Research Article

Screening of Gestational Diabetes Mellitus Using Diabetes in Pregnancy Study Group India (DIPSI) Guidelines in Tertiary Care Center

Dr Phanjamuthi Baro[1], Dr Runjun Doley[2], Dr Bharati Devi[3], Dr Bidyut Bikash Saikia[4]

[1] Post graduate trainee, Department of Obstetrics and Gynaecology, Jorhat Medical College & Hospital, Jorhat, Assam
[2] Associate Professor, Department of Obstetrics and Gynaecology, Jorhat Medical College & Hospital, Jorhat, Assam
[3] Professor and Head of Department, Department of Biochemistry, Diphu Medical College & Hospital, Diphu, Assam
[4] Assistant Professor, Department of Paediatrics, Gauhati Medical College & Hospital, Assam

OPEN ACCESS

Corresponding Author:

Dr Phanjamuthi Baro
Post graduate trainee, Department of Obstetrics and Gynaecology, Jorhat Medical College & Hospital, Jorhat, Assam.

A B S T R A C T

Introduction: Gestational Diabetes Mellitus (GDM) is defined as carbohydrate intolerance first recognized during pregnancy, irrespective of the treatment with diet or insulin. High blood sugar during pregnancy poses risks to both the mother and fetus, necessitating effective screening and management. DIPSI Recommends a non-fasting 75g oral glucose challenge test, diagnosing GDM if 2hour blood glucose is ≥ 140 mg/dl. This costeffective single step approach enhances screening accessibility, particularly in resource limited settings. **Methodology**: A prospective observational study evaluated the efficacy of DIPSI guidelines in screening of GDM and assessing maternal-fetal outcome. **Results**: The incidence of GDM in our study was 9.6 % by using 75 gm OGTT (DIPSI) and 7% by using standard 100 gm OGTT (Carpenter and Coustan). Most cases were in age group 25 to 29 years (30.8%). Higher gravidity (gravida ≥3, 12.5%) and BMI ≥30kg/m2 (50% positive) correlated with GDM risk. Family history of diabetes increased positivity (23.3%). Maternal complication included gestational hypertension (56.3%) and polyhydramnios (43.8%). Among 23 DIPSI positive cases 95.6% had LSCS and 4.4% had vaginal delivery. Respiratory Distress was the most common neonatal complications among the subjects, followed by hyperbilirubinaemia and hypoglycaemia. **Conclusions**: DIPSI, single step OGTT is economical, feasible and tailored for Indian populations, improving early detection and reducing complications. Its simplicity enhances compliance, making it crucial for GDM management in diverse healthcare settings.

Keywords: GDM, OGTT, DIPSI, Hyperinsulinaemia, Hyperbilirubinaemia, Hypoglycaemia.

INTRODUCTION

"Gestational Diabetes Mellitus (GDM)" is characterized by 'varying degrees of impaired glucose tolerance that is initially identified during pregnancy'. The condition was first described by O'Sullivan in 1961 as "glucose intolerance of varying degrees, detected for the first time in pregnancy," regardless of whether insulin therapy is required or if the condition continues postpartum [1]. The maternal metabolic adaptation is to maintain the mean fasting plasma glucose of 74.5 ± 11 mg/dl and the post prandial peak of 108.7 ± 16.9mg/dl. This fine turning of glycemic level during pregnancy is possible due to the compensatory hyperinsulinaemia, as the normal pregnancy is characterized by insulin resistance. A pregnant woman who is not able to increase her insulin secretion to overcome the insulin resistance even during normal pregnancy develops gestational diabetes. DIPSI Recommends a non-fasting test where the woman drinks 75g of glucose, if her blood sugar is ≥ 140 mg/dl after 2 hours, she is considered having GDM. This one step procedure of challenging women with 75 gm glucose and diagnosing GDM is simple, economical and feasible. High blood sugar during pregnancy can lead to complications for both the mother and baby, so screening, diagnosing and treating is crucial.

AIMS AND OBJECTIVES

AIM OF STUDY

To determine the effectiveness of Screening for Gestational Diabetes Mellitus using DIPSI guidelines.

OBJECTIVES

1) To find out the role and effectiveness of DIPSI guidelines for detection of Gestational Diabetes Mellitus in the population under study.
2) To evaluate neonatal and maternal outcome in patients of Gestational Diabetes Mellitus.

