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COMPARISON OF DIPSI AND IADPSG CRITERIA FOR DIAGNOSIS OF GESTATIONAL DIABETES MELLITUS AND ITS MATERNAL OUTCOMES.

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Abstract

Background: Gestational Diabetes Mellitus (GDM) is a common metabolic disorder in pregnancy linked with adverse maternal and neonatal outcomes. A number of diagnostic criteria are used, with IADPSG considered a reference standard, while DIPSI offers a simpler, non-fasting approach. This study aimed to compare the diagnostic accuracy of DIPSI with IADPSG and evaluate associated fetomaternal outcomes. ***Methods:*** This observational study was conducted on 250 antenatal women (24–28 weeks gestation) at a tertiary care center. Participants underwent DIPSI testing followed by IADPSG oral glucose tolerance testing. Sensitivity, specificity, predictive values, likelihood ratios, and accuracy of DIPSI were calculated using IADPSG as the reference. Maternal and neonatal outcomes were recorded. Statistical analysis was performed using SPSS v23, with $p < 0.05$ considered significant. ***Results:*** Using IADPSG, 76.8% were diagnosed with GDM, and DIPSI identified 82.8% as positive. DIPSI showed sensitivity of 77.60% and specificity of 36.21%, with positive and negative predictive values of 80.11% and 32.81%, respectively. Likelihood ratios (PLR 1.22, NLR 0.62) indicated limited diagnostic discrimination, and overall accuracy was 68.00%. The association between diagnostic classification and mode of delivery was significant ($p=0.001$), with higher LSCS rates in GDM-positive groups. Maternal and neonatal complications were observed, with hyperbilirubinemia being most frequent (6.8%). ***Conclusion:*** The present study demonstrated a high prevalence of GDM, with DIPSI identifying more cases than IADPSG but without significant differences in major maternal outcomes. While DIPSI is simple and suitable for resource-limited settings, larger multicentric prospective studies are needed to establish the optimal diagnostic strategy for improving maternal and perinatal outcomes.

Keywords: Gestational diabetes mellitus, DIPSI, IADPSG, diagnostic accuracy, pregnancy outcomes.

INTRODUCTION

Diabetes mellitus is a chronic metabolic disorder characterized by persistent hyperglycemia resulting from defects in insulin secretion, insulin action, or both.[1] It affects nearly 590 million adults globally, a figure projected to rise to 853 million by 2050, highlighting its growing public health burden.[2] During pregnancy, physiological changes—particularly in the later half —lead to increased insulin resistance due to placental hormones, placing additional stress on maternal glucose metabolism. In most women, pancreatic β-cells compensate adequately; however, when this adaptation fails, gestational diabetes mellitus (GDM) develops, defined as glucose intolerance first recognized during pregnancy.[3]

Globally, GDM affects approximately one in six pregnancies, with prevalence ranging from 4% to over 25%, depending on screening strategies, diagnostic thresholds, and population characteristics.[3–4] In India, the pooled prevalence is estimated at around 13%, though regional studies report higher rates, reflecting demographic and lifestyle variations.6 GDM is associated with adverse maternal and neonatal complications, including hypertensive disorders, polyhydramnios, cesarean delivery, fetal macrosomia, and neonatal hypoglycemia.7 Furthermore, both mother and child face long-term risks such as type 2 diabetes, obesity, and cardiovascular disease.[3]

Given these implications, early detection and appropriate management are essential and hence universal screening for GDM is recommended.8 Although the DIPSI method offers a convenient, single-step non-fasting approach suitable for routine clinical practice in resource-limited settings, concerns persist regarding its sensitivity and specificity when compared with the IADPSG, which are widely adopted internationally.

MATERIALS AND METHODS

Setting and Duration:
This observational study was conducted in the Department of Obstetrics and Gynaecology at SGRDIMSAR, Sri Amritsar, Punjab, from July 2024 to December 2026 after ethical approval.

Participants:
Antenatal women at 24–28 weeks of gestation, aged 20–35 years, were included. Women with chronic illnesses (diabetes, hypertension, asthma) and multifetal pregnancies were excluded.

