



PREVALENCE AND FETO-MATERNAL OUTCOMES IN GESTATIONAL DIABETES MELLITUS AT A TERTIARY CARE HOSPITAL

Dr Sanjana Patil

Assistant professor ,Mahadevappa Rampure Medical college, kalaburgi 585105, Karnataka.

Dr Rameshwari Malshetty*

Junior resident, Mahadevappa Rampure Medical college, kalaburgi kalaburgi 585105, Karnataka.*Corresponding Author

ABSTRACT

Gestational diabetes mellitus (GDM) is defined as any degree of glucose intolerance with the onset or first recognition during pregnancy with or without remission after the end of pregnancy. Worldwide prevalence of GDM is reported between 1.4 – 14 percent. The data regarding prevalence and outcomes of GDM will help in planning and allocation of resources and the preventive strategies at the hospital and community level. There are few studies conducted in this region describing the prevalence, associated risk factors, maternal and neonatal outcomes associated with GDM. This was retrospective study conducted at a tertiary care hospital in India. Data was obtained from January 2018 to January 2019. Women between 24-28 weeks of gestation were included in the study. The information collected included the following parameters: age, residence status, gravid status, family history of diabetes or history of diabetes in first degree relative, past history of GDM. Neonatal outcomes like stillbirths, macrosomia, hyperbilirubinemia were recorded. Most common age of presentation of GDM was 26-30 years. Gravida < 3 accounted for most of the cases. Urban residents accounted for 55.8% of the cases. Most of the cases of GDM had at least one risk factor like history of hypertension or diabetes mellitus. Most common adverse maternal outcome was cephalopelvic disproportion followed by Cesarean section and least common was abruptio placentae. Most common adverse fetal outcome was hyperbilirubinemia followed by macrosomia and least common was stillbirth. Early diagnosis and appropriate treatment of GDM will help in preventing maternal and fetal adverse outcomes and delay development of diabetes in high-risk individuals. The prevalence of GDM is going to increase in the near future exponentially, hence there is need for various community-based prevalence studies in different geographical regions of India to determine the exact prevalence and regional differences of GDM.

KEYWORDS : Type 2 diabetes mellitus, Post prandial dyslipidemia, Metabolic syndrome

INTRODUCTION

Gestational diabetes mellitus (GDM) is defined as any degree of glucose intolerance with the onset or first recognition during pregnancy with or without remission after the end of pregnancy [1]. Worldwide prevalence of GDM is reported between 1.4– 14 percent [2]. The prevalence of GDM is high in the Indian population as compared to other populations of southeast Asian [3] and varies from 3.8 to 21% in studies conducted in different geographical locations [4]. The regional differences in the prevalence of GDM is in correlation with type 2 diabetes. GDM is associated with higher risk of developing type 2 diabetes later in life [5].

There are wide number of morbidities with GDM, morbidities in mother include prolonged labour, gestational hypertension and in infants polycythemia, respiratory distress, hypoglycemia, growth restriction, hypocalcaemia and congenital malformations [6]. Adequate control of GDM is associated with improved perinatal outcome. Majority of the patients with GDM respond to diet therapy alone and very few require the addition of insulin [1-3]. In recent years the management of GDM has altered markedly. It is based on universal screening of blood glucose levels and achieving a tight control of glucose levels through home monitoring and glycosylated hemoglobin [7].

The data regarding prevalence and outcomes of GDM will help in planning and allocation of resources and the preventive strategies at the hospital and community level. The maternal and neonatal outcome in women with GDM can be improved, if a proper treatment plan is provided from the health care provider. Very few studies conducted in this region describing the prevalence, associated risk factors, maternal and neonatal outcomes associated with GDM. Hence the present study was conducted.

MATERIAL AND METHODS

The data was obtained from the medical records department from January 2018 to January 2019. Women between 24-28 weeks of gestation were included in the study. The Information collected included the following parameters: age, residence status, gravid status, family history of diabetes or history of diabetes in first degree relative, past history of GDM. Neonatal outcomes like stillbirths, macrosomia, hyperbilirubinemia were recorded. Women with serious medical disorders like heart, kidney, liver, pulmonary disorders, diabetes mellitus and hypertension were excluded from the study. GDM was diagnosed by OGTT using WHO criteria [8]. The information obtained

was recorded and analyzed using Microsoft Excel (2007 version). The results are explained in frequency and percentage.