MATERIAL AND METHODS

METHODLOGY –

Approval from institutional Ethics committee was taken prior to commencement of study. Informed consent from pregnant women was taken. They were explained about the study. The data was collected using proforma after taking informed consent. Pregnant women were given pre structured questionnaire and details mentioning to their anthropometry, family history, medical and obstetric history and other relevant information were collected. BMI and vitals were recorded. Pregnant women at 16 to 20 weeks or first attended at 24 to 28 weeks were given 75 gm oral glucose load irrespective of last meal timing. 2ml venous Blood sample collected at 2hours in fluoride vial. Plasma glucose was estimated at the central laboratory using glucose oxidase peroxidase (GOD-POD) method. Pregnant women with plasma glucose < 140mg/dl at 16 to 20 weeks of gestation were be repeated at 24 to 28 weeks of gestation. Pregnant women at with 2hour plasma glucose ≥ 140 gm/dl (DIPSI criterion) were underwent 100gm Glucose tolerance test as per Carpenter and Coustan criteria to confirm Gestational Diabetes Mellitus. Rest were classified as normal glucose tolerant women.

STUDY DESIGN- It is a Prospective Observational study.

STUDY AREA- Department of Obstetrics and Gynaecology, Jorhat medical college and hospital.

STUDY DURATION- One year.

STUDY SUBJECTS- Antenatal patients with inclusion criteria who attended / admitted in department of Obstetrics and Gynaecology, JMCH

SAMPLE SIZE - As per record, considering the inclusion and exclusion criteria, average antenatal patients at 16 to 20 weeks and 24 to 28 weeks, attended to Obstetrics and Gynaecology at Jorhat Medical College and Hospital per month was around 40. So 240 samples were collected for 6 month of data collection period.

SAMPLING METHOD – Consecutive sampling technique.

Inclusion criteria: All antenatal patients of 16-20 weeks and 24-28 weeks of gestation attending Obstetrics and Gynaecology department, Jorhat Medical College and Hospital.

Exclusion criteria: Patients diagnosed as diabetes before pregnancy.

RESULT AND OBSERVATION

It was a "prospective observational study" including 240 pregnant women who were analysed taking into consideration for different parameters.
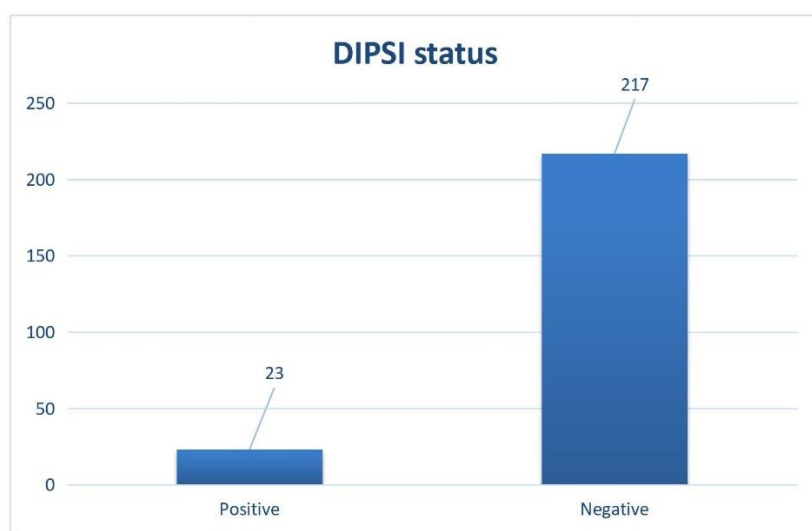

FIG.1 DIPSI STATUS

In this study 90.4% of study subject were D I P S I negative, 9.6% were DIPSI positive.