Data Collection:
After informed consent, demographic and clinical details including BMI, obstetric history, and gestational age were recorded. Participants underwent the DIPSI test using 75 g glucose irrespective of fasting status. A 2-hour plasma glucose ≥140 mg/dl was considered GDM.

For comparison, the same women underwent the IADPSG OGTT after 3 days with fasting, 1-hour, and 2-hour glucose measurements. GDM was diagnosed if any standard threshold was met.

Outcome Measures:
Fetomaternal outcomes such as preeclampsia, preterm labor, PROM, macrosomia, neonatal hypoglycemia, respiratory distress, and NICU admission were assessed.

Statistical Analysis:
Data were analyzed using SPSS v23. Descriptive statistics were expressed as percentages and means. Chi-square test assessed associations, with $p < 0.05$ considered significant. Diagnostic accuracy of DIPSI was evaluated using sensitivity, PPV, accuracy, prevalence, and likelihood ratios with 95% confidence intervals.

RESULTS

TABLE 1: DISTRIBUTION OF STUDY PARTICIPANTS DIAGNOSED WITH IADPSG CRITERIA

IADPSG	No. of cases	Percentage
POSITIVE	192	76.8%
NEGATIVE	58	23.2%
Total	250	100.0%

The table presents the distribution of IADPSG results among a total of 250 cases. Of these, 192 cases were positive, constituting 76.8% of the total, indicating that over three-quarters of the individuals showed positive IADPSG results. In comparison, 58 cases were negative, accounting for 23.2% of the total. Overall, the table demonstrates a predominance of positive cases relative to negative cases in the study population.

TABLE 2: DISTRIBUTION OF STUDY PARTICIPANTS DIAGNOSED WITH DIPSI CRITERIA

DIPSI	No. of cases	Percentage
NEGATIVE	43	17.2%
POSITIVE'	207	82.8%
Total	250	100.0%

The table summarizes the distribution of DIPSI test results among a total of 250 cases. Out of these, 207 cases were reported as positive, accounting for 82.8% of the total, indicating that the majority of individuals showed positive DIPSI results. In contrast, 43 cases were negative, representing 17.2% of the total. Overall, the table highlights a high proportion of positive cases compared to negative ones within the studied population.

TABLE 3: DISTRIBUTION OF PRETERM LABOR IN GDM CASES DIAGNOSED WITH DIPSI VS IADPSG CRITERIA

PRETERM LABOR			
	Preterm labor present	Preterm labor absent	p-value
DIPSI + IADPSG+	5	144	0.495
DIPSI + IADPSG-	1	57	
DIPSI - IADPSG+	1	42	
DIPSI – IADPSG -	0	0	

The distribution of preterm labour among gestational diabetes mellitus (GDM) cases was evaluated based on diagnosis using DIPSI and IADPSG criteria. Among the total cases of preterm labour in women with GDM, the majority were diagnosed as positive by both DIPSI and IADPSG criteria. Specifically, 5 cases (71.4%) were positive according to both DIPSI and IADPSG, indicating a substantial overlap between the two diagnostic methods in identifying GDM cases associated with preterm labour. A smaller proportion of cases showed discordance between the two criteria. One case (14.3%) was positive by DIPSI criteria but negative by IADPSG criteria, suggesting that DIPSI alone identified this case as GDM-related preterm labour. Similarly, one case (14.3%) was negative by DIPSI criteria but positive by IADPSG criteria, highlighting that IADPSG alone detected GDM in this instance. Statistical analysis revealed a p value of 0.495, indicating that there was no statistically significant difference between DIPSI and IADPSG criteria in their association with preterm labour among GDM cases.

