



GESTATIONAL DIABETES MELLITUS-PREVALENCE, EPIDEMIOLOGY AND OUTCOME IN WESTERN MAHARASHTRA

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ABSTRACT

Aims & Objectives: This study estimated the prevalence, epidemiology of Gestational Diabetes Mellitus in Western Maharashtra. This study also evaluated maternal and foetal outcome in patients of Gestational Diabetes Mellitus. **Material and Methods:** A total 504 antenatal women after excluding pre gestational diabetes diabetes were screened for GDM with 75 gm OGCT using the DIPSII method. Antenatal women with 2 hour plasma glucose > 140 mg/dl underwent 100 gm glucose tolerance test as per Carpenter and Coustan criteria to diagnose Gestational Diabetes Mellitus. **Results:** The prevalence of GDM WAS 4.7% using Carpenter and Coustan criteria. Age >25 years, BMI >25 and family history of diabetes mellitus were risk factors for GDM. Antenatal women with GDM have high prevalence in women who belonged to upper middle class by modified kuppuswami scale. GDM was more frequently associated with Pregnancy associated hypertension and Polyhydramnios. **Conclusion:** Universal screening using single step DIPSII 75 gm OGCT is an effective way of identifying GDM cases. Screening and diagnosis offered early in pregnancy can help prevent complications in both the mother and foetus. Screening for GDM must therefore be made part of Essential Obstetric Care.

KEYWORDS : Gestational Diabetes Mellitus, Prevalence, DIPSII, Carpenter and Coustan

INTRODUCTION:

Gestational diabetes mellitus (GDM) is defined as carbohydrate intolerance of variable severity with onset or first recognition during pregnancy.¹ The International Diabetes Federation (IDF) in 2017 estimated that GDM affects approximately 14% of pregnancies worldwide, representing 18 million births annually.² In fact, a high prevalence of gestational diabetes mellitus (GDM) of the order of 18% has been reported from India.³ GDM is associated with increased fetomaternal morbidity as well as long term complications in mother and babies. This study will help us to diagnose GDM at the earliest so that prompt measures can be taken to prevent further complications.

MATERIALS AND METHODS

This was a prospective cross sectional study which was conducted in the department of Obstetrics and Gynaecology, in a teaching hospital in Western Maharashtra. The study was initiated after the approval of institutional ethics committee. A total 504 consecutive antenatal women were screened for GDM after excluding pre gestational diabetes. After obtaining an informed consent, detailed history and examination findings were noted. Associated complications were also noted. Later, irrespective of their last meal, antenatal women were given 75 gm oral glucose load and venous plasma glucose was drawn at 2 hours. Antenatal women with 2 hours plasma glucose > 140mg/dl (DIPSII criteria) underwent 100 gm Glucose tolerance test as per Carpenter and Coustan Criteria to confirm Gestational Diabetes Mellitus. All antenatal women were followed up throughout pregnancy as per standard protocol. Appropriate management for GDM and foetal surveillance was done.

The parameters taken into account were age, family history of diabetes, past history of GDM, gravidity, maternal BMI, blood sugar levels after DIPSII, BSL after Carpenter and Coustan criteria where relevant, mode of delivery, neonatal birth weight, APGAR score, requirement of NICU admission. Quantitative data was presented with the help of Mean and Standard deviation. Comparison among the study group was done with the help of unpaired 't' test as per results of normalcy test. Qualitative data was presented with the help of frequency and percentage table. Association among the study group

was assessed with the help of Fisher's test, Student 't' test and Chi square test. 'p' value less than 0.05 was taken significant.

RESULTS

It was prospective cross sectional study including 504 antenatal women. The mean maternal age was 24.43 ± 4.06 years and the mean BMI $24.03 \pm 3.10\text{kg/m}^2$. Among 504 subjects, 4.76% had family history of diabetes mellitus.

Among the women with GDM, statistically significant association exists with factors like age >25 years, women with upper middle class by modified kuppuswami scale, Family history of diabetes, PIH, Polyhydramnios and NICU admission as per protocol (of department of neonatology) for babies of GDM mothers. 65.3% subjects in Gestational diabetes mellitus study group underwent LSCS which was statistically not significant.