Dr Phanjamuthi Baro *et al.* Screening of Gestational Diabetes Mellitus Using Diabetes in Pregnancy Study Group India (DIPSI) Guidelines in Tertiary Care Center. *Int. J Med. Pharm. Res., 6 (5): 880-887, 2025*
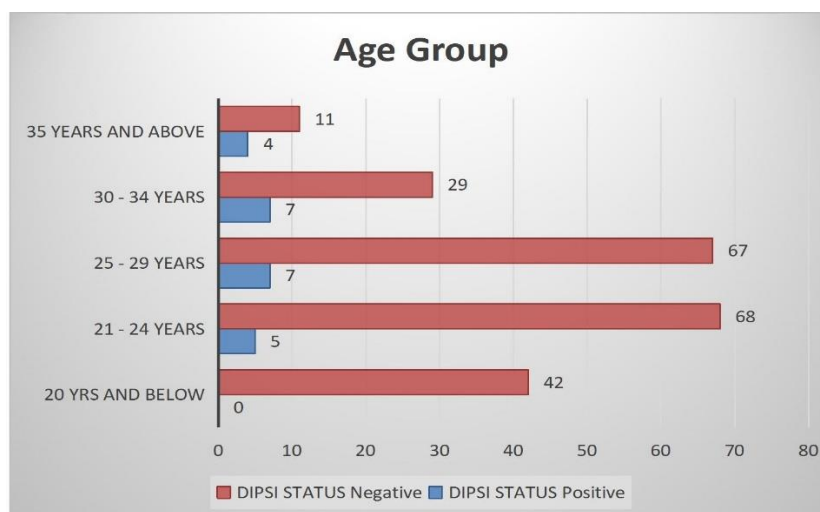
881

FIG.2 AGE DISTRIBUTION OF STUDY SUBJECTS

Majority of the study subjects belong to an age group 25 to 29 years (30.8%). 67 subjects were DIPSI negative and 7 subjects were DIPSI positive. Followed by 21 to 24 years (30.4%).
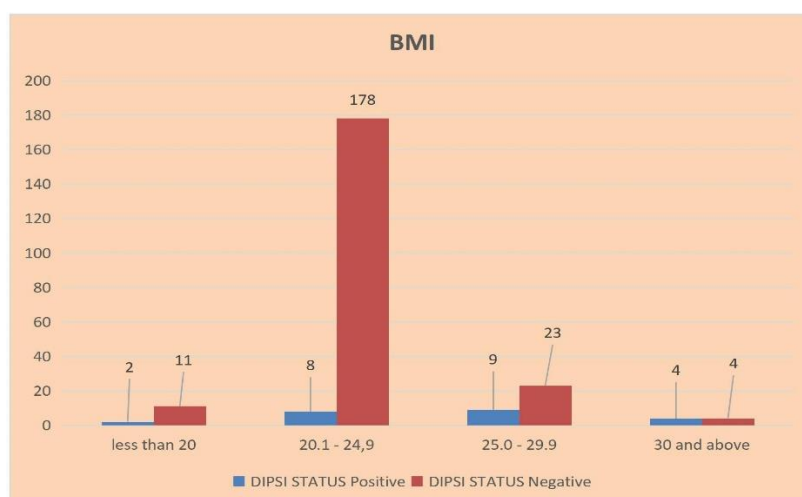

FIG. 3 OBSTETRICS SCORE OF STUDY SUBJECTS

Among Primi 93.7% were DIPSI negative and 6.3% were DIPSI positive. Among gravida 2, 87.6% were DIPSI negative and 12.4% were DIPSI positive. G3 and above 87.5% were negative and 12.5% were positive for DIPSI.
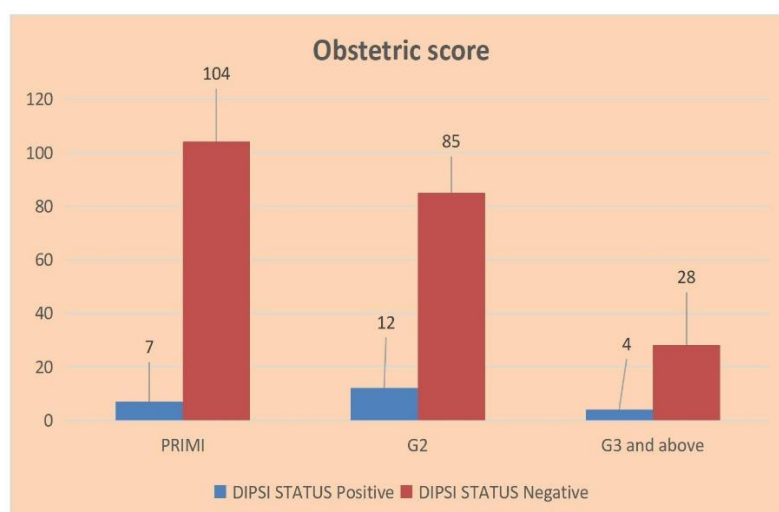

