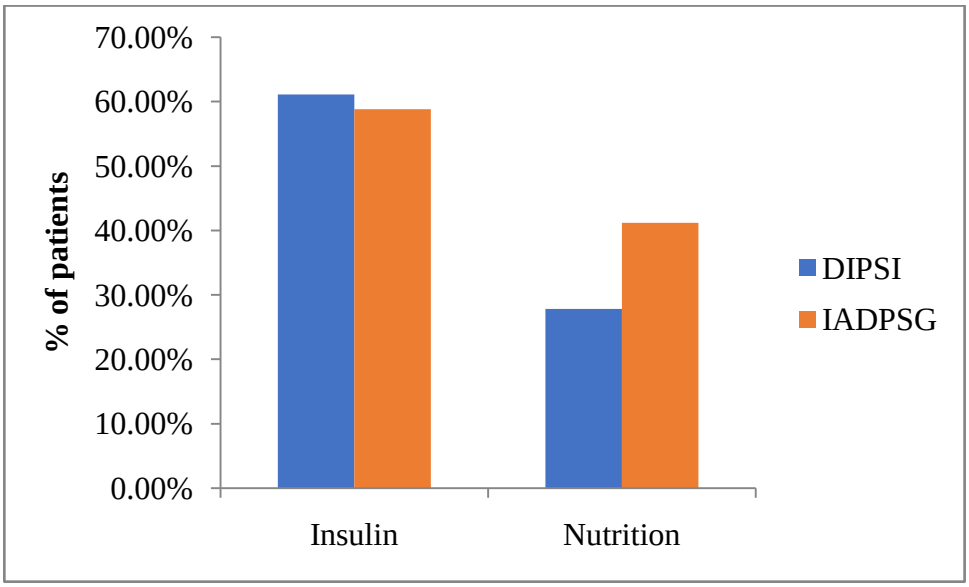
Received 25 April 2021; Accepted 08 May 2021.

Figure 2: Treatment of GDM cases with insulin and nutrition



GDM: gestational diabetes mellitus; DIPSI: Diabetes in Pregnancy Study Group of India [DIPSI]; IADPSG: International Association of Diabetes and Pregnancy Study Groups. A total of seven (38.9%) patients in DIPSI criteria had maternal antenatal complications compared to five (29.41%) in the IADPSG criteria (Table 4). However difference between two groups was not statistically significant (p=0.854). Details of comparative complications are given in table 4.

Table 4: Maternal: Antenatal Complications in GDM cases

	DIPSI (n=) N (%)	**IADPSG (n=) N (%)**	**P value**
Overall complications	7 (38.9%)	5 (29.41%)	0.854
Candidiasis	2 (11.1%)	1 (5.9%)	
Polyhydramnios	1 (5.6%)	2 (11.8%)	
Pregnancy induced hypertension	2 (11.1%)	2 (11.8%)	
Anaemia	1 (5.6%)	0	
Urinary tract infection	1 (5.6%)	0	

A total of one (5.6%) patients in DIPSI group and four (23.5%) in IADPSG group delivered preterm whereas 17 (94.4%) patients in DIPSI group and 13 (76.5%) in IADPSG group delivered as per the term of gestational period. (p=0.129). A total of six (33.3%) patients in DIPSI group and eight (47.1%) patients in IADPSG group delivered by lower segment caesarian section whereas 12 (66.7%) and nine (52.9%) delivered by vaginal delivery (p=0.407; Figure 3).

