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ORIGINAL RESEARCH

The relationship between foetal birth weight and gestational diabetes mellitus in pregnant women of Udaipur

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ABSTRACT
The impact of gestational diabetes mellitus (GDM) and varying time-point glucose levels on foetal birth weight may differ. The purpose of this prospective cohort study was to further assess the relationships between foetal birth weight and GDM and various time-point blood glucose levels.

Keywords- Gestational diabetes mellitus; Macrosomia; birth weight

INTRODUCTION

Any level of glucose intolerance that begins or is initially identified during pregnancy is known as gestational diabetes mellitus (GDM), a common pregnancy-related medical condition.[1] Globally, the prevalence of GDM is rising.[2, 3] among 2013, the global prevalence of GDM among pregnant women aged 20–49 years was 14.2%. The Southeast Asia region had the greatest prevalence, at 20.9%, while the North America and Caribbean region had the lowest, at 9.9%.[4.] Between 1999 and 2008, the prevalence of GDM in South Asia grew by 2.8 times[.5]. It is commonly acknowledged that GDM is linked to a higher risk of several negative maternal and new-born outcomes, both short- and long-term.

Shoulder dystocia, caesarean delivery, macrosomia, large for gestational age, hypocalcaemia, hyperbilirubinemia, and other short-term negative consequences are among them. Long-term effects for mothers and their children include a higher chance of obesity, cardiovascular disease, and type 2 diabetes.[6. 7. 8. 9.]

The most frequent unfavourable consequence of pregnancy exacerbated by GDM is macrosomia, often known as large for gestational age .[10.] Many studies have examined the relationship between GDM and foetal birth weight (macrosomia or large for gestational age), with conflicting and equivocal findings. GDM may raise the risk of macrosomia (RR = 1.81, 95% CI 1.47–2.22) and L large for gestational age (RR = 1.53, 95% CI 1.39–1.69) according to the WHO criteria, according to one meta-analysis; however, there was insufficient information for the International Association of the Diabetes in Pregnancy Study Group (IThe International Association of the Diabetes and Pregnancy Study Groups) criteria, and correlations varied amongst studies (I2 = 93%).[6]. GDM may potentially raise the risk of macrosomia, according to another meta-analysis (OR = 1.71, 95% CI: 1.52-1.94).1[1].Numerous other investigations, however, failed to identify any connections between GDM and large for gestational age, macrosomia, or birth weight. The numbers [12, 13, 14, 15, 16, 17 and 18.]

Therefore, additional research is required to clarify these correlations. Furthermore, only a small number of studies have calculated the relationship between foetal birth weight and various time-point blood glucose levels during pregnancy, including blood glucose during the first trimester, fasting plasma glucose , and 1 or 2 hours of plasma glucose in the oral glucose tolerance test during the second trimester. We hypothesised that the effects of GDM and various time-point glucose levels on foetal birth weight could differ.

Thus, the purpose of this investigation was to further assess, in a prospective cohort study conducted in

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Udaipur, the relationships between GDM and various time-point blood glucose levels and foetal birth weight (birth weight, macrosomia, or large for gestational age).

OBJECTIVES

- To assess the relationships between Gestational diabetes mellitus and various time-point blood glucose levels
- To assess the relationships betweenGestational diabetes mellitusand foetal birth weight (birth weight, macrosomia, or large for gestational age).

MATERIAL AND METHOD

Over the course of two years, this prospective cohort study was carried out. Using a stratified sampling strategy, the estimated sample size was determined to be 140 pregnant women. Pregnant women with a gestational age of 8–13 weeks who attended prenatal clinics, women above the age of 18, women who were single-parents, and women who had never been diagnosed with diabetes before were all included in the study. The study excluded women with diabetes diagnosed during or after pregnancy, those with multiple gestations, those with Hb < 8 gm/dl, and those with any concomitant disorders, including PIH, thyroid, and heart abnormalities. Then the birth weight of the babies were recorded in both high risk and low risk group Using the pre-structured proforma, data was gathered. Every patient gave their informed permission. The statistical software for social studies, or SPSS, was used to analyse the data. Data analysis was done using SPSS (statistical package for social studies) software and appropriate statistical test was use. P value < 0.05 was used as the level of significance.