Fig 4 BODY MASS INDEX OF DIPSI CASES

Dr Phanjamuthi Baro *et al.* Screening of Gestational Diabetes Mellitus Using Diabetes in Pregnancy Study Group India (DIPSI) Guidelines in Tertiary Care Center. *Int. J Med. Pharm. Res., 6 (5): 880-887, 2025*

882

BMI <25 kg/m² (77.5%), out of which 4.3% were DIPSI positive. BMI 25 to 29.9 kg/m² (13.3%), out of which 28.1% were DIPSI positive. BMI ≥30, 50% were DIPSI positive.
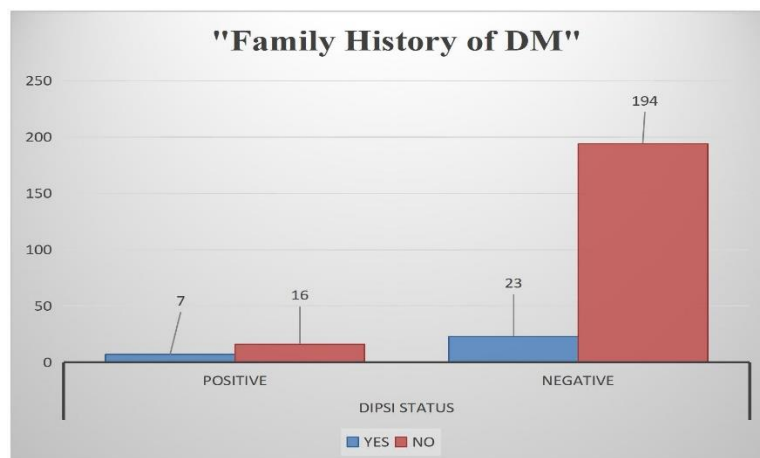

FIG.5 FAMILY HISTORY OF DIABETES

12.5% had positive family history for Diabetes mellitus, out of which 76.7% were DIPSI negative and 23.3% were DIPSI positive. 87.5% did not have the family history of DM , out of which 92.4% were negative and 7.6% were DIPSI positive.
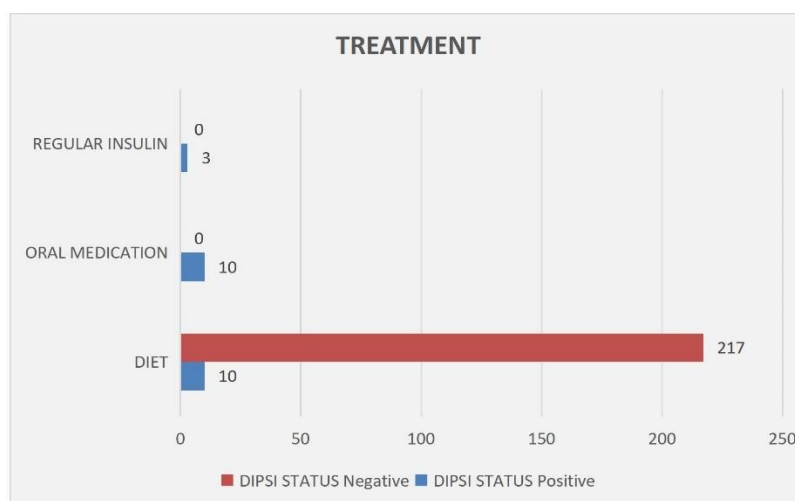

Fig 6 TREATMENT OF DIPSI CASES

43.5% DIPSI positive cases followed diet plan, other 43.5% cases took oral medication, 13% cases took regular Insulin.

Table – 1: MATERNAL COMPLICATIONS OF THE SUBJECTS

Maternal complications	DIPSI STATUS		
	Positive	Negative	Total
Maternal Complication	16	82	98
PROM	1	13	14
	6.3%	15.7%	
Gestational hypertension	9	10	19
	56.3%	12.0%	
Moderate anemia	0	13	13
	0.0%	15.7%	
Urinary trach infection	5	16	21
	31.3%	19.3%	
Preeclampsia	0	5	5
	0.0%	6.0%	
Polyhydromnios	7	11	18

	43.8%	13.3%	
Hypothyroidism	0	2	2
	0.0%	2.4%	
Abruptio Placenta	0	2	2
	0.0%	2.4%	
Oligohydromnios	0	5	5
	0.0%	6.0%	
Cephalopelvic Disproportion.	0	3	3
	0.0%	3.6%	
PPROM	0	2	2
	0.0%	2.4%	
Placenta Previa	0	2	2
	0.0%	2.4%	
Total	16	82	98

Among 240 subjects, 98 had maternal complications in which 83.7% were Negative on DIPSI, 16.3% were positive on DIPSI.

