

## Original Articles: Quantitative Research

### THE RELATIONSHIP BETWEEN KNOWLEDGE AND PREVENTION BEHAVIOR OF GESTATIONAL DIABETES MELLITUS AMONG PREGNANT WOMEN IN BOGOR, WEST JAVA, INDONESIA

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#### Abstract

**Background:** Gestational Diabetes Mellitus (GDM) is one of the complications of pregnancy that significantly contributes to maternal and infant morbidity and mortality rates. Although the prevalence of GDM is relatively low in Indonesia, the actual number may be higher due to underdiagnosis. There are limited previous studies on knowledge and preventive practices related to Gestational Diabetes Mellitus, particularly in Indonesia.

**Objective:** To analyze the relationship between knowledge and preventive behavior of Gestational Diabetes Mellitus among pregnant women.

**Methods:** A quantitative research study with a cross-sectional design involving 83 pregnant women in Bogor, West Java, Indonesia, selected through accidental sampling. The inclusion criteria were pregnant women in their first to third trimesters, while the exclusion criteria were those who had mental disorders. Data were collected using a questionnaire developed by Nanyangwe Siuluta, consisting of 31 items on knowledge and 5 items on preventive practices of Gestational Diabetes Mellitus. The multivariate Logistic regression was performed to analyze the data.

**Results:** The findings showed that 51.8% of pregnant women had good knowledge, and 54.2% had poor preventive behaviors. There is a significant relationship between age ( $p = 0.019$ ), family history of diabetes ( $p = 0.021$ ), knowledge ( $p < 0.001$ ), and preventive practices of Gestational Diabetes Mellitus. Multivariate analysis showed that knowledge ( $p < 0.001$ ) is a significant factor related to preventive practice after controlling for age ( $p = 0.169$ ) and family history of diabetes ( $p = 0.428$ ).

**Conclusion:** These findings highlight the importance of educational interventions to enhance the knowledge of pregnant women to promote good prevention behavior.

## INTRODUCTION

Maternal mortality shows how healthy a community is and how well pregnant women are cared for. In 2020, nearly 800 women around the world died every day due to pregnancy and childbirth (World Health Organization, 2024). Indonesia ranks third in Southeast Asia for the highest maternal deaths. In

2023, 4,482 mothers died—an increase from 3,572 in 2022 (Badan Pusat Statistik, 2020). The most common causes of maternal mortality in Indonesia were hypertension in pregnancy, obstetric hemorrhage, and other obstetric complications. The number of maternal deaths due to other obstetric complications in 2023 was recorded as many as 204 cases (Kementerian Kesehatan RI, 2024).

Diabetes Mellitus in pregnancy, also known as Gestational Diabetes Mellitus (GDM), refers to a condition of glucose intolerance that first occurs or is first detected during pregnancy. GDM develops when a pregnant woman, who did not previously have diabetes, is unable to produce enough insulin during pregnancy. This is due to the secretion of hormones by the placenta during pregnancy, such as progesterone, cortisol, lactogen, prolactin, and growth hormone, which can interfere with the body's ability to use insulin effectively, thereby contributing significantly to insulin resistance (International Diabetes Federation, 2024). Gestational Diabetes Mellitus is a serious and risky health problem in pregnancy, as it can have direct adverse effects on both the mother and the fetus. It can lead to complications such as an increased risk of miscarriage in the first trimester, congenital abnormalities, polyhydramnios, and increased fat cells resulting in a baby being larger than appropriate for gestational age (Zahara et al., 2024). In fact, beyond maternal and neonatal complications, GDM also significantly increases the risk of permanent Type 2 Diabetes Mellitus in the future for both the mother and the baby (Anggraini & Haiti, 2024).