Table 1: Association between various factors and GDM subjects

Factor	GDM (n=23) (%)	Non GDM (n=481) (%)
Age > 25 years	15 (65.2%)	158 (29.9%)
BMI > 25	19 (82.6%)	159 (29.1%)
Upper middle class	18 (78.1%)	200 (41.6%)
Family history	8 (34.8%)	16 (3.4%)
PIH	12 (52.2%)	6 (1.2%)
Polyhydramnios	8 (34.8%)	7 (1.4%)
NICU Admission	23 (100%)	25 (5.2%)

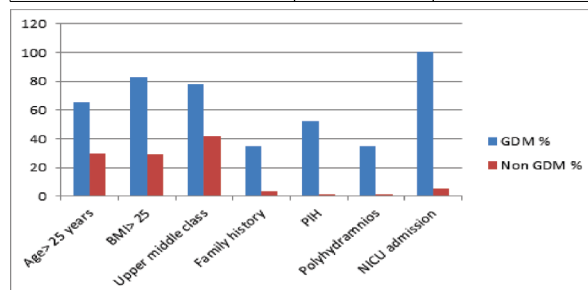
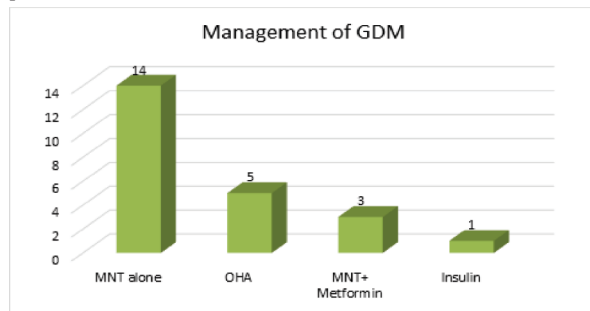


Fig 1: Association between various factors and GDM subjects

Glycemic control with medical nutrition was possible in 14 subjects with GDM (60.9%). Oral hypoglycemic agent was used in 5 GDM patients (21.7%). OHA along with MNT was started in 3 subjects(13.1%). Insulin was used in 1 GDM patient(4.3%).



DISCUSSION

As the prevalence of diabetes is rising as an epidemic, more women of childbearing age are at increased risk of diabetes during pregnancy⁴. The prevalence of GDM in our study was found to be 4.6% using carpenter and coustan criteria for diagnosis. Ferrara et al⁵ found prevalence of 4.8 % using carpenter and coustan criteria. GDM is found to be more prevalent in urban areas than in rural areas. However, Chanda S et al⁶ reported prevalence of 16.6% in rural population.

In our study, the prevalence proportion in age >25 years is 60.89% compared to 34.87% in age group <25 years. Similar studies by Seshiah et al⁷ and Kalra et al⁸ showed age \geq 25 years is a risk factor for GDM. Study by Kalyani KR et al⁹ also showed age \geq 25 as risk factor for GDM. So prevalence increases with the age. This supports the American Diabetes Association recommendation on the use of age 25 years as the cut off for screening. Thus age >25 years is a high risk factor for GDM. In our study, 82.6% women with Gestational diabetes mellitus had BMI \geq 25 kg/m². Similar studies by Seshiah et al⁷ and Kalra et al⁸ found that 21.4% and 67% of women with GDM, respectively, had BMI \geq 25 kg/m². Also Kalyani KR et al⁹ found that 96% women with GDM had BMI \geq 25 kg/m². It confirms that increased BMI is a risk factor for GDM. BMI is a modifiable risk factor. GDM women have high risk of developing diabetes in the future.¹⁰ They are the ideal group to be targeted for lifestyle modification to postpone the onset of overt Type 2 diabetes mellitus in later life. In our study family history of DM was found in 34.7% of GDM women. In studies by kalra et al⁸ and das et al¹¹, 33.33% of GDM women had family history of Diabetes mellitus. Williams MA et al¹² reported that family history of diabetes reflects genetic and behavioural factors whereby women may be predisposed to an increased risk of GDM. In our study higher prevalence of GDM was found in women belonging to upper middle class (78%). R rajput et al¹³ reported higher prevalence of GDM in women belonging to upper (25%) and upper middle class (16.8%) and it was statistically significant compared to women belonging to lower middle class and upper lower class.

In our study most common complication was pregnancy induced hypertension (52.2%) followed by polyhydramnios (34.8%). Chris L et al¹⁴ reported that gestational diabetic women found to be 1.5 fold increased risk of developing hypertensive disorders in pregnancy. Also Patil et al¹⁵ found that most common complication in GDM women was PIH (50%) followed by polyhydramnios (33.3%).