FIG.7 GESTATIONAL AGE AT DELIVERY

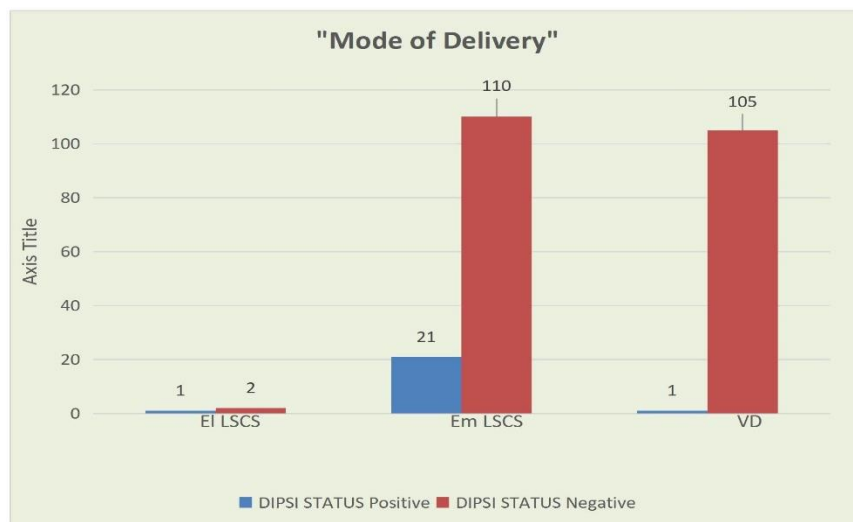Among 23 DIPSI positive cases 14 were delivered preterm baby. Rest 9 delivered at term.

FIG.8 MODE OF DELIVERY

Among 23 DIPSI positive cases 95.6 % had LSCS and 4.4% had vaginal delivery.
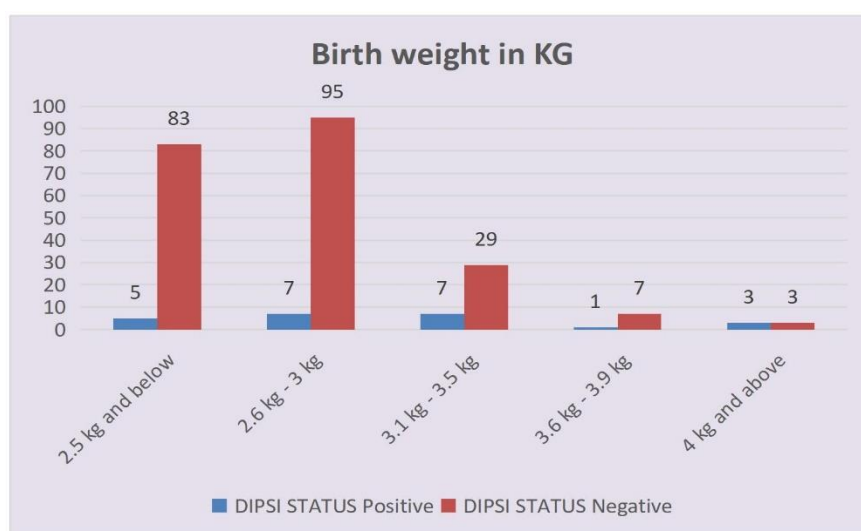
FIG.9 BIRTH WEIGHT OF BABY AMONG STUDY SUBJECTS

Among the DIPSI positive subjects 30.4% had baby weight between 2.6kg to 3 kg, 30.4% had 3.1kg to 3.5kg, 21.7% had baby weight 2.5 kg and below, 13% had 4kg and above baby weight, 4.3% had 3.6kg – 3.9kg baby weight.

Table – 2: NEONATAL COMPLICATIONS IN DIPSI STATUS CASES.

NEONATAL COMPLICATIONS	DIPSI POSITIVE	DIPSI NEGATIVE	Total
Hypoglycaemia	2	4	6
Hyperbilirubinaemia	2	29	31
Respiratory Distress	3	20	23
Birth Asphyxia	0	4	4
Birth Injury	0	0	0
Neonatal Death	0	5	5
Total	9	66	**75**

Respiratory Distress was the most common neonatal complications among the DIPSI positive subjects.

