ORIGINAL RESEARCH PAPER
Volume - 14 | Issue - 06 | June - 2025 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

PREVALENCE OF DIABETIS COMPLICATING PREGNANCY AND ASSOCIATED RISK FACTORS AND MATERNAL AND FETAL OUTCOME

Obstetrics & Gynaecology

Dr. Kodati Anusha* Assistant Professor, Department of Obstetrics and Gynaecology, ESIC Medical College and Hospital, Sanathnagar, Hyderabad, Telangana-500038. *Corresponding Author

Dr Akshatha D S Assistant Professor, Department of Obstetrics and Gynaecology, ESIC Medical College and Hospital, Sanathnagar, Hyderabad, Telangana-500038.

ABSTRACT

It is a prospective, non-randomized observational study, conducted at Vijay Marie Hospital during the period from june 2019 to july 2020. All antenatal women in 1st trimester of pregnancy who were diagnosed as GDM and with pre gestational diabetes were included in the present study irrespective of gravidity and maternal age and Irrespective of presence or absence of clinical or historical risk factors of GDM.

KEYWORDS

GDM, Cesarean Section, Parity

INTRODUCTION

Gestational Diabetes Mellitus (GDM) is defined as 'carbohydrate intolerance with recognition or onset during pregnancy', irrespective of the treatment with diet or insulin. Women with a history of GDM are at increased risk of future diabetes, predominately type 2 diabetes, as are their children[9,10].Gestational diabetes mellitus complicates 10% to 15% of pregnancies and is associated with both neonatal morbidity and obstetric complications[1,4,7,11,12,15]. The relationship between onset of GDM and complications in pregnancy and increased perinatal morbidity and mortality has been well documented[3]. The correlation between GDM and birth weight has proven to be complex and multi-faceted.The condition has been implicated as a risk factor for future diabetes and obesity in women as well as for impaired carbohydrate metabolism in their offspring[9,10]. Recently, the effect of screening and clinical management of GDM on antenatal, neonatal, and perinatal outcome has been deemed beneficial[3]. The purpose of the screening, management, treatment of GDM is two-fold increased to prevent stillbirths and to decrease the number of large for gestational age births, ultimately reducing neonatal and maternal morbidity and mortality[3]. Although stillbirth rates have decreased dramatically over last 20 years, the rates of Caesarean section and of large for gestational age birth weight have remained high and in some cases are unchanged among women with GDM despite the introduction of insulin therapy[13].

MATERIAL AND METHODS

It is a prospective, non-randomized observational study, conducted at Vijay Marie Hospital during the period from june 2018 to july 2019. All antenatal women in 1st trimester of pregnancy who were diagnosed as GDM and with pre gestational diabetes were included in the present study irrespective of gravidity and maternal age and Irrespective of presence or absence of clinical or historical risk factors of GDM.

Sample Size:

Calculation is done in the following way;
$n = Z^2 \times PQ/d2$
n= required sample size
Z = confidence level at 95% (standard value of 1.96)
P = estimated prevalence of GDM is about 11.5%
Q=1-P i.e. 0.72
d = margin of error i.e. (0.05)
Sample size =200 (including Dropouts)

Screening of diabetes was done in 200 pregnant women in first trimester. In 1st trimester fasting blood sugar level <126 mg/dl, post prandial blood sugar levels after 2 hrs <200 mg/dl and HbA1c levels <6.5% are done to know the overt diabetes mellitus.

In second trimester according to ACOG (2011) at (24 – 28weeks) Glucose Challenge Test is done to screen for gestational diabetes mellitus. They were given 50gm oral glucose irrespective of last meal. If 1 hour plasma glucose is ≥ 140mg/dL, then confirmation of GDM is done after 3 days by OGTT with 100gm of oral glucose, then if fasting blood glucose is <95 mg/dl ,1sr hr blood glucose <180 mg/dl,2nd hr blood glusose <155 mg/dl and 3rd hr blood glucose <140 mg/dl, any value more than these is considered as GDM. If the values are normal ,then the test is repeated in 3rd trimester at 32 weeks , if the values are less than the cutoff then they are classified as non GDM group and if the values are more than the cutoff they are classified as GDM group.

