

The Association of Blood Type Among Pregnant Women Aged 25-34 at the University of Santo Tomas Hospital - Clinical Division Outpatient Department in the Development of Gestational Diabetes Mellitus (GDM) - Study Protocol



Vincent Enrico A. Ong, RMT,¹ Franchezka Marie P. Napay, RMT,¹
Samantha Marie L. Navarro,¹ Daniella Faye T. Ngo, RPh,¹
Victor Orlando D. Ocampo II,¹ Gwyneth S. Olegario,¹
Hexiqyl B. Ong, RMT,¹ Christienne Chelito E. Onza,¹
Andrea Gwyneth S. Oro, RN,¹ Jose Emmanuel M. Pacheco, RN¹

ABSTRACT

This study aims to establish the potential association between ABO blood type among pregnant women (25-34 years old) at the University of Santo Tomas Hospital - Clinical Division Outpatient Department in the development of gestational diabetes mellitus (GDM). GDM, a prevalent condition during pregnancy, stems from the placenta producing hormones that impede insulin utilization in the body. This research seeks to ascertain whether maternal blood type

correlates with the incidence of GDM, utilizing 24-28 week 75 g OGTT (Oral Glucose Tolerance Test) as the diagnostic tool for GDM determination. Given the acknowledged genetic link between blood type and diabetes predisposition, genetic factors will be accounted for as potential confounders. Other variables such as maternal age, demographics and prior GDM history will also be considered due to their potential influence on GDM. The study employs a retrospective cross-sectional study with qualitative and quantitative analysis. It focuses on pregnant women's GDM development as the outcome, assessed concerning maternal blood type as the exposure. Utilizing a retrospective approach, past records of Filipino pregnant women aged 25 to 34 residing in the Philippines will be analyzed. Inclusion criteria encompassed Filipino citizenship, current residency in the Philippines, age between 25 and 34 years, a normal first trimester BMI (18.5-22.9 kg/m²) and normal HbA1c levels (4.0%-5.6%). Exclusion criteria

✉ Vincent Enrico Asuncion Ong, RMT
vincentenricoong@gmail.com

¹ Faculty of Medicine and Surgery, University of Santo Tomas, Manila

Academic editor: Warren Bacorro

Submitted date: August 29, 2025

Accepted date: December 10, 2025

involved pregnant women with more than five births, a family history of diabetes mellitus and a history of polycystic ovary syndrome (PCOS). Conducted at the University of Santo Tomas Hospital - Clinical Division Outpatient Department, this research aims to determine if ABO blood type predisposes mothers to GDM, potentially offering preventive measures against associated complications such as post-pregnancy diabetes mellitus and fetal complications.

Keywords: Gestational Diabetes Mellitus (GDM); ABO Blood Group; Pregnancy; 75g Oral Glucose Tolerance Test (OGTT); Maternal Age

INTRODUCTION

Gestational diabetes mellitus (GDM) is a common pregnancy complication caused by placental hormones that impair insulin utilization, resulting in maternal hyperglycemia.[1,2] While HbA1c is widely used to assess glycemic control, other potential predictors such as maternal blood type are being explored. Previous studies have suggested a possible link between ABO blood group and insulin resistance, type 2 diabetes and GDM, though results remain conflicting.[3,4]

Well-established risk factors for GDM include a family history of diabetes, prior GDM, macrosomia, high body mass index (BMI) and advanced maternal age.[5] Since BMI and height can influence insulin resistance differently across populations, it is important to consider these in Asian cohorts. However, limited evidence exists regarding the role of maternal ABO blood type in predicting GDM, and findings are often population-specific.

In the Philippines, there is a lack of local data examining the association between maternal blood type and GDM. Addressing this gap may aid in identifying women at higher risk and developing preventive strategies. This study therefore aims to evaluate the relationship between maternal ABO blood type and the incidence of GDM among women aged 25–34 years.

METHODOLOGY

Ethical Considerations

This study was reviewed and approved by the UST Hospital - Research Ethics Committee (Protocol

Reference No.: REC-2025-01-001-IS-AP). The study abides by the National Ethical Guidelines for Research Involving Human Participants (NEGRH) by the Philippine Health Research Ethics Board (PHREB), ensuring compliance with ethical standards in human research.

Study Design

This is a retrospective cross sectional study with qualitative and quantitative analysis. The study will focus more on the development of GDM in pregnant women (outcome) as determined by maternal blood type (exposure). The exposure will be assessed to determine an association with the outcome. It involves a retrospective approach in which past records of pregnant women will be analyzed.

Participants

The participants in the research study will be divided into two groups—pregnant women who developed GDM during their term of pregnancy and those who did not. GDM will be diagnosed based on their 24–28 week 75 g oral glucose tolerance test (OGTT). From the development of disease during their pregnancy term, the outcome will be correlated with their blood type with Rh factor and how this exposure may determine the risk of developing GDM.

Study Procedure

Prior to data collection, an endorsement certificate was obtained from the Department of Clinical Epidemiology, Faculty of Medicine and Surgery. The study protocol was then submitted to the University of Santo Tomas Hospital – Research Ethics Committee (USTH-REC) for ethical review and approval. Upon approval, permission letters were provided to the concerned hospital departments to allow access to records and data gathering.