DISCUSSION

Prevalence of GDM in India varied from 3.8 to 21 % in different parts of the country, depending on geographical locations and diagnostic methods used. Our research involving 240 participants revealed, 9.6% were found to be DIPSI positive.

This is comparable to the study conducted by Balaji et al ,2011 [4] and Kalra et al, 2013 [3] where incidence of GDM by 75 gm OGTT (DIPSI) observed 13.4% and 6.6% respectively. Our study population belonged to rural area. The incidence of GDM in our study population was found to be 9.6 % by using 75 gm OGCT (DIPSI) and 7% by using standard 100 gm OGTT (Carpenter and Coustan). This high pick up rate by 75 gm OGCT test may help us in providing extra care to the patients at risk, though it may lead to increased cost and intervention to the patient, especially people living in rural areas of our country.

The present study reveal that average age of the subjects of the study was 25 years ± 4.9, the age distribution was 17 to 39 years. Highest number of GDM subjects were in the age group of 25-29 years and 30-34 years. In this study it was observed that 20 years and below did not have GDM. There was statistically significant relation between age and GDM, it can be observed the increase in age impacted the GDM status from the data it can be seen that most of 'GDM positive' cases are in the age group of 25 to 34 years. In our study, the prevalence proportion increased with age from 0 in the age group < 20 years to 7.5% in the age group ≥ 25 years. Similar studies by Seshiah et al [2] and Kalra et al [3] showed age ≥ 25 years as a risk factor for GDM[2,3]. So as the age increases the incidence of GDM increases. This supports the American Diabetes Association recommendation on the use of age 25 years as the cutoff for screening and the observation that maternal age 25 years is an important predictive factor for GDM. In clinical practice, maternal age of 25 years may be adopted as a risk factor for the development of GDM [5].

Positive DIPSI test had highest incidence in gravida 3 and above (12.5%) followed by subjects with Gravida 2 (12.4%) followed by primi (6.3%).

In our study 77.5% were BMI <25 kg/m². out of which 95.7% were DIPSI negative and 4.3% were DIPSI positive. Followed by subjects with BMI 25 to 29.9 kg/m² (13.3%), out of which 71.9% of the subjects were DIPSI negative and 28.1% were

DIPSI positive. Subjects with 30 and above BMI 50% were negative and 50% were positive. Statistically there was significant relationship with BMI and DIPSI status. It can be observed that higher BMI has higher chances of GDM. Obesity as a significant risk factor for GDM is supported by several studies finding that overweight or obesity at the start of pregnancy predisposes to GDM. Das et al[7], found that 25% of women with GDM, had BMI > 27 kg/m^2, while Seshiah et al[2] and Kalra et al[3] found that 21.4% and 67% of women with GDM, respectively, had BMI ≥ 25 kg/m^2.

In our study 12.5% had positive family history for Diabetes mellitus, out of which 76.7% were DIPSI negative and 23.3% were DIPSI positive. 87.5% did not have the family history of DM, out of which 92.4% were negative and 7.6% were DIPSI positive. In studies by Bhattacharya et al[6], Das et al[7] and Kalra et al[3], 33.33% of GDM women had family history of diabetes mellitus. Seshiah et al[2] observed that age ≥ 25 years, BMI ≥ 25 kg/m2 and family history of diabetes were the risk factors for GDM. In our study population all these risk factors were observed.

Subjects those who had diabetes mellitus majority of them 56.3 % has gestational hypertension, 43.8 % polyhydramnios, 31.3 % had urinary tract infection. Kalra et al[3], found that the most common complications seen in GDM mothers were gestational hypertension (36.4%) followed by vaginal candidiasis (24.2%), premature rupture of membranes (PROM; 18.1%), and abruption placentae (12.12%).