Pre-requisites For OGTT(100gr):

- Unrestricted diet for previous 3 days (atleast 150gr carbohydrate/ day)
- Unlimited physical activity
- No smoking
- Overnight fasting (8-14 hrs)
- Sit throughout the procedure

Inclusion Criteria:

1. All antenatal women in 1st trimester of pregnancy who were diagnosed as GDM and with pre gestational diabetes were included in the present study.
2. All pregnant women irrespective of gravidity and maternal age.
3. Irrespective of presence or absence of clinical or historical risk factors of GDM

Exclusion Criteria

1. Chronic hypertensive
2. Connective tissue disorders
3. Asthma
4. Chronic liver disease
5. Epilepsy

Aims and Objectives

To study the maternal and perinatal outcome in diabetes complicating pregnancies.

RESULTS

Table 1 : Maternal Age Wise Distribution of Total Cases:

GROUP	AGE <25 YRS	AGE >25-30YRS	AGE >30 YRS	TOTAL
	NUMBER (%)	NUMBER (%)	NUMBER (%)	NUMBER (%)
ODM	0 (0.0)	5 (6.3)	2 (25.0)	7 (3.5)
GDM	7 (6.2)	8 (10.1)	2 (25.0)	17 (8.5)
NDM	106 (93.8)	66 (83.5)	4 (50.0)	176 (88.0)
TOTAL	113 (100.0)	79 (100.0)	8 (100.0)	200 (100.0)

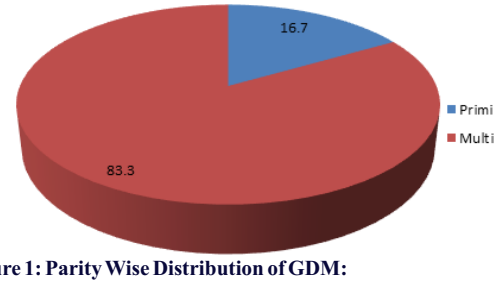

Figure 1: Parity Wise Distribution of GDM:

Table 2: BMI of Study Population:

GROUP	UNDER-WEIGHT	NORMAL WEIGHT	OVER-WEIGHT	OBESE	TOTAL

	NUMBER (%)	NUMBER (%)	NUMBER (%)	NUMBER (%)	NUMBER (%)
ODM	0 (0.0)	1 (4.1)	4 (16.66)	2 (8.33)	7 (29.1)
GDM	1 (4.1)	8 (33.33)	6 (25.0)	2 (8.33)	17(70.8)
TOTAL	1(4.1)	9(37.5)	10(41.6)	4(16.66)	24(100)

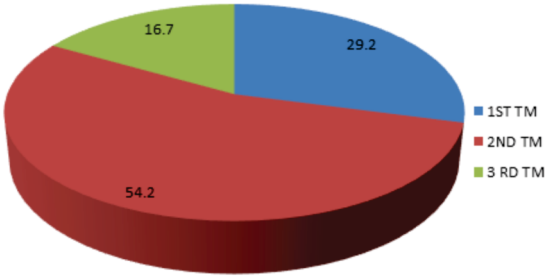

Figure 2: Trimester Wise Distribution of GDM+ODM Cases:

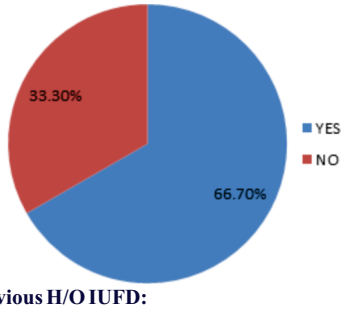

Figure 3 :Previous H/O IUFD:

Table 3: Comparision of Risk Risk Factors in GDM+ODM and NON- GDM Women:

RISK FACTORS	GDM+ODM No. (%)	No.NON-GDM cases	TOTAL
AGE >30yrs	9 (75%)	3(25%)	12(100%)
MULTIPARITY	20(17.2%)	96(82.7)	116(100%)
OBESITY	9(81.8%)	2(18.8%)	11(100%)
BOH	9(90%)	1(10%)	10(100%)
FAMILY H/O DM	21(55.2%)	17(44.7%)	38(100%)
PAST H/O DM	10(71.4%)	4(28.5%)	14(100%)

Table 4:Maternal Complications in GDM.