Kalra et al⁸ reported caesarean delivery rate of 78.8%. In our study also ,86% women with GDM underwent caesarean section.

In our study, none of the newborn of GDM mothers was macrosomic and IUGR. This can be because of good glycemic

control in antenatal period. y. At our centre, newborns of GDM mothers were observed in NICU as per protocols of department of neonatology.

CONCLUSION

Gestational Diabetes Mellitus is a growing concern in antenatal women. This medical complication is rising in prevalence not only in urban Indian women, but is also being seen in antenatal belonging to rural parts of India.

Universal screening using single step DIPSI 75 gm OGCT is an effective way of identifying these cases. Screening and diagnosis offered early in pregnancy can help prevent complications in both the mother and foetus. Screening for GDM must therefore be made part of Essential Obstetric Care. Age more than 25 years and family history of diabetes seems to be a risk factor for developing GDM. Women with BMI more than 25 are also at higher risk for developing GDM.

Early diagnosis and good glycemic control are effective in preventing foetal complications like macrosomia, which further curtails the rate of caesarian section in women with GDM.

Pre conceptional counselling to optimize the BMI, and age of conception (if possible) could perhaps help prevent the development of GDM and therefore it's associated complications.

Conflict Of Interest : None

REFERENCES

1. American Diabetes Association Classification and Diagnosis of Diabetes: Standards of Medical Care in Diabetes—2018. *Diabetes Care*. 2018;41:S13–S27. doi: 10.2337/dc18-S002.
2. International Diabetes Federation . IDF Diabetes Atlas. 8th ed. IDF; Brussels, Belgium: 2017.
3. Wild S, Roglic G, Green A et al. Global prevalence of diabetes: estimates for the year 2000 and projections for 2030. *Diabetes Care* 2004; 27: 1047-1053
4. Gary CF, Kenneth KJ, Bloom SL et al. Diabetes. In, Williams Obstetrics, 23rd edition. New York, McGraw Hill Medical Publisher, 2010; 1104-1125
5. Ferrara A, Hedderson MM, Quesenberry CP, Selby JV. Prevalence of gestational diabetes mellitus detected by the national diabetes data group or the carpenter and coustan plasma glucose thresholds. *Diabetes Care*. 2002 Sep;25(9):1625–30.
6. Chanda S, Dogra V, Hazarika N, Bambrath H, Sudke AK, Vig A, Hegde SK. Prevalence and predictors of gestational diabetes mellitus in rural Assam: a cross-sectional study using mobile medical units. *BMJ open*. 2020 Nov 1;10(11):e037836
7. Seshiah V, Balaji V, Balaji MS, Paneerselvam A, Arthi T, Thamizharasi M, Datta M. Prevalence of gestational diabetes mellitus in South India (Tamil Nadu): a community based study. *JAPL*. 2008 May 15;56:329-3.
8. 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
9. Kalyani KR, Jajoo S, Hariharan C, Samal S. Prevalence of gestational diabetes mellitus, its associated risk factors and pregnancy outcomes at a rural setup in Central India. *Int J Reprod Contracept Obstet Gynecol*. 2014;3(1):219-24
10. Gunderson EP. Breastfeeding after gestational diabetes pregnancy: Subsequent obesity and type 2 diabetes in women and their offspring. *Diabetes Care*. 2007;30:S161–8.
11. 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
12. Williams MA, Qiu CH, Dempsey JC, Luthy DA. Familial aggregation of type 2 diabetes and chronic hypertension in women with gestational diabetes mellitus. *The Journal of reproductive medicine*. 2003 Dec 1;48(12):955-62
13. Rajput R, Yadav Y, Nanda S, Rajput M. Prevalence of gestational diabetes mellitus & associated risk factors at a tertiary care hospital in Haryana. *The Indian journal of medical research*. 2013 Apr;137(4):728
14. Bryson CL, Ioannou GN, Rulyak SJ, Critchlow C. Association between gestational diabetes and pregnancy-induced hypertension. *American journal of epidemiology*. 2003 Dec 15;158(12):1148-53
15. Patil S, Sharma S. Role of DIPSI guidelines as a universal screening as well as diagnostic tool for gestational diabetes mellitus in rural tertiary health care centre