**Capsule Proposal**

**Assessing the Use of Triglyceride Glucose (TyG) Index for Early Prediction of Gestational Diabetes in Filipino Women: A Prospective Cohort Study**

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**RESEARCH QUESTION**

Among Pregnant Filipino Women, does measuring Triglyceride Glucose (TyG) Index during first trimester have a predictive value in identifying and assessing the risk of gestational diabetes?

**RESEARCH TOPIC**

A Prospective Cohort Study on the Use of Triglyceride Glucose (TyG) Index during the First Trimester for Early Prediction of Gestational Diabetes Mellitus among Filipino Women in a tertiary hospital in the Philippines from April 2024 to December 2024.

**BACKGROUND OF THE STUDY**

Gestational Diabetes Mellitus (GDM), the most common medical disorder in pregnancy, is defined as glucose intolerance resulting in hyperglycemia that begins or is first diagnosed during pregnancy (1). GDM poses significant health risks to both mothers and infants, with implications extending beyond the perinatal period [1].

GDM is believed to result from pancreatic beta-cell dysfunction in women with preexisting insulin resistance[2]. In particular, defects in beta-cell adaptive mechanisms (through which pancreatic islets adapt to the increased gestational insulin demand) lead to the development of GDM. GDM is associated with an increased risk of fetal complications (macrosomia, polyhydramnios, neonatal hypoglycemia, shoulder dystocia, respiratory-distress syndrome, increased perinatal mortality) and maternal complications (hypertension, preeclampsia, increased risk of cesarean delivery) [3.4]

According to the International Association of Diabetes and Pregnancy Study Groups (IADPSG) criteria, screening for GDM should be performed particularly in at-risk women through a 2-hour, 75-g oral glucose tolerance test (OGTT) performed at 24–28 weeks of gestation. However, empirical evidence suggests that by the time GDM is diagnosed at this stage, both the mother and fetus may have already

been adversely affected to varying degrees, despite the potential benefits of symptom management [5,6]

Early detection of insulin resistance (IR) in pregnant women has been shown to assist in predicting the onset of GDM before clinical diagnosis [7,8]. The evaluation of IR requires sophisticated methods which are not available for use in daily clinical practice.Hyper insulinemic-euglycemic clamp (HEC) is the direct method to measure IR and is considered the ‘‘gold standard’’ procedure, but it is difficult to perform in daily practice. Several surrogate markers have therefore been proposed, including the homeostatic model assessment of IR (HOMA-IR) which requires overnight fasting and plasma insulin measurement several times. At present, though many types of biomarkers have been tested individually or in predictive models for GDM as well, such as adiponectin, sex hormone-binding globulin, and C-reactive protein (8, 9, 10), these parameters are also not available in most clinics. Therefore, identifying feasible biomarkers is warranted for predicting GDM in early pregnancy.

The TyG index, calculated from fasting plasma glucose (FPG) and serum triglycerides (TG), is considered a straightforward, economical, replicable, and reliable surrogate for IR [9,10]  In several previous studies, TyG index out-performed HOMO-IR in the Brazilian population (11) and the Korean population (17) in predicting the risk of diabetes. Measurement of TyG is also cheap and convenient (12), which is more accessible in outpatient settings, and could be a screening tool for large populations.

Pazhohan et al. showed that there was a significant association between the increase in Fasting Plasma Glusoce, triglycerides, TG /HDL-C ratio, and increase in TyG index and the risk of GDM [14]. Liu et al. found the first trimester TyG index to be higher in the GDM group, and the risk of developing GDM was 3.53-fold higher in high tertiles compared to reference tertiles [13]. Sánchez-García et al. showed that the TyG index in the second trimester shows high sensitivity and negative predictive value in the diagnosis of GDM and can be used as a screening strategy to reduce the need for OGTT [15]. Recently, a cohort study by Kim et al examined the association between pre-pregnancy TyG index and GDM and found a significant association in primiparous women [17]. Although Sánchez-García et al. did not find a significant association between TyG index in he first trimester and GDM, they found a significant association in the second trimester [15, 16]. This difference may be due to differences in the study population such as maternal age, racial and ethni differences, geographical characteristics, and BMI. In a meta-analysis by Song et al, women with the highest TyG index independently have a higher risk of GDM [18].

In the Philippines, where cultural and healthcare factors may influence the prevalence and management of gestational diabetes, there is a need for more effective and culturally tailored screening methods. Biomarkers, such as the Triglyceride Glucose (TyG) Index, have emerged as potential tools for predicting diabetes risk. However, their specific role in the context of gestational diabetes among Filipino patients remains understudied.

This study aims to bridge this knowledge gap by investigating the predictive value of the TyG Index in identifying gestational diabetes risk in a cohort of Filipino pregnant women. Through a prospective cohort design, we will assess longitudinal changes in TyG Index values, correlate them with established gestational diabetes diagnostic methods, and explore associations with maternal and neonatal outcomes. The findings of this study are expected to enhance our understanding of gestational diabetes risk factors in the Filipino population and contribute to the development of more effective screening and intervention strategies tailored to this specific demographic.

**OBJECTIVES**

**General**

To investigate the predictive value of Triglyceride Glucose (TyG) Index measured during the first trimester for the early identification of Gestational Diabetes Mellitus (GDM) among Filipino women.

**Specific**

1) Determine the association between TyG Index levels measured during the first trimester and the incidence of Gestational Diabetes Mellitus (GDM) among healthy pregnant Filipino women seen in a tertiary hospital in the Philippines from April 2024 to December 2024.

2) Investigate whether elevated TyG Index during the first trimester is an independent predictor of GDM after adjusting for potential confounding factors, including maternal age, history of GDM, pre-pregnancy BMI, family history of diabetes, etc.

3) Assess the sensitivity and specificity of TyG Index measurements in early pregnancy for the accurate identification of individuals at risk of developing GDM.

4) Correlate maternal TyG Index levels with neonatal outcomes such as birth weight, Apgar scores, and the incidence of neonatal hypoglycemia..

5) Investigate associations between elevated TyG Index levels and adverse maternal outcomes (e.g., pre-eclampsia, cesarean section) and neonatal outcomes (e.g., macrosomia, neonatal hypoglycemia).

**METHODOLOGY**

**Study Participants**

Pregnant Filipino women attending prenatal clinics at The Medical City. Inclusion criteria include Filipino women in their first trimester of pregnancy, with no pre-existing diabetes diagnosis, and those willing to participate in regular follow-up assessments.

**Exclusion Criteria**

* Pregnant women with pre-existing Diabetes Diagnosis/ history of GDM
* Multiple Pregnancies
* Known Pregnancy Complications (e.g., known congenital anomalies, severe intrauterine growth restriction, etc)
* Chronic Medical Conditions (e.g., chronic kidney disease, autoimmune disorders).
* Medication Use (e.g., corticosteroids, antipsychotics, etc)
* Incomplete Follow-Up Data (participants with incomplete follow-up data or those who are unable or unwilling to participate in regular assessments throughout pregnancy)
* Non-Filipino Ethnicity

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normal and abnormal glucose tolerance during pregnancy. American Journal of Obstetrics and Gynecology. 1998;179(1):156-165

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