MATERNAL COMPLICATIONS	NUMBER OF CASES	PERCENTAGE (%)
PIH	10	41.7
PROM	4	16.7
POLYHYDRAMNIOS	2	8.3
OLIGIHYDRAMNIOS	5	20.8
RECURRENT UTI	4	16.7
VVC	7	29.2
PPH	7	29.2

Table 5 : Maternal Outcome in 24 GDM Patients:

MATERNAL OUTCOME	NO.OF CASES
ABORTION	2 (8.3%)
NVD	6 (25%)
Operative vaginal delivery	6 (25%)
LSCS	10 (41.6%)
SHOULDER DYSTOCIA	2 (8.3%)
PPH	7 (29.1%)

Table 6: Neonatal Outcome Among GDM Mothers:

NEONATAL OUTCOME	NUMBER OF CASES	PERCENTAGE (%)
PRETERM	3	12.5
NICU ADMISSION	10	41.7
MACROSOMIA	17	70.8
FGR	2	8.3
IUFD	1	4.1
ANAMOLIES	1	4.1
RDS	9	37.5
HYPOGLYCEMIA	4	16.6

DISCUSSION

This study is a prospective non randamised observational study done to evaluate risk factors in mother predisposing to GDM, complications associated with GDM like preeclampsia, polyhydramnios, rate of caesarean section; mode of intervention applied, diet or insulin therapy and fetal outcome like preterm births, Macrosomia, neonatal hypoglycemia, need for NICU care, congenital anomalies and respiratory distress syndrome.

The mean age of the study population was 28±3.7 years which is comparable to the study conducted by hussain et al in 2020[18] which had mean age of 27.62±3.86 years and 23.7 years in the study conducted by chanda et al in 2020[16].

Age >30 years is a well known risk factor for developing GDM which is proved in this study.among 24 GDM patients In the present study,among 24 GDM cases 70.8% subjects had age >25 years which correlates with the study by panigrahi et al 2020[3] which had 82% cases and chanda et al 2020[16] with 73.19% cases with age > 25 years. saxena p et al 2022[16] with 25-27 yrs ,10.4% and Hussain et al 2020[18] 18-25 yrs 9.8% prevalence.Multiparity is an established risk factor for glucose intolerance and, ultimately, development of GDM. Saxena et al in 2022[15] had 70% of multiparous subjects, 59.5% in study by Hussain et al 2020[18]. In this study among 116 multiparous women ,20 patients are diabetic .as most of the multiparous women in this study belongs to younger age group.so multi parity as a significant risk factor for developing GDM cannot be proved.Obesity is a significant risk factor for GDM and overweight and obesity before pregnancy predispose to GDM. We found 41.6% GDM subjects had BMI 21-24 kg/m2 and in study by Shridevi et al 2015, 73.91% subjects had BMI >25kg/m2, chanda et al 2020[16] found that 32% and Nagalingam et al 2019[5] 65% of women with GDM had obesity.Family H/O DM was present in 37.5% GDM subjects which is comparable with the results of study done by Nagalingam et al 2019[5] which was 53%,present study it is 21%. Our study shows that 37.5% of the diabetic mothers had previous bad obstetric outcome with previous abortions or neonatal deaths, this being one of the reasons for referral of some of them to our center and study conducted by Kalra et al 2010[19] showed that 15.15% of GDM mothers had BOH.Past H/O GDM was seen in 62.5% subjectsObesity is a modifiable risk factor among all these.

Maternal Complications

The present study had 41.7% of hypertensive cases in comparison to study conducted by Prakash et al 2017[7] which had 31% cases of PIH and 9% cases of chronic hypertension.

In the present study, 41.7% of subjects had polyhydramnios whereas study conducted by Saadia Tariq et al 2010 had 26.8% of polyhydramnios cases. The present study had 20.8% of oligohydramnios cases and the study of Kevin Johns in 2006[20] showed 2.8%.

Recurrent urinary tract infections were seen in 16.7% subjects compared to 8.8% subjects in study by murmur et al 2018[8]. Vulvovaginal candidiasis was seen in 29.2% subjects.

In this study, 16.7% subjects were managed with dietary therapy. 50% subjects required insulin along with dietary therapy compared to 65% subjects in study by Prakash et al 2017[7].