RESULT

Table 1: Birth weight among the study group

Birth weight	High risk group	Low risk group	Total	P value
< 3.5 kg	60 82.2%	60 89.6%	120 85.7%	0.23
>= 3.5 kg	13 17.8%	7 10.4%	67 47.9%	
Total	73 100.0%	67 100.0%	140 100.0%	

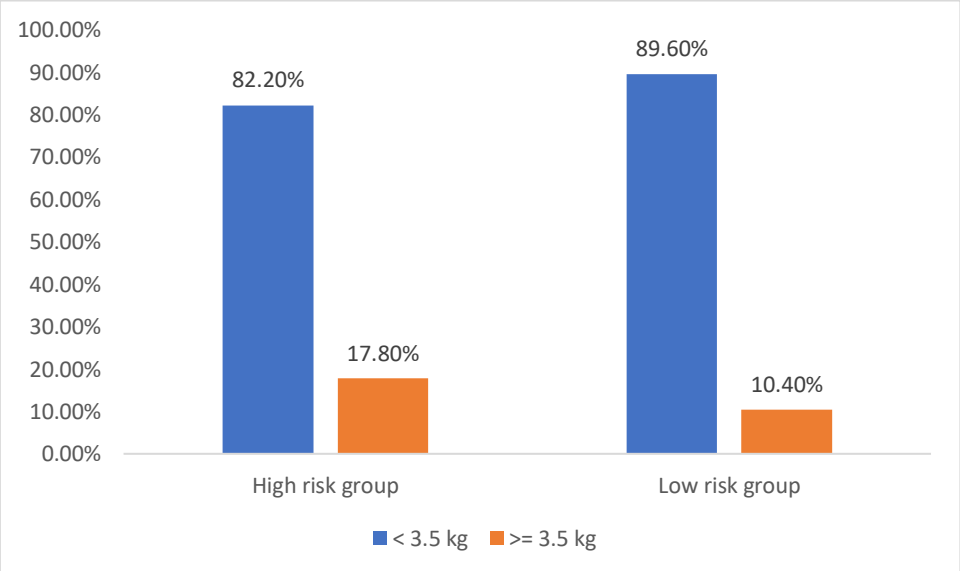

Figure 1: Birth weight

Table 1 and figure 1 shows birth weight. Result shows that in high risk group 82.2% of the study participants had <3.5kg of birth weight and 17.8% had >=3.5kg of birth weight. In low risk group 89.6 % of the study participants had <3.5kg of birth weight and 47.9 % had >=3.5kg of birth weight. There was no statistically significant difference across two group (p value = 0.23).

DISCUSSION

The present study was conducted to predict early risk for GDM during 1st trimester of pregnancy which may offer a unique opportunity for earlier interventions, also To assessthe relationships between GDM and various time-point blood glucose levels To assess the relationships between GDM and foetal birth weight (birth weight, macrosomia, or large for gestational age).Our study was conducted over 2 years among 140 pregnant women.Result shows that in high-risk group 82.2% of the study participants had <3.5kg of birth weight and 17.8% had >=3.5kg of

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birth weight. In low-risk group 89.6 % of the study participants had <3.5kg of birth weight and 47.9 % had >=3.5kg of birth weight. There was no statistically significant difference across two groups (p-value = 0.23). In a study conducted by Valadan M et al[19] birth weight in the GDM group was 3519.13 ± 301.91 grams and in the non-GDM group was 3307.06 ± 192.46 grams.

In a study conducted by Mane Laura et al[20] found an association between elevated early HbA1c levels and pre-eclampsia, large for gestational age (large for gestational age), macrosomia, and preterm delivery (RR 2.02, 95% CI 1.53–2.66; RR 1.38, 95% CI 1.15–1.66; RR 1.40, 95% CI 1.07–1.83; and RR 1.67, 95% CI 1.39–2.0, respectively) was shown, with a moderate–high grade of certainty. According to the subgroup analysis of all studies, large for gestational age, pre-eclampsia, and labour induction were associated with elevated HbA1c levels only in studies using an HbA1c threshold >39 mmol/mol (5.7%).

