

ORIGINAL RESEARCH

A clinical study on investigation of gestational diabetes mellitus and rate of pre-eclampsia

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ABSTRACT

Introduction: The symptoms of these diseases may go away early when the pregnancy ends, but because of changes in the body, women who have had GDM or preeclampsia are at a significant risk of acquiring type 2 diabetes or persistent hypertension. **Materials & Methods:** Information about the patient and their medical history was collected, and a general physical and local examination was performed. Patients were assigned treatment based on their blood glucose levels; they received either medical nutritional therapy or a combination of insulin and MNT. **Results:** There were 15 participants with GDM and PE and 22 participants with GDM without PE in their first pregnancy. In their second pregnancy, there were 10 participants with GDM and PE and 10 participants without PE. In their third pregnancy, there were 3 participants with GDM and PE and 6 participants without PE. In their fourth pregnancy and beyond, there were 2 participants with GDM and PE and 4 participants without PE. The difference was notable ($P < 0.05$). **Conclusion:** Considering the negative effects reported in patients with borderline AFI and the lack of clear data and specific guidelines regarding delivery for those with borderline AFI, it is recommended to closely monitor and conduct antepartum surveillance for these patients.

Keywords: gestational, diabetes mellitus, pre-eclampsia

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INTRODUCTION

Global GDM is a notable public health issue. Gestational diabetes mellitus (GDM) can result in negative effects on the health of the foetus, such as neonatal jaundice, stillbirths, and macrosomia. It also has an impact on the health of the mother. Gestational diabetes mellitus (GDM) can result in maternal problems such as pre-eclampsia, the requirement for a caesarean delivery, and respiratory distress. The risk of acquiring diabetes in mothers with GDM increases by 10% immediately after delivery.¹ Research indicates that children born to moms with GDM have a much higher risk of developing diabetes later in life, ranging from four to eight times higher compared to their siblings born to the same parent without GDM.² Various organisations, including O'Sullivan, the American Diabetes Association (ADA), the Australian Diabetes in Pregnancy Society (ADIPS), Carpenter-Coustan (CC), the International Association of the Diabetes and Pregnancy Study Groups (IADPSG), and the International Classification of Diseases (ICD), have created diagnostic criteria.³ The

diagnostic criteria differ in terms of the methods used for screening and the threshold for screening. The diagnosis of GDM mainly relies on the findings of an oral glucose tolerance test (OGTT).⁴ The OGTT can be done using either a 75-gram two-hour test or a 100-gram three-hour OGTT. The 75-gram two-hour oral glucose tolerance test (OGTT) is considered a single-step method, but the 100-gram three-hour OGTT is typically used as the second stage in a two-step technique.⁵ A diagnosis of GDM is determined when a single glucose measurement is higher than normal during the 75-gram two-hour oral glucose tolerance test (OGTT).

Despite their clinical manifestation and diagnostic criteria not overlapping, there have been numerous studies indicating a link between preeclampsia and GDM, suggesting that they may not be independent disease entities. Miyakoshi and colleagues.⁶ Examined the perinatal results of expectant mothers with slight glucose intolerance or GDM and observed considerably elevated incidence of preeclampsia. Likewise, preeclampsia is believed to be associated

with the level of glucose intolerance.⁷⁻⁹ Schneider et al.¹⁰ Identified shared risk factors for both illnesses include older maternal age, never having given birth before, having many pregnancies, and having a higher body mass index before being pregnant. The presumed cause of the disorders sharing the same underlying pathophysiology is vascular endothelial dysfunction.¹¹⁻¹³ The clinical symptoms of these diseases may resolve early after the pregnancy ends. However, due to changes in the body's systems, women who have had gestational diabetes or preeclampsia are at a significant risk of acquiring type 2 diabetes or chronic hypertension.¹⁴ Both of these disorders impact the health of the mother and any subsequent pregnancy as a result.