Our study had a rate of 41.6% of caesarean sections, this can be attributable to increase in rate of medical complications associated with GDM like PIH, precious pregnancy with advanced age or complications of labour like PROM, polyhydramnios, malpresentations, previous sections and CPD with big baby.In the study by Kelvin johns 2006[20] Caesarean section rate is 36.3% and Rajesh kumar et al 2017[13] it is 50% and 41.6% in present study and Postpartum hemorrhage was noted in only 7 (29.1%) cases in our study as we practice active management of third stage of labour for preventing PPH. A full-fledged SMBG could not be applied because of poor socioeconomic status also contributed by illiteracy. Antenatal fetal monitoring was done using daily fetal kick count (DFKC) from 28 weeks of gestation, AFI weekly and Non Stress Test biweekly from 32-34weeks of gestation, monthly ultrasonography for fetal biometry in uncomplicated cases was done. Diabetes related maternal complications like neuropathy, nephropathy or retinopathy were not observed in any of the cases in the present stud

FETAL/NEONATAL OUTCOMES

Macrosomia defined as birth weight greater than 4 kg (90th percentile) was observed in 17 cases among 24 GDM cases. This study had 4 cases of neonatal hypocalcemia, Our study had 37.5% neonates with

RDS.There were 1 cases with congenital anomalies in our study concurrent withNilofer et al 2012 [21]study.We had 41.7% NICU admissions concurrent with Prakash et al 2017[7] which had 20% NICU admissions.In this study 12.5% cases had preterm delivery and premature rupture of membranes

Summary

Introduction of universal screening for detection of GDM has increased the prevalence rate of GDM with more cases being diagnosed.Dietary therapy and insulin usage in management of GDM, when followed strictly and with patient's motivation proves to be satisfactory in achieving adequate sugar control. This has reflected in low neonatal complications like neonatal hypoglycaemia and RDS .Advocating SMBG may be useful in monitoring of blood sugars in educated population and also actively involves patients for understanding and early detection of disease complications like hypoglycemia or hyperglycemia.

Education regarding GDM and timely intervention also plays a major role in reducing unfavourable outcome. Intensive care of GDM for the short duration of pregnancy results in safe motherhood and results in long term pay off in the primary prevention of obesity, IGT and DM in the offspring.

