

Original Research Article

Proportion of Overt Diabetes among Women Who had Gestational Diabetes Mellitus : A Cross Sectional Study at a Tertiary Care Hospital, Mandya

Dr. Amar Prakash Arvind¹, Dr. Darshan M.L.², Dr. Anikethana G.V.³

¹Assistant Professor, Department of General Medicine, Mandya Institute of Medical Sciences (MIMS), Mandya, Karnataka, India.

²Second Year Postgraduate, Department of General Medicine, Mandya Institute of Medical Sciences (MIMS), Mandya, Karnataka, India.

³Assistant Professor, Department of General Medicine, Mandya Institute of Medical Sciences (MIMS), Mandya, Karnataka, India.

Corresponding Author

Dr. Darshan M.L., Second Year Postgraduate, Department of General Medicine, Mandya Institute of Medical Sciences (MIMS), Mandya, Karnataka, India.

Received: 14-05-2024 / Revised: 20-05-2024 / Accepted: 28-06-2024

ABSTRACT

Background

Gestational Diabetes Mellitus (GDM) is defined as carbohydrate intolerance of variable severity with its onset or first recognition during pregnancy. GDM has its effect both on the pregnant women and the fetus, like- higher rates of cesarean deliveries, pregnancy induced hypertension and higher risk of developing Type 2 Diabetes in future.

Objective

To estimate proportion of Overt Diabetes among Pregnant women who were diagnosed with Gestational Diabetes Mellitus and to evaluate awareness regarding screening for Overt Diabetes in women who were diagnosed with Gestational Diabetes Mellitus.

Methods

It is a cross sectional observational study where details of the pregnant women who were diagnosed to have Gestational Diabetes Mellitus delivered during the period January 2022 to December 2022 is taken from medical records. Through phone call participants are interrogated about the screening for Type 2 Diabetes Mellitus at or after 6-12 weeks of post partum and annually thereafter and the details of the same will be noted. Those who are not screened for the Type 2 Diabetes Mellitus at or after 6-12 weeks of post partum will be advised to undergo screening for the same and followed up accordingly.

Results

Progression to Dysglycemia (Over Diabetes Mellitus and impaired glucose tolerance) among GDM women is nearly 26% within 2 years post-delivery. Among the women who developed diabetes, 72% had a history of insulin administration during pregnancy. Despite this rapid conversion rate, 42% of GDM women did not undergo screening as per the protocol, with the major reasons being a lack of awareness about the risk of conversion to overt diabetes and inadequate counseling regarding the screening protocols post-delivery.

Conclusion

In Indian women with GDM, progression to type 2 Diabetes mellitus is high. Hence measures

should be taken to provide proper counseling to women with GDM about the risk of converting to Overt Diabetes and the need for screening.

Keywords: Gestational Diabetes Mellitus , progression to Type 2 Diabetes Mellitus.

INTRODUCTION

Gestational Diabetes Mellitus (GDM) is defined as carbohydrate intolerance of variable severity with its onset or first recognition during pregnancy.^[1]

Indian women have 11-fold increased risk of developing glucose intolerance during pregnancy compared to Caucasian women. The recent data on the prevalence of GDM in our country is 16.55%.^[2]

GDM has its effect both on the pregnant women and the fetus, like- higher rates of cesarean deliveries, pregnancy induced hypertension and higher risk of developing Type 2 Diabetes in future. Fetal complications includes- Macrosomia, shoulder dystocia, respiratory distress (due to surfactant deficiency), increased risk of developing Type 2 Diabetes Mellitus, Hypertension and obesity later in adulthood.^[3]

Conversion to dysglycemic in later part of life in women with Gestational Diabetes is attributed to several risk factors like- increasing maternal age, BMI, family history of Type 2 Diabetes Mellitus, previous history of GDM, HbA1c, weight gain during pregnancy, insulin treatment during pregnancy and birth weight of the baby.^[4]

