Risk Factors and Diagnostic Performance of Predictors as a Screening Technique for Gestational Diabetes Mellitus: A Retrospective Cross-Sectional Study.

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Introduction

Gestational diabetes mellitus (GDM) is a prevalent condition that affects women across the globe (1). It can lead to a range of complications for both the mother and the baby. The mother may be at a higher risk of developing type 2 diabetes and premature cardiovascular disease, while the baby may experience macrosomia, obesity, hypoglycemia, diabetes, hypertension, and cardiovascular disease in their youth and adulthood (2,3). Early detection of gestational diabetes mellitus (GDM) is crucial to avoid its consequences. In 2010, the International Association of Diabetes and Pregnancy Study Groups (IADPSG) recommended a 2-hour, 75-gram oral glucose tolerance test (OGTT) to diagnose GDM in all pregnant women who did not have a history of overt diabetes during the 24^{th}-28^{th} weeks of pregnancy (4). The oral glucose tolerance test (OGTT) is considered to be the most reliable method, but it can be time-consuming, has poor reproducibility, and is often poorly tolerated during pregnancy (5,6). It is important that pregnant women are not required to attend lengthy clinic sessions for OGTTs, especially during a pandemic. Therefore, simpler yet accurate alternative screening tests should be implemented to reduce the number of OGTTs (7).

Previous research has suggested that fasting plasma glucose (FPG) can be used as a screening technique for gestational diabetes mellitus (GDM) diagnosis. FPG is easier and quicker to use, is less expensive, and can lower healthcare costs associated with universal oral glucose tolerance test (OGTT) screening. However, to accurately diagnose GDM, it is necessary to evaluate the diagnostic performance and determine the ideal FPG cutoff (7). Ping et al. found that gestational diabetes mellitus (GDM) can be predicted through both pre-BMI and initial fasting plasma glucose (FPG) levels before 24 weeks (8). Similarly, Hao et al. found that women who develop GDM tend to have significantly higher FPG levels during the first trimester (4.6 ± 0.3 mmol/L) compared to women with normal glucose tolerance (4.4 ± 0.3 mmol/L; p=0.001), as well as higher BMI during the same period (9). Additionally, Shin Y et al. reported that a higher BMI is linked to a greater prevalence of GDM. Despite a higher risk

of developing type 2 diabetes, lifestyle interventions that aim to reduce BMI have the potential to lower the risk of GDM (10). The lack of a standardized agreement on diagnostic criteria and cutoff values for screening tests of FBG and pre-BMI has made it difficult to detect women with GDM early (8). Thus, our study aims to define optimal levels of FBG for the detection of GDM.

Rationale

The aim of this study is to examine potential risk factors and complications linked to high-risk pregnancies, with a specific focus on gestational diabetes mellitus (GDM). The study intends to offer an understanding of the relationship between GDM and factors such as impaired fasting glucose or impaired glucose tolerance (IFG/IGT), family history of diabetes mellitus (DM), and medical conditions. The study also intends to evaluate the diagnostic performance of screening techniques for gestational diabetes mellitus (GDM), including a history of GDM and impaired fasting glucose (IFG) or impaired glucose tolerance (IGT).

Methods and materials

Study design and area

This study was a hospital-based retrospective cross-sectional study. The study was conducted at the clinic of King Abdul-Aziz Medical City, a tertiary care hospital in Jeddah, Saudi Arabia. Data were collected from the target population through the use of medical records.

Study Population

For this study, we looked at all pregnant patients who visited high-risk pregnancy outpatient clinics at King Abdul-Aziz Medical City in Jeddah from 2021 to 2022. Our focus was on singleton pregnant women who received prenatal care services in Obstetrics clinics at King Abdul-Aziz Medical City. However, to ensure accurate and valid results, we excluded pregnant women with diabetes mellitus or autoimmune diseases. By examining this specific

population of pregnant women, we aimed to investigate potential risk factors and complications associated with high-risk pregnancies.

Sampling technique and size

The sampling technique for this study is non-probability consecutive sampling, which will include all pregnant patients who visited high-risk pregnancy outpatient clinics at King Abdul-Aziz Medical City in Jeddah from 2021 to 2022. The study aims to collect data from all members of the target population instead of sampling from a larger population.

Data Collection Technique and Tool

The data collection tool was developed and face-validated by two consultants in the field. The tool was designed to collect data from the medical records of the participants, including their fasting blood glucose (FBG) levels and oral glucose tolerance test (OGTT) results. The tool was also used to collect information about the participants' obstetric history, demographic characteristics, and medical conditions.

Data Entry and Statistical Analysis

The researchers used IBM SPSS Statistics (version 29.0) for data analysis. Categorical variables were presented as proportions, while numerical variables were presented as medians and interquartile ranges due to non-normal distribution. Inferential analyses of categorical variables were conducted using statistical tests such as chi-square and Fisher-Freeman-Halton Exact Tests. Additionally, multivariate analyses were conducted using binary logistic regression, with significance determined by p-values less than 0.05 and inferences made with a 95% confidence level.

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