REFERENCES

1. Modzelewski R, Stefanowicz-Rutkowska MM, Matuszewski W, Bandurska-Stankiewicz EM. Gestational Diabetes Mellitus-Recent Literature Review. J Clin Med. 2022 Sep 28;11(19):5736. doi:10.3390/jcm11195736. PMID: 36233604; PMCID: PMC9572242
2. Ye W, Luo C, Huang J, Li C, Liu Z, Liu F et al. Gestational diabetes mellitus and adverse pregnancy outcomes: systematic review and meta-analysis BMJ 2022; 377 :e067946 doi:10.1136/bmj-2021-067946
3. Panigrahi, A., Mallicka & Panda, J. Gestational diabetes mellitus, its associated factors, and the pregnancy outcomes among pregnant women attending tertiary care hospitals of Bhubaneswar, India. Int J Diabetes Dev Ctries 40, 371–378 (2020).
4. Lee, K.W., Ching, S.M., Ramachandran, V. et al. Prevalence and risk factors of gestational diabetes mellitus in Asia: a systematic review and meta-analysis. BMC Pregnancy Childbirth 18, 494 (2018). https://doi.org/10.1186/s12884-018-2131-
5. Nagalingam, Saranya, AND Murugaraj, Vaishnavi. "Prevalence and commonest predictors of gestational diabetes mellitus: a cross-sectional study" International Journal of Advances in Medicine [Online], Volume 6 Number 1 (23 January 2019)
6. Chanda S, Dogra V, Hazarika N, et al. Prevalence and predictors of gestational diabetes mellitus in rural Assam: a cross-sectional study using mobile medical units. BMJ Open 2020;10:e037836. doi:10.1136/ bmjopen-2020-037836
7. Prakash GT, Das AK, Habeebullah S, Bhat V, Shamanna SB. Maternal and Neonatal Outcome in Mothers with Gestational Diabetes Mellitus. Indian J Endocrinol Metab. 2017 Nov-Dec;21(6):854-858. doi: 10.4103/ijem.IJEM_66_17. PMID: 29285448; PMCID: PMC5729673.
8. Murmu M, Karun MKP, Meher RK, Pradhan B, Kar A, Naik M. Spectrum of uropathogens and their antibiotic sensitivity pattern in diabetes mellitus patients at a tertiary care hospital in Odisha, India. Int J Res Med Sci 2018;6:1549-53.
9. Kawasaki M, Arata N, Miyazaki C, Mori R, Kikuchi T, Ogawa Y, Ota E. Obesity and abnormal glucose tolerance in offspring of diabetic mothers: A systematic review and meta-analysis. PLoS One. 2018 Jan 12;13(1):e0190676. doi: 10.1371/journal.pone.0190676. PMID: 29329330; PMCID: PMC5766126.
10. Nijs, H., & Benhalima, K. (2020). Gestational Diabetes Mellitus and the Long-Term Risk for Glucose Intolerance and Overweight in the Offspring: A Narrative Review. Journal of Clinical Medicine, 9(2), 599. https://doi.org/10.3390/jcm90209
11. Mantri N, Goel AD, Patel M, Baskaran P, Dutta G, Gupta MK, Yadav V, Mittal M, Shekhar S, Bhardwaj P. National and regional prevalence of gestational diabetes mellitus in India: a systematic review and Meta-analysis. BMC Public Health. 2024 Feb 20;24(1):527. doi: 10.1186/s12889-024-18024-9. PMID: 38378536; PMCID: PMC10877914.
12. Nigatu, B., Workneh, T., Mekuria, T. et al. Prevalence of Gestational Diabetes Mellitus among pregnant women attending antenatal care clinic of St. Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia. Clin Diabetes Endocrinol 8, 2 (2022).
13. Kumari R, Dalal V, Kachhawa G, Sahoo I, Khadgawat R, Mahey R, Kulshrestha V, Vanamail P, Sharma JB, Bhatla N, Kriplani A. Maternal and Perinatal Outcome in Gestational Diabetes Mellitus in a Tertiary Care Hospital in Delhi. Indian J Endocrinol Metab. 2018 Jan-Feb;22(1):116-120. doi: 10.4103/ijem.IJEM_582_17. PMID: 29535949; PMCID: PMC5838890.
14. Das A K, Kapur Anil, Anjalakshi C, Balaji V, Diwakar Hema, Chawla Rajeev, et al. Diagnosis & Management of Gestational Diabetes Mellitus(2021) by-Diabetes in Pregnancy study Group India. 2021;1–39.
15. Saxena P, Shubham T, Puri M, Jain A. Diagnostic Accuracy of Diabetes in Pregnancy Study Group of India with Carpenter–Coustan and National Diabetes Data Group Criteria for Diagnosis of Gestational Diabetes Mellitus and Correlation with Fetomaternal Outcome. J Obstet Gynecol India.; 2022;72:154–159 10.1007/s13224-021-01486-x.
16. Chanda S, Dogra V, Hazarika N, Bambrah H, Sudke AK, Vig A, et al. Prevalence and predictors of gestational diabetes mellitus in rural Assam: a cross-sectional study using mobile medical units. BMJ Open. 2020:10.
17. Dave VR, Rana BM, Sonaliya KN, Chandwani SJ, Sharma SV, Khatri SO, Shaikh KM, Hathiari FM. Screening of Gestational Diabetes and Hypertension Among Antenatal Women in Rural West India. Cent Asian J Glob Health. 2014 Dec 8;3(1):140. doi: 10.5195/cajgh.2014.140. PMID: 29755888; PMCID: PMC5927732.
18. Hussain, Tahziba; Das, Shritam; Parveen, Firdoush; Samanta, Prashanti; Bal, Madhusmita; Yadav, V. S.; Pati, Sanghamitra. Prevalence, risk factors and morbidities of gestational diabetes among pregnant women attending a hospital in an urban area of Bhubaneswar, Odisha. Journal of Family Medicine and Primary Care 9(10):p 5327-5333, October 30, 2020. | DOI: 10.4103/jfmpc. jfmpc_869_20
19. Kalra S, Kalra B, Sharma A. Prevalence of type 1 diabetes mellitus in Karnal district, Haryana state, India. Diabetol Metab Syndr 2010; 2:14.
20. Kevin Johns, Christopher Olynik, Robert Mase, Stuart Kreisman, Hugh Tildesley. Gestational Diabetes Mellitus Outcome in 394 Patients. J Obstet Gynaecol Can 2006; 28(2):122–127.
21. Nilofer AR, Raju V.S, Dakshayini BR, Zaki SA. Screening in high risk group of gestational diabetes mellitus with its maternal and fetal outcomes. Indian J Endocr Metab 2012; 16: S74-8.