Figure 3: Mode and time of delivery in GDM cases

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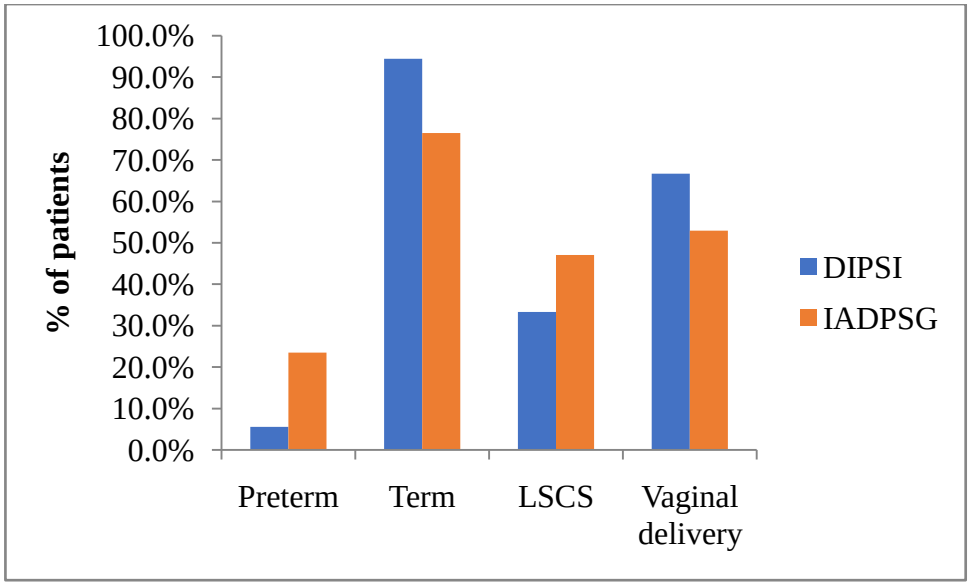
Received 25 April 2021; Accepted 08 May 2021.



GDM: gestational diabetes mellitus; DIPSI: Diabetes in Pregnancy Study Group of India [DIPSI]; IADPSG: International Association of Diabetes and Pregnancy Study Groups; LSCS: lower segment caesarean sectionFetal antenatal complication rate was three (16.7%) and two (11.8%) in DIPSI and IADPSG groups respectively (p=0.679) Only one (1.56%) had shoulder dystocia case in DIPSI and no case of it was seen in women from IADPSG group. Puerperal maternal complications ie post-partum hemorrhage was observed in one (5.6%) in DIPSI and two (11.8%) in IADPSG experienced PPH whereas two (11.1%) patients in the DIPSI group and one (5.9%) in IADPSG group had infection in puerperal period. Newborn complications rate was two (11.1%) in DIPSI and four (23.5%) in the IADPSG group (p=0.33). Hypoglycaemia was seen in two (11.1%) in DIPSI and in two (11.8%) in IADPSG. No patient in DIPSI group hyperbilirubinemia or respiratory distress syndrome (RDS) whereas one (5.9%) in IADPSG had hyperbilirubinemia and RDS each (Table 5).

Table 5: Comparative outcomes in patients with GDM diagnosed with DIPSI and IADPSG criteria

	DIPSI (n=) N (%)	**IADPSG (n=) N (%)**	**P value**
Overall fetal antenatal complications	3 (16.7%)	2 (11.8%)	0.679
Intrauterine death	1 (5.6%)	0	
Macrosomia	2 (11.1%)	2 (11.8%)	
Shoulder dystocia	1 (5.6%)	0%	0.324
Post-partum haemorrhage	1 (5.6%)	2 (11.8%)	0.512
Infection	2 (11.1%)	1 (5.9%)	0.581
Overall new-born complications	2 (11.1%)	4 (23.5%)	0.33
Hyperbilirubinemia	0	1 (5.9%)	
Hypoglycaemia	2 (11.1%)	2 (11.8%)	
Respiratory distress syndrome	0	1 (5.9%)	

GDM: gestational diabetes mellitus; DIPSI: Diabetes in Pregnancy Study Group of India [DIPSI]; IADPSG: International Association of Diabetes and Pregnancy Study Groups;