Prevalence rate of Diabetes in GDM women is 13 times higher than that in normal mothers. For each year after delivery, the incidence of Type 2 Diabetes Mellitus increases by 12%.^[5]

South Asian women with GDM has the greatest risk of being subsequently diagnosed with Diabetes. Despite of increased prevalence of overt diabetes in GDM, studies till now suggest that women with GDM may not be informed about implications of their diagnosis, risk of converting to Overt Diabetes, screening for the same and how to reduce the risk of diabetes or about the advantages of lifestyle modifications. ^[6,7,8]

MATERIALS AND METHODS

Methodology

It is a cross sectional observational study where details of the pregnant women who were diagnosed to have Gestational Diabetes Mellitus delivered during the period January 2022 to December 2022 is taken from medical records. Through phone call participants are interrogated about the screening for Type 2 Diabetes Mellitus at or after 6-12 weeks of post partum and annually thereafter and the details of the same will be noted. Those who are not screened for the Type 2 Diabetes Mellitus at or after 6-12 weeks of post partum will be advised to undergo screening for the same and followed up accordingly.

Study population

Women with history of GDM in pregnancy who were admitted and delivered in the year 2022 at MIMS Mandya.

Sample Size

Here, Sample size is calculated by using the formula, based on one of the previous studies by Balaji Bhavadharini, et al.^[3]

$$N = Z^2 \times P(1-P) / d^2$$

Z= standard normal variate (1.96)

P= prevalence of dysglycemia in women with history of Gestational Diabetes Mellitus is 38.1%.

D= Relative Error of 20% is 7.62

$$N = 1.96 \times 1.96 \times 38.1 \times 62.9 / 7.62^2 = 156.03$$

Rounded off to 156

Hence, sample size is 156.

Sampling Method

Consecutive enrollment of study participants based on in-patients records from Medical Record Department pertaining to admission of pregnant women diagnosed with GDM and delivered during the period January 2022 to December 2022, till the sample size is met.

Inclusion Criteria

1. Women diagnosed with GDM who were admitted in MIMS hospital and delivered during the period January 2022 to December 2022.
2. Patients willing to give informed consent to participate in the study.

Exclusion Criteria

1. Pregnant women with history of abortion, still births etc.
2. Pregnant women with documented pancreatic disorders.
3. Pregnant women who were diagnosed with Type 1 Diabetes Mellitus during pregnancy.

Statistical analysis

All collected data will be entered in excel sheet and the data will be statistically analyzed by using IBM SPSS software trial version 24. Descriptive statistical tests like proportion, percentage of categorical data, mean, standard deviation for quantitative data like Age, duration of Diabetes Mellitus and inferential statistical tests like chi square test to know the association of Age group, pregnancy, Gestational Diabetes Mellitus, parity and family history of Diabetes Mellitus with Diabetes Mellitus status and also awareness of Diabetes Mellitus after pregnancy. Significance level will be considered at 5 % ($p < 0.05$).

RESULTS

Parameters (n=156)	
Age	<25yrs-38 25-30yrs-92 >30yrs- 27
Family History of Diabetes	93 (60%)
Parity	Primiparous-82 Multiparous-74
Prior history of GDM in multiparous women	36
Treatment for GDM	Insulin- 65 Insulin+Oral drugs- 24 Oral drugs- 67
Underwent screening at or after 6-12weeks and yearly thereafter	86 (55%)
Not underwent screening	70 (44%)

Status after delivery	Number	Treatment taken during pregnancy

Diabetes	36(23%)	Insulin-26 Oral medication-10
✓ Underwent screening at or after 6-12weeks and yearly thereafter	25	Oral medication-8 Insulin- 17
✓ Not underwent screening	11	Oral medications- 2 Insulin- 9
Impaired Glucose Tolerance	5	Oral medications-4 Insulin-1

DISCUSSION

Main findings

In the present cross-sectional observational study, the rate of conversion to Dysglycemia (Over Diabetes Mellitus and Impaired Glucose Tolerance) among GDM women is nearly 26%. Among the women who developed diabetes, 72% had a history of insulin administration during pregnancy. 42% of GDM women did not undergo screening as per the protocol, with the major reasons being a lack of awareness about the risk of conversion to overt diabetes and inadequate counseling regarding the screening protocols post-delivery.