RESULTS

Out of 5169 cases evaluated during the study period, 129 were diagnosed with GDM. The Prevalence was 2.4%. Urban residents accounted for 55.8% of the cases.

Table 1: Prevalence of risk factors in GDM cases

Risk factor	Number	Percentage
Age>25 years	62	48
Family history of diabetes mellitus	46	35.6
History of hypertension	34	26.3
History of perinatal losses	14	10.8
History of spontaneous abortions	11	8.5
History of macrosomia	09	6.9
History of caesarean section	19	14.7
Past history of GDM	23	17.8

All the cases of GDM had at least one risk factor.

Table 2: Maternal outcomes in GDM cases

Maternal Outcome	Number	Percentage
Caesarean delivery	61	47.2
Cephalopelvic disproportion	74	57.3
Assisted vaginal delivery	09	6.9
Shoulder dystocia	02	1.5
Pregnancy induced hypertension	41	31.7
Polyhydramnios	18	13.9
Abruptio placentae	03	2.3
Premature rupture of membranes	05	3.8

Most common adverse maternal outcome was cephalopelvic disproportion followed by Cesarean section and least common was abruptio placentae.

Table 3: Fetal outcomes in GDM cases

Fetal Outcome	Number	Percentage
Macrosomia	23	17.8

Hyperbilirubinemia	29	22.4
Hypoglycemia	03	2.3
NICU admission	14	10.8
Prematurity	19	14.7
IUGR	11	8.5
Stillbirth	02	1.5
Congenital anomaly	09	6.9
Respiratory distress	05	3.8

Most common adverse fetal outcome was Hyperbilirubinemia followed by Macrosomia and least common was stillbirth.

DISCUSSION

The prevalence of GDM in the present study was 2.4%. Studies conducted in India have reported prevalence ranging between 3.8 to 21% in different geographical locations [4]. The wide range of prevalence may be due to different demographic profile of the patients and different criteria for diagnosis of GDM. Other studies have also used WHO, ADDA, IADPG and DIPSI guidelines for diagnosis.

In the present study, women aged >25 years are three times more likely to develop GDM [9-11]. Primigravida and gravida <3 risk factor for development of GDM as reported by various studies [3, 9, 11, 9, 12, 13]. But some studies have shown the association between parity >2 and development GDM as statistically insignificant [14,15]. Urban patients formed 56% of the cases and rural 44%. This may be due to the fact that our hospital caters to both urban and rural places nearby.

The prevalence of risk factors for GDM are listed in table 1. All the GDM cases had at least one risk factor. The most common risk factors were age >25 years, family history of diabetes mellitus and history of hypertension. These risk factors have also been reported in various studies [3,11,16,17]. One important risk factor we did not include in the present study was obesity as measured by body mass index (BMI). As the present study was retrospective, we did not find the data (accurate height and weight from the records). Obesity is an important risk factor in the development of GDM. Higher prevalence of GDM in women with higher BMI has been reported in other studies [3,17, 18].

The most common adverse maternal outcome was cephalopelvic disproportion followed by Cesarean section and least common was abruptio placentae. Other studies have reported complication in varying percentages such as gestational hypertension, vaginal candidiasis, premature rupture of membranes, perineal tear and postpartum hemorrhage [19-21]. The rate of Cesarean section in the present study was 47.2%. Other studies have reported incidence of Cesarean section between 30% to 71% [21-23]. The main indications for Cesarean section in this study were maternal hypertension, macrosomia, non-progress of labor, failure of induction and previous history of cesarean sections.

The most common adverse fetal outcome was hyperbilirubinemia followed by macrosomia and least common was stillbirth. Similar fetal complications are reported by other studies [22, 24]. Macrosomia incidence has reported between 3% to 18% [21, 25], in the present study it was 17.8%. Hyperbilirubinemia incidence was 22%, is higher than other studies which have reported between 6% to 12% [21, 26]. The rate of NICU admission was 10.8%, but other studies have reported NICU admission rates of 16% and 28% [27, 28]. IUGR babies and stillbirth rate is lower than other studies [26-28]. Congenital anomalies (cleft lip and palate, hip dislocation, meningocele) incidence was 10.8%. One study reported same incidence of 10% [22] and other study 3.8% [24].