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Discussion

In this study we compared DIPSI and IADPSG criteria for diagnosis of GDM and followed the diagnosed patients until delivery. We adopted universal screening, as it improves pregnancy outcomes compared to selective screening and that non-screening omits approximately 4% patients with GDM.[9]We included pregnant women between 28-42 weeks of gestation as this period increases chances of detecting higher number of cases, compared to other studies between 24-28 weeks of gestation. [10,11] This time window was selected because early testing may miss some patients who later develop carbohydrate intolerance. The mean age of patients and mean gestational age and mean BMI of patients in our study more than that in Anjalakshi et al study. In our study, of the 300 cases studied, 18(12%) cases out of 150 in DIPSI and 17 (11.3%) out of 150 in IADPSG were GDM positive. Among GDM positive cases, mean age was 26 years in DIPSI as with one study[10] and 26 years in IADPSG similar to another[12] study. A community based study from South India showed that age > 25 years as a risk factor for GDM.[13]As per a study from India Diabetes in Pregnancy Study Group of India [DIPSI] (2009) criteria, the non-fasting two hour venous plasma value of ≥ 140 mg/dl is a single-step, definitive, screening and diagnostic test for GDM.[14] The study was done in 800 pregnant women of gestational age between 16 – 32 weeks. GDM was diagnosed in 10.9% in both DIPSI and WHO1999 criteria. They reported 100% sensitivity and specificity of non-fasting DIPSI compared to WHO 1999 criteria in diagnosing GDM. According to the authors, this method offer advantageous to pregnant women as they need not come again in the fasting state. This method has potential to improve compliance and also less risk of vomiting after glucose load. It is rational to do test in non-fasting state, as glucose levels are affected only little by the time of meal in a normal glucose tolerant woman, whereas they may be affected GDM. Another study with 75g OGTT in 1463 pregnant women reported GDM in 214 (14.6%) pregnant women by IADPSG and 196 (13.4%) by DIPSI criteria. The study reported that DIPSI is cost-effective without compromising the clinical equipoise.[15]A study was conducted a study in 500 pregnant women between gestational age 16 – 32 weeks which calculated incidence GDM by single non-fasting 75g oral glucose challenge test and then repeating on the same woman the conventional two hour fasting 75 g OGTT (WHO) and compared the results of two tests. GDM was observed in 11% pregnant women in both. The authors concluded that non-fasting 75g glucose challenge test is cost effective, patient friendly and evidence based single-step procedure that serves as both screening as well as diagnostic procedure in a country with limited resources but requiring universal screening.[12]Lee et al[16]predicted that lowering the two hour glucose level cut-off below 140 mg/dl (WHO) did not have any cost-effectiveness.In a cross sectional study among 306 pregnant women of gestational age of 24 weeks and above, with DIPSI procedure, without taking into consideration the time since last meal, GDM was observed in 7.8 % cases.[17]A their prospective study involving antenatal mothers in 24 to 28 weeks of pregnancy reported 14.42% prevalence of GDM as per DIPSI guidelines.[18] Stillbirth, perinatal and neonatal mortality were two 3.3 and six times higher in GDM respectively. Most of the GDM were diagnosed in primigravida. Low birth weight was observed 35% in GDM vs 16% in non GDM cases. GDM positive cases had 20.6% positive family history of diabetes as compared to 6.5% in non-GDM cases. Relative risks for post birth unit, large for gestational age, low birth weight, pre-eclampsia and jaundice were also higher. As part of the International Diabetes Federation [IDF] sponsored Women in India with GDM Strategy [WINGS] programme, a cross-sectional study, compared non-fasting [DIPSI criteria] with fasting [WHO 1999 and IADPSG criteria] 75g OGTT in urban and rural antenatal clinics in Tamil Nadu, South India.[19] Of the 1400 pregnant women irrespective of the gestational age who underwent the initial non-fasting 75g OGTT,