MATERIALS & METHODS

The current research was carried out on 188 women who had gestational diabetes, which was confirmed using the guidelines provided by the International Association of Diabetes and Pregnancy Study Groups (IADPSG) in 2011 and the recommendations of the American Diabetes Association (ADA). Information about the patient and their medical history was collected, and a general physical examination was performed. Patients were assigned treatment based on their blood glucose levels; they

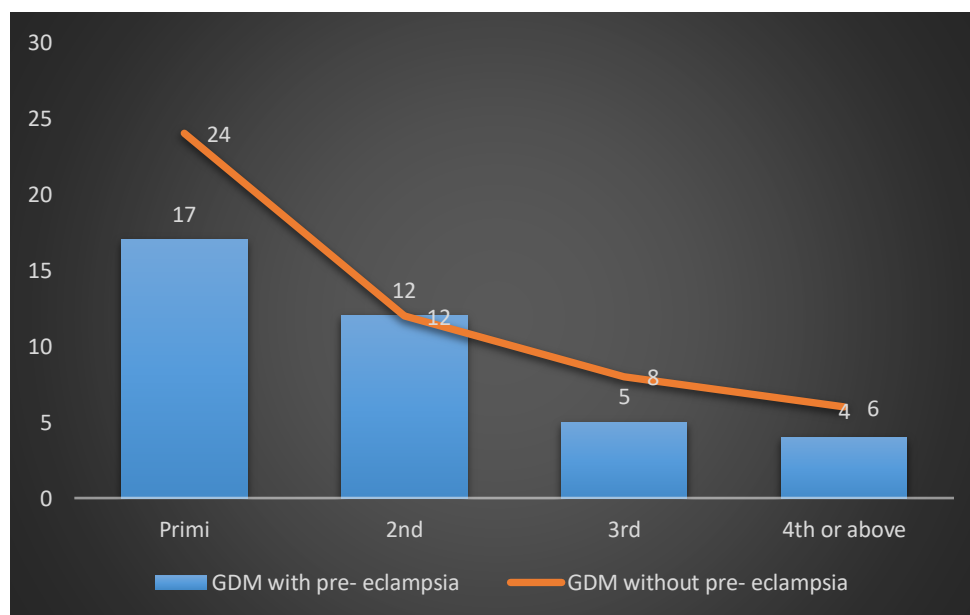
received either medical nutritional therapy or a combination of insulin and MNT. Regular blood tests, blood pressure measurements, and changes in weight were assessed at every appointment. Every female participant was requested to consume 75 grammes of dehydrated glucose that was dissolved in 300 millilitres of water within a time frame of 5 to 10 minutes. Following a 2-hour period of consuming glucose, we assessed blood glucose levels using glucometers calibrated with plasma. A blood sugar level of 140 mg/dL or above indicates GD. Analysed the data using a chi-square test. A P value below 0.05 was regarded as significant.

RESULTS

Table 1 indicates that there were 17 individuals with GDM and PE in their first pregnancy, while there were 24 individuals with GDM but without PE in their first pregnancy. In the second pregnancy, there were 12 individuals with GDM and PE, as well as 12 individuals with GDM but without PE. In the third pregnancy, there were 5 individuals with GDM and PE, and 8 individuals with GDM but without PE. Lastly, in the fourth pregnancy and beyond, there were 4 individuals with GDM and PE, and 6 individuals with GDM but without PE. The discrepancy was notable (P< 0.05).

Table 1 Distribution of subjects based on gravid and eclampsia

Gravida	GDM with pre-eclampsia	GDM without pre-eclampsia	Pvalue
Primi	17	24	0.05
2nd	12	12	1
3rd	5	8	0.02
4 th or above	4	6	0.02



Graph 1: Distribution of subjects

Table 2 indicates that GDM with PE and GDM without PE had a 1st hour OGTT of 199.4 mg/dl and 175.3 mg/dl, a 2-hour OGTT of 173.1 mg/dl and 160.2 mg/dl, weight increase of 18.3 Kilogramme and 13.2 Kilogramme, and HbA1c levels of 8.63% and 8.03% respectively. The discrepancy was notable (P< 0.05).

Table 2 Assessment of parameters in subjects

Parameters	GDM with pre-eclampsia	GDM without pre-eclampsia	Pvalue
1 st hour OGTT(mg/dl)	199.4	175.3	0.13
2hours OGTT(mg/dl)	173.1	160.2	0.53
Weightgain	18.3	13.2	0.06
HbA1c levels(%)	8.63	8.03	0.18

DISCUSSION

GDM is a significant contributor to death and illness for both the mother and the newborn globally. Mothers who have GDM are at risk of developing gestational hypertension, preeclampsia, and caesarean section.¹⁵In addition, women who have had gestational diabetes (GDM) are also at a greatly increased risk of having type 2 diabetes mellitus (T2DM) and cardiovascular illnesses.¹⁶Babies born to women with GDM are at risk of being larger than average, may experience more birth defects, and have a higher likelihood of getting low blood sugar and type 2 diabetes later in life.¹⁷A study was done to evaluate instances of gestational diabetes mellitus.