Globally, the worldwide prevalence of Gestational Diabetes Mellitus is estimated at 14.2% (Wang et al., 2022). The prevalence of GDM in the general pregnant population in Indonesia ranges from 1.9% to 3.6% (Aspilayuli et al., 2023). According to the Indonesian Health Survey data in 2023, the proportion of Gestational Diabetes Mellitus throughout Indonesia, detected based on a doctor's diagnosis, is 2.6% (Badan Pusat Statistik, 2024). West Java Province recorded almost 6% of the 792 maternal deaths due to obstetric complications (Dinkes Provinsi Jawa Barat, 2023). There are various types of complications in pregnant women can occur during pregnancy, including hyperemesis gravidarum, anemia, hypertension, infection, fetal malposition, diabetes mellitus, preeclampsia, and hemorrhage (Zahara et al., 2024). A study conducted by Rohati & Siregar (2023) showed a significant relationship between the history of disease and maternal mortality. Another study conducted by Supardi et al. (2022) showed that there was a significant relationship between pregnancy complications and the incidence of maternal mortality, with a risk of 26.98 times of experiencing death in pregnant women who had complications compared to pregnant women without complications.

Knowledge of Gestational Diabetes Mellitus (GDM) is critically important for pregnant women because it directly influences their ability to prevent, detect, and manage the condition effectively. Since GDM often presents no clear symptoms, women without sufficient knowledge may fail to recognize early warning signs such as excessive thirst or fatigue. Informed mothers are more likely to attend regular prenatal checkups and accept or request GDM screening, facilitating early diagnosis and timely intervention. Adequate knowledge also empowers women to make healthier choices, including proper nutrition, physical activity, and self-monitoring of blood glucose. It helps them understand the serious

risks of untreated GDM, such as macrosomia (high birth weight), preeclampsia, or even stillbirth, encouraging them to take proactive preventive measures. Moreover, women knowledgeable about GDM are more likely to adhere to medical guidance, such as dietary modifications, blood sugar monitoring, and insulin therapy if required. This contributes to better stress management, healthier weight gain, and reduced pregnancy-related complications. Uncontrolled GDM can lead to birth complications, neonatal hypoglycemia, and long-term metabolic problems in the child. However, when well-informed, mothers are better equipped to maintain safe glucose levels, supporting optimal fetal development. At the community level, low awareness of GDM results in delayed diagnosis and poor disease management, which contribute to higher rates of maternal and infant morbidity and mortality. Thus, increasing maternal knowledge has a cascading effect, not only improving individual health outcomes but also reducing the broader burden on families and healthcare systems (WHO, 2016).

However, this figure could be higher because GDM often goes undetected. Even though the prevalence of gestational diabetes in Indonesia is still relatively low, the potential consequences of GDM can be fatal. This highlights the importance of knowing mothers' knowledge and preventive behaviors regarding GDM, considering the risks associated with the condition. Furthermore, there is still limited research on the knowledge and preventive behaviors of gestational diabetes among pregnant women in Indonesia. Therefore, this study aims to analyze the relationship between knowledge and preventive behaviors of Gestational Diabetes Mellitus among pregnant women.

## METHODS

### *Study Design*

This study employed a quantitative approach using a cross-sectional design to analyze Knowledge and behavior prevention of GDM among pregnant women.

### *Settings*

This study was conducted from April to May 2025 in Bogor City, West Java, Indonesia, at three public health centers: North Bogor, East Bogor, and Kayumanis Public Health Center.

### *Research Subject*

The study population consisted of pregnant women who visited the selected public health centers for antenatal care visits. The sample size was calculated using the *Lemeshow* formula for two proportions.

$$n = \frac{(Z_{1-\frac{\alpha}{2}} \sqrt{2P'(1-P')} + Z_1 - \beta \sqrt{P_1(1-P_1) + P_2(1-P_2)})^2}{(P_1 - P_2)^2}$$

$$Z_{1-\frac{\alpha}{2}} = \text{Confidence Interval} = 95\% = 1.96$$

$$Z_1 - \beta = \text{Statistical Power} = 80\% = 0.842$$

|    |   |                                                                                                 |
|----|---|-------------------------------------------------------------------------------------------------|
| P1 | = | Proportion of Good Knowledge of DMG based on previous research<br>= 65.6%                       |
| P2 | = | Proportion of Poor Knowledge of DMG based on previous research<br>= 34.4% (Hassan et al., 2023) |
| n  | = | Sample size = 80                                                                                |

An additional 10% was added to account for potential drop-outs, bringing the total to 88 respondents (Hassan et al., 2023). However, five respondents withdrew from participation during data collection because they had not completed the questionnaire. The final sample of 83 respondents was included in the analysis.