Some studies concluded that even very small fluctuations in glucose levels can result in abnormal fetal growth which can be easily prevented by simple but aggressive control of blood glucose level [29, 30]. The present study thus supports the findings that diabetes during pregnancy is a state of concern and is responsible for high maternal and fetal morbidity. Along with insulin therapy and lifestyle modifications, we need to broaden the research on GDM, a recent study conducted on efficacy of oral hypoglycemic agents, particularly glyburide and metformin, found to be useful in management of GDM [31]. Another study although for conducted for a short-term, has not shown any

adverse effect of these oral hypoglycemics on the fetus, which are increasingly being used in pregnancy [32]. More prospective randomized controlled trials are need on use of oral medications in GDM.

Limitations of the study

The was a retrospective study and we did not have a control group to compare. Future studies should be prospective, randomized and include a large sample size.

CONCLUSION

The prevalence of GDM was 2.4%. Most of the cases of GDM had at least one risk factor for GDM. The most common adverse maternal outcome was cephalopelvic disproportion. The most common adverse fetal outcome was hyperbilirubinemia. Early diagnosis and appropriate treatment of GDM will help in preventing maternal and fetal adverse outcomes and can delay in development of diabetes in high-risk individuals. The prevalence of GDM is going to increase in the near future, hence there is need for various community-based prevalence studies in different geographical regions of India to determine the exact prevalence of and regional differences of GDM.

Acknowledgement

We authors thanks the staff of medical records department for providing the case files.

Conflict of interest: None

REFERENCES

- Seshiah V, Das AK, Balaji V, et al. Diabetes in Pregnancy Study Group. Gestational diabetes mellitus-guidelines. *J Assoc Physicians India* 2006;54:622-8.
- American Diabetes Association. Diagnosis and classification of diabetes mellitus. *Diabetes Care*. 2010;33 Suppl 1:S62-9.
- Seshiah V, Balaji V, Balaji MS, et al. Prevalence of gestational diabetes mellitus in South India (Tamil Nadu)-A community based study. *J Assoc Physicians India* 2008;56:329-33.
- Divakar H, Tyagi S, Hosmani P. Diagnostic criteria influence prevalence rates for Gestational diabetes. *Perinatology* 2008;10:155-61.
- Mahalakshmi MM, Bhavadharini B, Kumar M, et al. Clinical profile, outcomes, and progression to type 2 diabetes among Indian women with gestational diabetes mellitus seen at a diabetes center in south India. *Indian J Endocrinol Metab* 2014;18:400-6.
- Opara PI, Jaja T, Onubogu UC. Morbidity and mortality amongst infants of diabetic mothers admitted into a special care baby unit in Port Harcourt, Nigeria. *Ital J Pediatr* 2010;36:77.
- Sendag F, Terek MC, Ilil M, Oztekin K, Bilgin O. Maternal and perinatal outcomes in women with gestational diabetes mellitus as compared to nondiabetic controls. *J Reprod Med* 2001;46(12):1057-62.
- Definition, Diagnosis and Classification of Diabetes Mellitus and its Complications Report of a WHO Consultation, Part 1: Diagnosis and Classification of Diabetes Mellitus. Geneva: World Health Organization; 1999. p. 1-59.
- Kale SD, Kulkarni SR, Lubree HD, Meenakumari K, Deshpande VU, Rege SS, et al. Characteristics of gestational diabetic mothers and their babies in an Indian diabetes clinic. *J Assoc Physicians India* 2005;53:857-63.
- Seshiah V, Balaji V, Balaji MS, Sekar A, Sanjeevi CB, Green A. One step procedure for screening and diagnosis of gestational diabetes mellitus. *J Obstet Gynecol India* 2005;55:525-9.
- Zargar AH, Sheikh MI, Bashir MI, et al. Prevalence of gestational diabetes mellitus in Kashmiri women from the Indian subcontinent. *Diabetes Res Clin Pract* 2004;66:139-45.
- Verma AK, Singh B, Mengi V. Gestational diabetes in rural women of Jammu. *Indian J Community Med* 2008;33:54-5.
- Raja MW, Baba TA, Hanga AJ, et al. A study to estimate the prevalence of gestational diabetes mellitus in an urban block of Kashmir valley (North India). *Int J Med Sci Public Health* 2014;3:191-5.
- Jang HC, Min HK, Lee HK, Cho NH, Metzger BE. Short stature in Korean women: a contribution to the multifactorial predisposition to gestational diabetes mellitus. *Diabetologia* 1998;41: 778-83.
- Rajput R, Yadav Y, Nanda S, Rajput M. Prevalence of gestational diabetes mellitus and associated risk factors at a tertiary care hospital in Haryana. *Indian J Med Res* 2013;137:728-33.
- Metzger BE, Buchanan TA, Coustan DR, et al. Summary and recommendations of the Fifth International Workshop-Conference on Gestational Diabetes Mellitus. *Diabetes Care* 2007;30:S251-60.
- Torloni MR, Betran AP, Horta BL, et al. Pre-pregnancy BMI and the risk of gestational diabetes: a systematic review of the literature with meta-analysis. *Obes Rev* 2009;10:194-203.
- Swami SR, Mehete R, Shivane V, et al. Prevalence of carbohydrate intolerance of varying degrees in pregnant females in western India (Maharashtra) - A hospital-based study. *J Indian Med Assoc* 2008;106:712-4.
- Gajjar F, Maitra K. Intrapartum and perinatal outcomes in women with gestational diabetes and mild gestational hyperglycemia. *J Obstet Gynaecol India* 2005;55:135-7.
- El-Mallah KO, Narchi H, Kulaylat NA, Shaban MS. Gestational and pre-gestational diabetes: Comparison of maternal and fetal characteristics and outcome. *Int J Gynaecol Obstet* 1997;58:203-9.
- Kalra P, Kachhwaha CP, Singh HV. Prevalence of gestational diabetes mellitus and its outcome in western Rajasthan. *Indian J Endocr Metab* 2013;17:677-80.
- Saxena P, Tyagi S, Prakash A, Nigam A, Trivedi SS. Pregnancy outcome of women with gestational diabetes in a tertiary level hospital of North India. *Indian J Community Med* 2011;36:120-3.
- Sreelakshmi PR, Nair S, Soman B, Alex R, Vijayakumar K, Kutty VR. Maternal and neonatal outcomes of gestational diabetes: A retrospective cohort study from Southern India. *J Family Med Prim Care* 2015;4:395-8.
- Shefali AK, Kavitha M, Deepa R, Mohan V. Pregnancy outcomes in pre-gestational and gestational diabetic women in comparison to non-diabetic women- A prospective study in Asian Indian mothers (CURES-35). *J Assoc Physicians India* 2006;54:613-8.