Comparison with previous studies

The various studies conducted across South India, Chennai, Pune, Delhi and South Asia between 1991 to 2011 revealed that women with history of Gestational Diabetes Mellitus in pregnancy has increased risk developing Type 2 Diabetes Mellitus in later part of life with prevalence being 20 to 40%. The risk increases progressively each year after pregnancy and it is attributed to various risk factors like increasing maternal age, previous history of GDM and family history of Type 2 Diabetes Mellitus etc. Crude prevalence of Diabetes in women with history of GDM is almost 13 times higher than that in normal mothers. South Asian women has increased propensity to develop Diabetes when compared to other population.^[3,4,5,7,8]

The various studies conducted across Delhi and France revealed that less than 25% of women with GDM undergo screening for Type 2 Diabetes Mellitus and thus the awareness regarding need of postpartum glucose tolerance testing and its importance is lacking. Thus general population should be educated about Type 2 Diabetes Mellitus, its antecedent complications, sensitization about importance of postpartum screening for Diabetes Mellitus and also about advantages of lifestyle modifications.^[6,7]

STRENGTHS AND LIMITATIONS

The limitations of the study were that the assessment of glycemic status among patients who were not previously screened was based on fasting or random blood glucose levels and most of them did not get their HbA1c levels assessed. The strengths include assessment of awareness regarding the knowledge of conversion to overt diabetes among GDM women and their awareness of screening methods.

CONCLUSION

In Indian women with GDM, progression to Type 2 Diabetes Mellitus is high. Hence measures should be taken to provide proper counseling to women with GDM about the risk of converting to Overt Diabetes and the need for screening.

REFERENCES

1. Cunningham FG, Leveno KJ, Dashe JS, Hoffman BL, Spong CY, Casey BM, et al.

- Williams obstetrics. New York: McGraw Hill;26th ed; 2022:1068 -85.
2. Seshiah V, Das AK, Balaji V, Joshi SR, Parikh MN, Gupta S. Gestational diabetes mellitus-guidelines. JAPI. 2006 Aug;54(622).
 3. Mahalakshmi MM, Bhavadharini B, Kumar M, Anjana RM, Shah SS, Bridgette A, 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 journal of endocrinology and metabolism. 2014 May;18(3):400.,
 4. Bhavadharini B, Anjana RM, Mahalakshmi MM, Maheswari K, Kayal A, Unnikrishnan R, et al. Glucose tolerance status of Asian Indian women with gestational diabetes at 6 weeks to 1 year postpartum (WINGS-7). Diabetes Research and Clinical Practice. 2016 Jul 1;(117):22-7.
 5. Kale SD, Yajnik CS, Kulkarni SR, Meenakumari K, Joglekar AA, Khorsand N, et al. High risk of Diabetes and metabolic syndrome in Indian women with Gestational Diabetes Mellitus. Diabetic medicine. 2004 Nov;21(11):1257-8.
 6. Rph CL, Tinong RT. The Incidence and Management of Type 2 Diabetes Mellitus After Gestational Diabetes Mellitus. Cureus. 2023 Aug 31;15(8).
 7. Jindal R, Siddiqui MA, Gupta N, Wangnoo SK. Prevalence of glucose intolerance at 6 weeks postpartum in Indian women with Gestational Diabetes Mellitus. Diabetes & Metabolic Syndrome: Clinical Research & Reviews. 2015 Jul 1;9(3):143-6.
 8. Mukerji G, Chiu M, Shah BR. Impact of Gestational Diabetes on the risk of Diabetes following pregnancy among Chinese and South Asian women. Diabetologia. 2012 Aug;(55):2148-53