The sampling technique used was accidental sampling, involving pregnant women who met the inclusion criteria and were present at the health centers during the data collection period. The inclusion criteria were pregnant women in the first to third trimesters who had attended at least one antenatal care visit. They were able to read and communicate in the Bahasa Indonesia language. The exclusion criteria were those who had any diagnosed mental health disorder.

### ***Instruments***

The instrument used in this study was adopted from Nanyangwe Siuluta et al. (2024) designed to measure knowledge and preventive behavior related to GDM. The original English version consists of 36 items, covering key domains such as risk factors, symptoms, prevention strategies, and lifestyle behaviors. Developed and validated through an international publication, the instrument demonstrated good psychometric properties, with strong validity and reliability reported by the original authors. Its use in this study ensures consistency with previous research and supports the credibility of the data collected.

The researcher translated it into the Indonesian language. Furthermore, content validity was assessed by three experts from maternity nursing, clinical nurse practice, and nurse educator/lecturer. The Content Validity Index (CVI) results obtained an i-CVI value of 1 and an s-CVI of 1. This follows Polit & Beck (2006); if the Content Validity test expert is three people, then the results of i-CVI and s-CVI are 1. Then, the Construct Validity test was carried out on 30 respondents. The results of the Construct Validity test found all items valid with an r value between 0.410 to 0.839. The reliability test using Alpha Cronbach obtained results of 0.958.

### ***Data Collection***

After obtaining approval from the local health office and receiving an ethical clearance letter, the researcher visited prospective respondents at the designated community health center to collect the data. Data collection was conducted using a paper-based questionnaire. Prospective respondents who met the inclusion criteria were first provided with an informed consent form by the researcher, which explained the purpose of the study, the confidentiality of responses, and the voluntary nature of

participation. Only those who agreed and signed the informed consent were included in the study. After giving their consent, respondents were asked to complete the questionnaire, which took approximately 15 minutes.

### **Data Analysis**

Univariate analysis was performed using descriptive statistics to summarize the data. Frequencies and percentages were used to describe categorical variables, such as participants' demographic characteristics, knowledge levels, and preventive practices related to Gestational Diabetes Mellitus (GDM). For continuous variables, measures of central tendency (mean, median) and dispersion (standard deviation, range) were also calculated to provide a comprehensive overview of the study population.

Bivariate analysis employed the Chi-Square ( $\chi^2$ ) test to determine the relationship between knowledge and preventive practices at  $\alpha=0.05$ . The chi-squared test was also used to examine the association between respondent characteristics and GDM prevention practices.

A multivariate logistic regression analysis was conducted to control for potential confounding variables, particularly age and family history of diabetes mellitus, which were identified as characteristics potentially associated with preventive practices. Logistic regression ensured a more accurate and unbiased interpretation of the relationship between knowledge and preventive practices by adjusting for these covariates.

### **Ethical Consideration**

This study obtained ethical approval from the Health Research Ethics Committee under approval number: Un.01/F.10/KP.01.1/KE.SP/04.08.003/2025. Before participation, respondents were informed about the objectives, procedures, and their rights related to the study. All participants provided written informed consent before data collection. To ensure confidentiality, the researcher guaranteed anonymity by removing any identifying information. All data were securely stored for at least three years and accessible only to the researcher. After data entry, the paper-based questionnaires were safely **destroyed** by burning to protect participant privacy further.

## **RESULTS**

### **Respondent Characteristics**

This study examined the characteristics of 83 pregnant women in three public health centers in Bogor City, focusing on demographics, obstetric history, respondents' family history of Diabetes Mellitus (DM), and their exposure to DM information, including the source of that information. The full distribution of these characteristics is presented in Table 1.

Most respondents were aged 25 years or older (74.7%) and had completed high school education (50.6%). A significant proportion were housewives (85.5%). In terms of pregnancy stage, over half were in their third trimester (54.2%), and most were multigravida (65.1%), meaning they had been pregnant more than once.