TABLE 4: DISTRIBUTION OF POLYHYDRAMINOS IN GDM CASES DIAGNOSED WITH DIPSI VS IADPSG CRITERIA

POLYHYDRAMINOS			
	Polyhydraminos present	**Polyhydraminos absent**	**p-value**
DIPSI + IADPSG+	6	143	0.683
DIPSI + IADPSG-	1	57	
DIPSI - IADPSG+	3	40	
DIPSI – IADPSG -	0	0	

The table illustrates the occurrence of polyhydramnios among patients with gestational diabetes mellitus (GDM) diagnosed using DIPSI and IADPSG criteria. In the group where both DIPSI and IADPSG tests were positive, polyhydramnios was present in 6 cases, while it was absent in 143 cases. Among patients who were positive by DIPSI but negative by IADPSG criteria, only 1 case showed polyhydramnios and 57 cases did not have this condition. In contrast, among those who were negative by DIPSI but positive by IADPSG criteria, polyhydramnios was observed in 3 cases and was absent in 40 cases. The calculated p-value of 0.683 indicates that there was no statistically significant difference in the distribution of polyhydramnios among the different diagnostic groups. This finding suggests that the occurrence of polyhydramnios was comparable irrespective of the diagnostic criteria used to identify GDM in the study population.

TABLE 5: DISTRIBUTION OF PRE ECLAMPSIA IN GDM CASES DIAGNOSED WITH DIPSI VS IADPSG CRITERIA

PRE-ECLAMPSIA			
	Pre-eclampsia present	Pre-eclampsia absent	p-value
DIPSI + IADPSG+	8	141	0.598
DIPSI + IADPSG-	1	57	
DIPSI - IADPSG+	1	42	
DIPSI – IADPSG -	0	0	

The distribution of preeclampsia among women with gestational diabetes mellitus (GDM) was analysed using both DIPSI and IADPSG diagnostic criteria. Among the total cases of preeclampsia observed in women with GDM, the majority were diagnosed as positive by both DIPSI and IADPSG criteria. Specifically, 8 cases, constituting 80.1% of the total, were positive according to both diagnostic methods, demonstrating a high level of agreement between DIPSI and IADPSG in identifying GDM cases associated with preeclampsia. A smaller proportion of cases showed discordance between the two criteria. One case (10.1%) was positive by DIPSI criteria but negative by IADPSG criteria, indicating that DIPSI alone identified preeclampsia in this GDM case. Conversely, one case (10.1%) was negative by DIPSI criteria but positive by IADPSG criteria, suggesting that IADPSG alone detected preeclampsia in this instance. Statistical evaluation revealed a p value of 0.598, indicating that there was no statistically significant difference between DIPSI and IADPSG criteria in relation to the distribution of preeclampsia among GDM cases.

TABLE 6: DISTRIBUTION OF PROM IN GDM CASES DIAGNOSED WITH DIPSI VS IADPSG CRITERIA

PROM			
	PROM present	**PROM absent**	**p-value**
DIPSI + IADPSG+	2	147	0.505
DIPSI + IADPSG-	1	57	
DIPSI - IADPSG+	1	42	
DIPSI – IADPSG -	0	0	

The distribution of premature rupture of membranes (PROM) among women with gestational diabetes mellitus (GDM) was analysed based on diagnosis using DIPSI and IADPSG criteria. Among the total PROM cases observed in women with

GDM, half of the cases were diagnosed as positive by both DIPSI and IADPSG criteria. Specifically, 2 cases, accounting for 50% of the total, were positive according to both diagnostic methods, indicating a moderate level of agreement between DIPSI and IADPSG criteria in identifying GDM cases associated with PROM. A proportion of cases demonstrated discordance between the two diagnostic criteria. One case (25%) was positive by DIPSI criteria but negative by IADPSG criteria, suggesting that DIPSI alone identified PROM in this GDM case. Similarly, one case (25%) was negative by DIPSI criteria but positive by IADPSG criteria, indicating that IADPSG alone detected PROM in this instance. Statistical analysis showed a p value of 0.505, demonstrating that there was no statistically significant difference between DIPSI and IADPSG criteria with respect to the distribution of premature rupture of membranes among GDM cases.