In our study among 23 DIPSI positive cases 95.6 % had LSCS and 4.4% had vaginal delivery. The data analysis shows that women with GDM have higher chances of lower segment cesarean section. Cesarean delivery rate in the study by Kalra et al[3] was 78.8% amongst the GDM patients, with the most common indication being arrest of labor. While the rate of cesarean section in a study by Gorgal et al[8] was 19.5%. The results of this study were consistent with those of previous studies that the cesarean section rate increased significantly among GDM women (66.67%). The high incidence of cesarean section in GDM study group can be attributed to the following facts:
- Associated maternal complications like PIH and Polyhydramnios can lead to obstetric indications like abruptio placentae and cord prolapse respectively.
- More intensive antenatal and intrapartum fetal surveillance which helps in diagnosing fetal distress at the earliest.

Among the DIPSI positive subjects 30.4% had baby weight between 2.6kg to 3.5 kg, which is considered normal. This can be attribute to good glycemic control in antenatal period. 13% had 4kg and above baby weight, 4.3% had 3.6kg – 3.9kg baby weight. Balaji et al[4] and Kalra et al[3] 'reported 9.9% and 18% incidence of macrosomia' in the GDM group respectively. There was statistically strong relationship between baby weight and DIPSI status with P < .05 = .001, the analysis suggests that subjects with GDM has high chances of increased baby weight.
Respiratory Distress was the most common neonatal complications among the subjects, followed by Hyperbilirubinaemia.

CONCLUSION
The Diabetes in Pregnancy Study Group India (DIPSI) is a significant initiative aimed at addressing the challenges of gestational diabetes mellitus (GDM) in India. Its guidelines recommend a single-step, cost-effective, and practical approach to diagnosing GDM using a 75g oral glucose tolerance test (OGTT), irrespective of the last meal timing. This approach has been widely adopted due to its simplicity and effectiveness in resource- limited settings. DIPSI's guidelines are tailored to the Indian context, making them highly practical for widespread implementation, especially in rural and semi-urban areas. Early diagnosis and management of GDM through DIPSI guidelines help reduce complications such as macrosomia, preeclampsia, and neonatal hypoglycemia. The single-step OGTT is economical and reduces the burden on healthcare systems, making it accessible to a larger population. DIPSI's approach has gained international recognition and aligns with WHO recommendations for GDM screening. DIPSI has played a crucial role in raising awareness about GDM among healthcare providers and pregnant women, emphasizing the importance of early screening. Pregnancy induced hypertension and polyhydramnios are common associated complications in women with GDM. Pregnancy-induced hypertension and polyhydramnios are frequently observed complications in women with gestational diabetes mellitus (GDM). The heightened likelihood of cesarean deliveries among these women further contributes to increased maternal morbidity. Effective glycemic control during the antenatal period can play a crucial role in reducing the incidence of macrosomic infants, thereby improving maternal and neonatal outcomes.

REFERENCES
1. Freinkel N, Josimovich J, Conference Planning Committee, American Diabetes Association Workshop-Conference on gestational diabetes: summary and recommendations. Diabetes Care 1980; 3: 499-501.
2. Seshiah V, Sahay BK, Das AK, Shah S, Banerjee S, Rao PV, Ammini A, Balaji V, Gupta S, Divakar H, Misra S, Thanawala U. Gestational diabetes mellitus--Indian guidelines. J Indian Med Assoc. 2009 Nov;107(11):799-802, 804-6. PMID: 20469784.
3. Kalra P, Kachhwaha CP, Singh HV. Prevalence of gestational diabetes mellitus and its outcome in western Rajasthan. Indian J Endocrinol Metab. 2013 Jul;17(4):677–80.

4. Balaji V, Balaji M, Anjalakshi C, Cynthia A, Arthi T, Seshiah V. Diagnosis of gestational diabetes mellitus in Asian-Indian women. Indian J Endocrinol Metab. 2011 Jul;15(3):187–90.
5. American Diabetes Association. Standards of medical care in diabetes-2007. Diabetes Care. 2007 Jan;30 Suppl 1:S4–41.
6. Bhattacharya C, Awasthi RT, Kumar S, Lamba PS. Routine screening for Gestational Diabetes Mellitus with glucose challenge test in antenatal patients. J Obst Gyn of India.2001;51:75-78.
7. Das V, Kamra S, Mishra A, Agarwal A, Agarwal CG. Screening for gestational diabetes and maternal and fetal outcome. J Obstet Gynaecol India. 2004;54:449–51.
8. Gorgal R, Gonçalves E, Barros M, Namora G, Magalhães A, Rodrigues T, et al. Gestational diabetes mellitus: a risk factor for non-elective cesarean section. J Obstet Gynaecol Res. 2012 Jan;38(1):154–9.