- 25) Hong JU, Rumbold AR, Wilson KJ, Crowther CA. Borderline gestational diabetes mellitus and pregnancy outcomes. *BMC Pregnancy Childbirth* 2008;8:31.
- 26) Madi JM, Viecceli C, Barazzetti DO, Pavan G, Triches CB, Araújo BF. Gestational diabetes and perinatal outcomes: A case control study. *Journal of Medicine and Medical Science* 2011;2:1022-7.
- 27) Ostlund I, Hanson U, Björklund A, Hjertberg R, Eva N, Nordlander E, et al. Maternal and fetal outcomes if gestational impaired glucose tolerance is not treated. *Diabetes Care* 2003 Jul;26(7):2107-2111.
- 28) Gasim T. Gestational Diabetes Mellitus: Maternal and Perinatal Outcomes in 220 Saudi Women. *Oman Medical Journal* 2012;27(2):140-4.
- 29) Bonomo M, Corica D, Mion E, et al. Evaluating the therapeutic approach in pregnancies complicated by borderline glucose intolerance: a randomized clinical trial. *Diabet Med* 2005;22(11):1536-41.
- 30) Landon MB, Spong CY, Thom E, et al. Eunice Kennedy Shriver National Institute of Child Health and Human Development Maternal-Fetal Medicine Units Network. A multicenter, randomized trial of treatment for mild gestational diabetes. *N Engl J Med* 2009;361(14):1339-48.
- 31) Paglia MJ, Coustan DR. The use of oral antidiabetic medications in gestational diabetes mellitus. *Curr Diab Rep* 2009;9(4):287-90.
- 32) Serlin DC, Lash RW. Diagnosis and management of gestational diabetes mellitus. *Am Fam Physician* 2009;80(1):57-62.