TABLE 7: DISTRIBUTION OF PERINEAL INJURIES IN GDM CASES DIAGNOSED WITH DIPSI VS IADPSG CRITERIA

PERINEAL INJURIES			
	Perineal injuries present	**Perineal injuries absent**	**p-value**
DIPSI + IADPSG+	6	143	0.49
DIPSI + IADPSG-	1	57	
DIPSI - IADPSG+	3	40	
DIPSI – IADPSG -	0	0	

The distribution of perineal injuries among women with gestational diabetes mellitus (GDM) was assessed based on diagnosis using DIPSI and IADPSG criteria. Among the total cases of perineal injuries observed in women with GDM, the majority were diagnosed as positive by both DIPSI and IADPSG criteria. Specifically, 6 cases, accounting for 60.1% of the total, were positive according to both diagnostic methods, indicating a substantial overlap and agreement between DIPSI and IADPSG criteria in identifying GDM cases associated with perineal injuries. A smaller proportion of cases showed discordance between the two criteria. One case (10.1%) was positive by DIPSI criteria but negative by IADPSG criteria, suggesting that DIPSI alone identified perineal injury in this GDM case. In contrast, three cases (30.1%) were negative by DIPSI criteria but positive by IADPSG criteria, indicating that IADPSG criteria alone detected a higher number of perineal injury cases associated with GDM compared to DIPSI. Statistical analysis reealed a p value of 0.49, demonstrating that there was no statistically significant difference between DIPSI and IADPSG criteria with respect to the distribution of perineal injuries among GDM cases.

TABLE 8: DISTRIBUTION OF PPH IN GDM CASES DIAGNOSED WITH DIPSI VS IADPSG CRITERIA

PPH		
	PPH present	**PPH absent**
DIPSI + IADPSG+	3	146
DIPSI + IADPSG-	0	58
DIPSI - IADPSG+	0	43
DIPSI – IADPSG -	0	0

This table depicts the distribution of postpartum hemorrhage among gestational diabetes mellitus (GDM) cases diagnosed using the DIPSI and IADPSG criteria. All cases of postpartum hemorrhage were observed in women who were positive by both DIPSI and IADPSG criteria, with a total of 3 cases accounting for 100% of the reported postpartum hemorrhage. No cases of postpartum hemorrhage were seen in women who were DIPSI positive but IADPSG negative, or in those who were DIPSI negative but IADPSG positive. Thus, postpartum hemorrhage was noted only when both diagnostic criteria identified GDM. Owing to the absence of cases in the other comparison groups, statistical analysis and hence no p-value was obtained.

DISCUSSION

Gestational Diabetes Mellitus (GDM) is defined as glucose intolerance with onset or first recognition during pregnancy and represents one of the most common metabolic disorders affecting pregnant women worldwide.[1] The increasing global burden of GDM has been attributed to rising maternal age, urbanization, sedentary lifestyle, and the growing prevalence of obesity.[6] GDM is associated with a wide range of adverse maternal and fetal outcomes, including hypertensive disorders of pregnancy, increased rates of cesarean section, fetal macrosomia, birth trauma, and neonatal metabolic complications such as hypoglycemia. Furthermore, women diagnosed with GDM are at a significantly higher risk of developing type 2 diabetes mellitus later in life, along with long-term metabolic consequences for the offspring.[10],7 Given these risks, timely diagnosis and appropriate management play a critical role in improving both short-term pregnancy outcomes and long-term health.

In the present study, a total of 250 antenatal women were evaluated using the IADPSG criteria, among whom 192 (76.8%) were diagnosed with GDM, and 58 (23.2%) were found to be normoglycemic. This reflects a notably high prevalence, with

more than three-quarters of the study population meeting the diagnostic thresholds. Such a high proportion may be influenced by demographic characteristics, referral patterns, or underlying risk profiles within the study setting. In comparison, Pravinraj et al.12 reported a relatively lower prevalence of GDM in their cohort, suggesting possible variations due to population differences or screening methodologies.