CONCLUSION

Higher birth weight and a higher incidence oflarge for gestational age and macrosomia were substantially correlated with GDM. Rather than FBG, postload glucose levels had a greater impact on foetal growth. Furthermore, birth weight and the likelihood of large for gestational age and macrosomia were strongly impacted jointly by varying time-point blood glucose levels.

REFERENCES

1. K.J. Hunt *et al.*The increasing prevalence of diabetes in pregnancyObstet Gynecol Clin North Am(2007)
2. L.L. Lipscombe *et al.*Trends in diabetes prevalence, incidence, and mortality in Ontario,Canada 1995–2005: a population-based studyLancet(2007)
3. L. Guariguata *et al.*Global estimates of the prevalence of hyperglycaemia in pregnancyDiabetes Res Clin Pract(2014)
4. E.A. Reece *et al.*Gestational diabetes: the need for a common groundLancet(2009)
5. N. Weintrob *et al.*Short- and long-range complications in offspring of diabetic mothersJ Diabetes Complications(1996)
6. J. Ogonowski *et al.*Factors influencing risk of macrosomia in women with gestational diabetes mellitus undergoing intensive diabetic careDiabetes Res Clin Pract(2008)
7. P.M. Catalano *et al.*Perinatal risk factors for childhood obesity and metabolic dysregulationAm J Clin Nutr(2009)
8. Y. Zhu *et al.*Growth and obesity through the first 7 y of life in association with levels of maternal glycemia during pregnancy: a prospective cohort studyAm J Clin Nutr(2016)
9. Xiong *et al.*Gestational diabetes mellitus: prevalence, risk factors, maternal and infant outcomes Int J Gynaecol Obstet (2001)
10. Association ADDiagnosis and classification of diabetes mellitus Diabetes Care(2014)
11. F. Zhang *et al.*Increasing prevalence of gestational diabetes mellitus in Chinese women from 1999 to 2008Diabet Med(2011)
12. E.M. Wendland *et al.*Gestational diabetes and pregnancy outcomes—a systematic review of the World Health Organization (WHO) and the International Association of Diabetes in Pregnancy Study Groups (IADPSG) diagnostic criteriaBMC Pregnancy Childbirth(2012)
13. C. KimGestational diabetes: risks, management, and treatment optionsInt J Womens Health(2010)
14. X.J. He *et al.*Is gestational diabetes mellitus an independent risk factor for macrosomia: a meta-analysis?Arch Gynecol Obstet(2015)
15. A.B. Konig *et al.*Gestational diabetes outcome in a single center study: higher BMI in children after six monthsHormMetab Res(2014)
16. M.T. Pham *et al.*Risk of childhood obesity in the toddler offspring of mothers with gestational diabetesObstet Gynecol(2013)
17. N. Regnault *et al.*Sex-specific associations of gestational glucose tolerance with Childhood Body CompositionDiabetes Care(2013)
18. C.S. Wright *et al.*Intrauterine exposure to gestational diabetes, child adiposity, and blood pressureAm J Hypertens(2009)
19. Valadan M, Bahramnezhad Z, Golshahi F, Feizabad E. The role of first-trimester HbA1c in the early detection of gestational diabetes. BMC Pregnancy Childbirth. 2022 Jan 27;22(1):71. doi: 10.1186/s12884-021-04330-2. PMID: 35086491; PMCID: PMC8793236.
20. Mañé, Laura, Humberto Navarro, Juan Pedro-Botet, Juan José Chillarón, Silvia Ballesta, Antonio Payà, Verónica Amador, Juana Antonia Flores-Le Roux, and David Benaiges. 2024. "Early HbA1c Levels as a Predictor of Adverse Obstetric Outcomes: A Systematic Review and Meta-Analysis" *Journal of Clinical Medicine* 13, no. 6: 1732. https://doi.org/10.3390/jcm13061732