We discovered that there were 188 individuals with GDM. 38 individuals had gestational diabetes mellitus (GDM) with pre-eclampsia (PE), and 50 individuals had GDM without PE. Lee and colleagues¹² included eighty-four studies in their investigation that had a STROBE score of 14 or higher. The combined occurrence of GDM in Asia was 11.5% (95% confidence interval 10.9–12.1). There was a significant variation ($I^2 > 95%$) in the occurrence of GDM throughout Asia, which is probably because of variations in the criteria used for diagnosis, methods used for screening, and the settings of the studies. Meta-analysis showed that the risk factors for GDM include a previous history of GDM (OR 8.42, 95% CI 5.35–13.23), having a baby with macrosomia (OR 4.41, 95% CI 3.09–6.31), and having a baby with congenital abnormalities (OR 4.25, 95% CI 1.52–11.88). Additional risk factors include having a BMI of 25 kg/m² or higher (OR 3.27, 95% CI 2.81–3.80); experiencing pregnancy-induced hypertension (OR 3.20, 95% CI 2.19–4.68); having a family history of diabetes (OR 2.77, 2.22–3.47); having a history of stillbirth (OR 2.39, 95% CI 1.68–3.40); having polycystic ovary syndrome (OR 2.33, 95% CI 1.72–3.17); having a history of abortion (OR 2.25, 95% CI 1.54–3.29); being 25 years old or older (OR 2.17, 95% CI 1.96–2.41); having given birth two or more times (OR 1.37, 95% CI 1.24–1.52); and having a history of preterm delivery (OR 1.93, 95% CI 1.21–3.07).

There are a few restrictions that need to be taken into account in the current investigation. Initially, our data was not gathered for research objectives but rather for the purpose of claiming costs. The data includes information on the occurrence of preeclampsia and GDM, which is derived from insurance claims data obtained from the KNHI Claims Database. The primary drawback of our database is the loss of validity. In particular, the occurrence of GDM during

the second pregnancy is elevated. Regrettably, there is a dearth of research that validate data specifically for gestational diabetes mellitus (GDM) and preeclampsia. Nevertheless, research has validated the reliability of information obtained from the KNHI Claims Database of the HIRA, and numerous studies rely on this data.¹⁸⁻²⁰In addition, we previously stated that the occurrence of GDM rose from 3.86% in 2007 to 11.83% in 2010, with a steady increase even after accounting for age.²¹Considering the rising trend of GDM incidence, it is anticipated that the prevalence will also continue to increase. While the cause of this elevated occurrence is uncertain, there are a number of potential reasons. Firstly, the rising occurrence of GDM could be a result of or add to the continuing trend of a growing number of pregnant women with risk factors for GDM, such as advanced age and obesity.²²In addition, the increased frequency seen in this study could be due to alterations in diagnostic criteria. When using the CC criteria, which are more comprehensive compared to the NDDG criteria, there was a 30-50% rise in the diagnosis of GDM.^{23,24}The Korean Society of Obstetrics and Gynaecology suggests utilising either CC criteria or NDDG criteria for diagnosing GDM. Therefore, the increased occurrence could be attributed to the change in standards from NDDG criteria to CC criteria. However, we were unable to obtain data on characteristics such as maternal BMI, lifestyle, and laboratory test results, as well as the criteria commonly utilised by practitioners in Korea. Additionally, the increased occurrence could be ascribed to the study methodology. The population being examined was limited to pregnant women who had previously given birth. Therefore, the prevalence may appear larger when compared to that of all pregnant women. Additional research is required to assess the reason for the increased occurrence of GDM. For insulin treatment, a prescription is necessary for each medicine. This prescription is automatically recorded in the KNHI Claims Database of the HIRA. Thus, the information regarding insulin treatment is comprehensive and precise.

CONCLUSION

Researchers discovered that timely identification of gestational diabetes by effective prenatal care and rigorous management of blood sugar levels could potentially reduce the risk of developing preeclampsia.

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