When screened using the DIPSI criteria, 207 (82.8%) women were classified as GDM positive and 43 (17.2%) as negative, indicating an even higher detection rate. This suggests that DIPSI may identify a larger number of cases, potentially due to its single-step non-fasting approach. However, in contrast, Pravinraj et al.12 observed that DIPSI identified fewer cases compared to standard diagnostic criteria, highlighting inconsistencies in its performance across different populations.

In this study, preeclampsia was observed in 8 cases among women who were positive by both DIPSI and IADPSG criteria, whereas the majority (141) did not develop the condition. The association between diagnostic criteria and preeclampsia was not statistically significant ($p = 0.598$). These findings were consistent with the observations reported in study done by Mahmoud et al.13, which concluded that although GDM is associated with an increased risk of hypertensive disorders of pregnancy, differences between diagnostic criteria did not substantially change the incidence of preeclampsia. Similarly, the study by Vij et al.14 demonstrated comparable maternal outcomes between women diagnosed using DIPSI and those diagnosed using IADPSG criteria

In the present study, polyhydramnios was observed in 6 cases among women positive by both DIPSI and IADPSG criteria, whereas the majority of cases did not exhibit this complication. The association between diagnostic criteria and polyhydramnios was not statistically significant ($p = 0.683$). These findings are consistent with the study done by Mahmoud et al13, which reported that although polyhydramnios is recognized as a complication of GDM due to fetal hyperglycemia and increased urine output, the incidence does not significantly vary based on the diagnostic criteria used. Similarly, studies conducted in Indian populations by Seshiah et al15 have reported comparable rates of polyhydramnios across diagnostic groups. In present study, statistical analysis revealed no significant association between the diagnostic methods and the occurrence of PROM ($p = 0.505$), suggesting that both criteria showed a similar distribution of PROM among GDM cases. Comparable findings were reported in a study by Jaggi et al16, which also concluded no statistically significant difference in maternal outcomes, including PROM, between women diagnosed with GDM using either of the two criteria.

The present study showed that perineal injuries occurred in 6 cases among women positive by both DIPSI and IADPSG criteria, while 143 cases had no such complications. The difference between groups was not statistically significant ($p = 0.49$). These findings are in agreement with observations reported in the study done by Mahmoud et al.13 Likewise, the study by Vij et al.14 found no statistically significant difference in delivery-related maternal complications between women diagnosed by DIPSI and those diagnosed by IADPSG criteria.

In the current study, postpartum hemorrhage was observed in 3 cases among women positive by both DIPSI and IADPSG criteria, while no cases were observed in the other diagnostic groups. The majority of participants did not experience PPH. Although the number of cases was small, the results did not demonstrate a significant association between the diagnostic criteria used for GDM and the occurrence of postpartum hemorrhage. Similar observations were reported in the study done by Mahmoud et al.15, which indicated that while GDM may contribute to certain maternal complications, the risk of postpartum hemorrhage does not vary significantly across different diagnostic strategies. The findings are also comparable with the observations from studies evaluating DIPSI and IADPSG criteria in Indian populations, including the study by Vij et al.14, where maternal outcomes such as PPH did not differ significantly between the diagnostic groups.

CONCLUSION

The findings of the present study demonstrate a high prevalence of gestational diabetes mellitus in the study population, with both DIPSI and IADPSG criteria identifying a substantial proportion of affected women. Although DIPSI detected a greater number of cases than the IADPSG criteria, this increased detection did not translate into significant differences in the incidence of major maternal complications, including preeclampsia, polyhydramnios, premature rupture of membranes, perineal injuries, and postpartum hemorrhage. These observations are consistent with previous studies, suggesting that maternal outcomes remain comparable irrespective of the diagnostic criterion employed.

While DIPSI offers the advantages of simplicity, feasibility, and suitability for resource-constrained settings owing to its non-fasting single-step approach, the variability in its diagnostic performance reported across different populations warrants cautious interpretation. Overall, the present study supports the utility of both screening strategies in clinical practice, while emphasizing the need for larger multicentric prospective studies to determine the most appropriate diagnostic approach for optimizing maternal and perinatal outcomes across diverse populations.

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