The study population consisted of pregnant women who attended prenatal consultations at the University of Santo Tomas Clinical Division Outpatient Department from January 2022 to December 2024. Using the inclusion and exclusion criteria, a total of 110 eligible participants were selected. Inclusion criteria: Filipino women aged 25–34 years old, residing in the Philippines, with normal first trimester BMI (18.5–22.9 kg/m²) and normal HbA1c levels

(4.0%–5.6%). Exclusion criteria: Pregnant women with more than five births, a family history of diabetes mellitus, or a history of polycystic ovary syndrome (PCOS). Eligible participants were divided into two groups: (1) women diagnosed with GDM and (2) women without GDM. Diagnosis of GDM was based on 75 g oral glucose tolerance test (OGTT) results following the American College of Obstetricians and Gynecologists (2018) criteria.

Data Gathering Procedure

The approach for quantitative data collection involves reviewing patient medical charts and secondary data sources. The primary variables of interest include maternal blood types and Rh factor, age of subjects during their gestational terms categorized into age groups (25-29 and 30-34 years old), first trimester body mass index (BMI) within the range of 18.5-22.9 kg/m², and results of 24-28 week 75 g OGTT tests for gestational diabetes diagnosis. The suggested measurement tools for analysis include the Chi-square test to evaluate the association between two categorical variables (such as the relationship between developing GDM and maternal blood type) and logistic regression analysis to assess the association of categorical or continuous variables with one dependent variable. This analysis helps understand the relationship between developing GDM and maternal blood type while considering other factors such as BMI and age.

Data Analysis

The study will be using the Chi square test. Chi-square test can be used regardless of whether the data is parametric or non-parametric. It is also used to compare the relationship between categorical variables. This test can then be used to determine the significance of differences among ABO blood groups according to GDM prevalence. It is the most applicable for this study since the independent variable (ABO blood group) and dependent variable (GDM prevalence) are both categorical variables.

EXPECTED RESULTS

The outcome of interest in this study was the development of GDM among pregnant women aged 25 to 34 years old based on their blood type.

Statistical analysis will be performed to compare the prevalence of GDM among blood types and their rhesus factors. Measures such as odds ratios (OR) may be calculated to assess the association between potential risk factors (such as maternal blood type) and the development of GDM. OR represents the odds of an event, in this study, developing GDM, occurring in one group (eg, specific blood type) compared to another group (eg, reference blood type). Patient demographics such as maternal age will be likewise analyzed to determine a possible association with GDM development. Moreover, factors known to influence the development of GDM, such as BMI outside the normal range, a history of diabetes mellitus and history of PCOS, will be excluded and controlled for in the analysis to ensure that any observed associations will not be confounded by these variables. BMI will be calculated using data gathered from records and classified based on the Asian BMI criteria.

Individual Author's Contributions

V.O. served as the team leader and supervised overall development of the manuscript. G.O. acted as liaison officer, facilitating communication and securing necessary endorsements. F.N. and D.N. assisted in preparing correspondence and contributed to manuscript formatting. S.N. and V.O II will oversee data collection, while H.O. and C.O. will supervise data analysis. A.O. and J.P. will be responsible for data management. All authors contributed to the study protocol, participated in drafting and revising the manuscript and approved the final version for submission.

Disclosure Statement

The paper did not receive any funding.

Conflicts of Interest


The authors of this paper declare no conflicting interest.

Acknowledgment

We are grateful to Carmela Madrigal-Dy, M.D., who served as our Content Adviser, for her insights and recommendations. We also extend our gratitude to

Kathryn Baltazar-Braganza, M.D., our Technical Adviser, for her review, constructive feedback and technical expertise. We also thank Maria Elizabeth P. Mercado, M.D., for her assistance in securing the necessary endorsements.

Supplementary Material

Data Collection Table - Patient Chart (Double click the paperclip icon to open) 

REFERENCES

1. Bahkali N, Eissa G, Sindi H, Almutairi OA, Ghamri K. Association between ABO blood group and gestational diabetes mellitus in pregnant women at King Abdulaziz University Hospital: A retrospective study. *Cureus* [Internet]. 2022;14(11):e31784. Available from: <http://dx.doi.org/10.7759/cureus.31784>
2. Gestational Diabetes Mellitus (GDM) [Internet]. John Hopkins Medicine. 2019 [cited 2025]. Available from: <https://www.hopkinsmedicine.org/health/conditions-and-diseases/diabetes/gestational-diabetes>
3. Chen D, Lin L, Hong Q, Li X. Relationship between ABO blood group and gestational diabetes mellitus: A protocol for systematic review and meta-analysis. *Medicine (Baltimore)* [Internet]. 2021;100(19):e25877. Available from: <http://dx.doi.org/10.1097/md.00000000000025877>
4. Zhang C, Li Y, Wang L, Sun S, Liu G, Leng J, et al. Blood group AB is protective factor for gestational diabetes mellitus: a prospective population-based study in Tianjin, China: Blood Types and Gestational Diabetes. *Diabetes Metab Res Rev* [Internet]. 2015;31(6):627–37. Available from: <http://dx.doi.org/10.1002/dmrr.2650>
5. Alduayji MM, Selim M. Risk factors of gestational diabetes mellitus among women attending an antenatal care clinic in Prince Sultan Military Medical City (PSMMC), Riyadh, kingdom of Saudi Arabia: A case-control study. *Cureus* [Internet]. 2023;15(8):e44200. Available from: <http://dx.doi.org/10.7759/cureus.44200>



Open Access This article is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License, which permits use, share — copy and redistribute the material in any medium or format, adapt — remix, transform, and build upon the material, as long as you give appropriate credit, provide a link to the license, and indicate if changes were made. You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use. You may not use the material for commercial purposes. If you remix, transform, or build upon the material, you must distribute your contributions under the same license as the original. You may not apply legal terms or technological measures that legally restrict others from doing anything the license permits. The images or other third party material in this article are included in the article's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this license, visit <https://creativecommons.org/licenses/by-nc-sa/4.0/>.