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36 women vomited and were excluded. A total of 1071 women came back after two to three days for fasting 75g OGTT. Forty women vomited and were excluded. On analyzing the 1031 pregnant women, they diagnosed GDM in 44(4.2%) cases with DIPSI, 83 (8.0%) by WHO and 106 (10.3%) by IADPSG criteria. According to them, the current DIPSI guidelines of a single non-fasting OGTT using two hour cut-off point of 140 mg/dl would miss 72.3% of women with GDM diagnosed by WHO criteria and that non-fasting DIPSI method had a poor sensitivity compared to both WHO 1999 criteria (sensitivity 27.7%; specificity of 97.7%) and IADPSG criteria (sensitivity 22.6%; specificity of 97.8%). There was no significant difference in women who vomited after fasting to non-fasting. Based on their study results, they suggested that fasting 75g OGTT or WHO 1999 (single sample) or IADPSG (three samples) would be a better single-step screening and diagnostic test, depending on resources available. If not, two step procedure using non-fasting 50g OGCT, followed by fasting 75g OGTT in screen positive would be better.

A clinic based cross sectional study from a tertiary hospital in Srilanka investigated the sensitivity and specificity of non-fasting 75g GCT [Srilankan College of Obstetricians and Gynaecologists (SCOG)] with fasting 75g GTT [IADPSG] for diagnosing GDM in 274 pregnant women in 24 - 28 weeks of gestation.[20] After subjecting the consented women for the 75g non-fasting GCT they were advised to come back within a week for the 3-sample fasting 75g GTT. 36(13.1%) pregnant women with DIPSI and 59(21.5%) by IADPSG were diagnosed as GDM. They found a sensitivity of 40.6% and specificity of 94.4% with non-fasting 75g GCT. According to them, non-fasting 75g GCT is not sensitive enough to diagnose GDM. A study was conductedamong 839 pregnant women with gestational age between 24-28 weeks, by two step method of screening OGCT and diagnosing GDM with subsequent 75 gram WHO OGTT.[11] In this study, 6.3% women had GDM. According to the authors, fasting glucose tends to have low sensitivity in South Asians. Hence, two-hour postprandial glucose is more sensitive than fasting glucose in diagnosing GDM in Indians. The two-step procedure is not practical as the pregnant women have to visit the antenatal clinic at least twice and the number of blood samples drawn varies from three to five which women resent. The recent IADPSG criteria, although adopted recently by a WHO expert group, may be difficult to adopt in developing countries due to shortage of trained phlebotomists, extra costs and the lack of laboratory. Use of IADPSG criteria may also lead to inflated rates of GDM. It is reasonable to assume that since the IADPSG has raised the two-h value to 153 mg/dl, many cases of GDM could be missed. WHO criteria of >140 mg/dl alone appears to be sufficient to diagnose GDM, as it picks up the majority of GDM cases diagnosed by both the whole WHO criteria as well as the same number of cases as the three sample IADPSG criteria. They concluded that for universal screening, a single fasting OGTT with a 75 gram of oral glucose load and diagnosing women with two-hour PPG ≥140 mg/dl as GDM, serves both as a one-step screening and diagnostic procedure and is easy to perform besides being economical. Maternal antenatal complication rate in our study was 38.9% in DIPSI and 29.4% in IADPSG. Adverse pregnancy outcomes in our study were preterm labour in 14.3% and shoulder dystocia in 2.9% cases. Maternal postpartum complications encountered were PPH and wound infection. There was no significant difference in adverse outcomes between two methods used for diagnosis of GDM. Our study has some limitations. It was a single center study. We were not able to perform both the criteria in the same patient due to ethical issues. Considering these limitations, larger studies are warranted to confirm our observations.

Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 6, 2021, Pages. 11496 - 11506
Received 25 April 2021; Accepted 08 May 2021.

Conclusion

There was no significant difference in the rate of diagnosis of GDM or maternal and perinatal outcomes in patients diagnosed by DIPSI or IADPSG. In our study population, DIPSI was found to be reliable and feasible method for the diagnosis of GDM.

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Received 25 April 2021; Accepted 08 May 2021.

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