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Research Article

Investigating the Relationship between Vitamin D and Gestational Diabetes in Patients

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ABSTRACT

Background: Gestational diabetes mellitus (GDM) causes various complications for the patient.
Methods: This study included patients admitted to the women's ICU. These patients were divided into a case and control group. Vitamin D was measured in all patients using the same laboratory kit and the results were categorized as Vit D insufficiency, Vit D deficiency and Vit D severe deficiency. Data This study was conducted using a registry checklist that included questions on Serum vitamin D levels, Anemia, Education, Age and Body mass index (kg/m2) which was completed using information available in the patient's clinical record.
Results: Result showed, in the Case Group, the mean (SD) age was 28.96 (1.54), BMI was 24.6 (0.81), and 48% of the mothers had anemia. Also, in the control group, the mean (SD) age was 29.2 (1.22), BMI was 25.96 (1.69), and 28% of the mothers had anemia. also, the findings showed that in the Case Group, 56% of mothers had Vit D deficiency, 16% had Vit D insufficiency, and 28% had severe Vit D deficiency. Also, in the Control Group, 32% of mothers had Vit D deficiency, 56% had Vit D insufficiency, and 12% had severe Vit D deficiency. Also, different vitamin D percentages were reported in the two groups studied($p<0.05$).
Conclusion: Given the relationship between vitamin D and GDM, it is recommended that necessary preventive measures be taken in this regard to prevent pregnant mothers from contracting the disease.

Introduction

Diabetes is common chronic metabolic diseases, the number of patients with which increases every year. Diabetes includes various types and is characterized by hyperglycemia. GDM leads to numerous complications in patients, including reduced quality of life and increased medical costs [1-3]. The term gestational diabetes refers to the potential for the development of diabetes to be an exacerbation of physiological changes in glucose metabolism. Pregnancy itself presents a challenge to the body's insulin stores, which increases with advancing gestational age and tissue resistance to insulin. This condition usually occurs in the last trimester of pregnancy and leads to progressive insulin resistance that persists until delivery [4-6].

GDM is defined as impaired glucose tolerance of varying severity that is first diagnosed during pregnancy. The physiological changes of pregnancy lead to a diabetogenic state [7-9]. Factors such as high body mass index, insulin requirements during pregnancy, high fasting blood sugar, and a history of miscarriage are the most important predictors of diabetes and impaired

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carbohydrate tolerance after delivery. According to available evidence, GDM increased cesarean section, increased fetal insulin, and neonatal obesity. This metabolic disorder is considered an important short- and long-term risk factor for both mother and child with increased severity of adverse effects [10-14].

Research indicates that a lack of vitamin D in mothers is linked to GDM, preeclampsia, lower birth weight, premature delivery, skeletal issues, type 1 diabetes, schizophrenia, disorders related to brain growth and development, dysfunction of the fetal immune system, and asthma [15-19].

Methods

This study included patients who were admitted to the women's ICU. The inclusion criteria consisted of being over 18 years of age, having gestational diabetes mellitus (GDM), and being admitted to the ICU. Exclusion criteria included a history of chronic diseases (such as liver, kidney, and thyroid failure, heart failure, thyroid and lupus disorders, and malignancies), fetal death of unknown cause, recurrent miscarriage, malnutrition, gastric bypass surgery, increased blood pressure above 140/90, history of macrosomic infants (over 4 kg), previous history of diabetes or gestational diabetes in previous pregnancies, and use of medications that affect vitamin D metabolism.

This study comprised a case group (N=25) of individuals meeting the inclusion criteria and a control group (N=25) of those who did not. Vitamin D levels were measured in all participants using a consistent laboratory method, and the results were classified into three categories: vitamin D insufficiency, deficiency, and severe deficiency.

Data This study used a registry checklist that included questions on Serum vitamin D levels, Anemia, Education, Body mass index (kg/m^2) and Age which was completed using information available in the patient's clinical record. Data were analyzed using SPSS version 21 statistical software.

Results

Result showed, in the Case Group, the mean (SD) age was 28.96 (1.54), BMI was 24.6 (0.81), and 48% of the mothers had anemia. Also, in the control group, the mean (SD) age was 29.2 (1.22), BMI was 25.96 (1.69), and 28% of the mothers had anemia (Table1).

The findings showed that in the Case Group, 56% of mothers had Vit D deficiency, 16% had Vit D insufficiency, and 28% had severe Vit D deficiency. Also, in the Control Group, 32% of mothers had Vit D deficiency, 56% had Vit D insufficiency, and 12% had severe Vit D deficiency (Table 2). Also, different vitamin D percentages were reported in the two groups studied($p<0.05$).

Table 1– Comparison of the status of the variables examined

Variable		Case Group N (%)	Control Group N (%)
Age		28.96(1.54)	29.2(1.22)
BMI		24.6(0.81)	25.96(1.69)
Education	Up to High School	12(48)	3(12)
	Up to Secondary School	6(24)	12(48)
	University & above	7(28)	10(40)
Anemia	Yes	12(48)	7(28)
	No	13(52)	18(72)

Table 2- Distribution of vitamin D classification among groups

Variable	Case Group N (%)	Control Group N (%)	Total N (%)
Vit D insufficiency	4(16)	14(56)	18(36)
Vit D deficiency	14(56)	8(32)	22(44)
Vit D severe deficiency	7(28)	3(12)	10(20)
Total	25(100)	25(100)	50(100)

Discussion

The findings of this study indicate that the mean vitamin D levels in patients with gestational diabetes mellitus (GDM) were lower compared to the control group.

Similarly, Hosseini et al. (N=164), the mean (SD) vitamin D status in the case group was 24.2 (13.3) and in the control group was 29.4 (19). Vitamin D deficiency also resulted in a 2-fold increased risk of GDM [20]. In the study by Sobhani et al., 154 pregnant mothers referred to the hospital were examined as case controls. According to the findings, the M(SD) serum vitamin D score in the healthy group was 17.81 (11.06) and in the

affected group was 17.41 (6.76). There was also an inverse relationship between OGTT and vitamin D levels [21]. Also, in a study by Fallah Nejad et al., which examined 198 pregnant women referring to medical centers, it was shown that the average vitamin D level in the GDM group was 16.97 and, in the control, group was 26.76. [22]. The results of this study align with previous research that has found lower vitamin D levels in individuals with gestational diabetes mellitus (GDM).

Several meta-analyses support a link between maternal vitamin D deficiency and gestational diabetes mellitus (GDM). Zhang et al. [23] (N=112 articles, 58,304 patients) and Lu et al. [24] (N=25 articles, 16,515 patients) found this association. However, this is not universally consistent. Lotfalizadeh et al. [25] found no significant relationship between vitamin D levels and GDM in a study of pregnant women (aged 15-40), despite observing vitamin D deficiency in 15.1% and insufficiency in 56.1% of participants. This contrasts with the findings of the current study.

Paying attention to patients' health is important and should be a priority. For this reason, it is recommended to take preventive and therapeutic measures to improve patients' health [26-27].

Conclusion

It is recommended that preventive measures be implemented to help reduce the risk of pregnant mothers developing this condition. This may include regular screening for vitamin D levels, dietary modifications, and appropriate supplementation when necessary to ensure adequate vitamin D status during pregnancy.

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