Regarding parity, 63.8% of the mothers had given birth previously, with almost an equal distribution between primiparas (27.7%) and multiparas (36.1%). Most of those who had given birth reported their last child's birth weight as normal (84.9%). Additionally, most respondents had no history of stillbirth (84.3%) and had never undergone a Cesarean section (77.3%).

Most pregnant women (88%) in the study did not have a family history of DM. A substantial majority (71.1%) reported previous exposure to DM information. Interestingly, the primary source of this information was the community (32.2%), such as their neighbors and residents. Only a small percentage received information from healthcare professionals (10.2%) or a volunteer health cadre (8.5%) among those exposed to information.

We calculated the respondent characteristics and to prevention behavior of GDM. The results showed that age (p-value= 0.019) and family history of DM (p-value= 0.021) had a significant relation to prevention behavior of GDM. In contrast, education level, working status, gestational age, Gavida, parity, last child's birth weight, history of stillbirth, history of cesarian section, information exposure, and information source had no. significant relation to the prevention behavior of GDM.

**Table 1.** Respondent Characteristics (N=83) and Relation to Prevention Behavior of Gravidarum Diabetes Mellitus.

| Characteristic                     | Category           | n  | %    | $\chi^2$ | p-value |
|------------------------------------|--------------------|----|------|----------|---------|
| <b>Age</b>                         | < 25 years         | 21 | 25.3 | 5.469    | 0.019   |
|                                    | ≥ 25 years         | 62 | 74.7 |          |         |
| <b>Education Level</b>             | Primary School     | 14 | 16.9 | 2.830    | 0.419   |
|                                    | Junior High School | 15 | 18.1 |          |         |
|                                    | High School        | 42 | 50.6 |          |         |
|                                    | University         | 12 | 14.5 |          |         |
| <b>Working Status</b>              | Housewife          | 71 | 85.5 | 0.100    | 0.751   |
|                                    | Employed           | 12 | 14.5 |          |         |
| <b>Gestational Age</b>             | Trimester 1        | 17 | 20.5 | 2.490    | 0.288   |
|                                    | Trimester 2        | 21 | 25.3 |          |         |
|                                    | Trimester 3        | 45 | 54.2 |          |         |
| <b>Gravida</b>                     | Primigravida       | 29 | 34.9 | 0.348    | 0.555   |
|                                    | Multigravida       | 54 | 65.1 |          |         |
| <b>Parity</b>                      | Nullipara          | 30 | 36.1 | 0.524    | 0.77    |
|                                    | Primipara          | 23 | 27.7 |          |         |
|                                    | Multipara          | 30 | 36.1 |          |         |
| <b>Last Child's Birth Weight*</b>  | Low                | 8  | 15.1 | 0.030    | 1.000   |
|                                    | Normal             | 45 | 84.9 |          |         |
| <b>History of Stillbirth</b>       | Yes                | 13 | 15.7 | 0.333    | 0.564   |
|                                    | No                 | 70 | 84.3 |          |         |
| <b>History of Cesarean Section</b> | Yes                | 20 | 22.7 | 2.176    | 0.140   |
|                                    | No                 | 68 | 77.3 |          |         |
| <b>Family history of DM</b>        | Yes                | 10 | 12.0 | 5.363    | 0.021   |
|                                    | No                 | 73 | 88.0 |          |         |
| <b>Information Exposure</b>        | Yes                | 59 | 71.1 | 3.756    | 0.053   |
|                                    | No                 | 24 | 28.9 |          |         |
| <b>Information Source**</b>        | Family             | 13 | 22.0 | 1.097    | 0.895   |
|                                    | Community          | 19 | 32.2 |          |         |

|                        |    |      |
|------------------------|----|------|
| Social Media           | 16 | 27.1 |
| Health Professional    | 6  | 10.2 |
| Volunteer health cadre | 5  | 8.5  |

\* Percentages for Last Child's Birth Weight are based only on respondents who had given birth (n=53).

\*\* Percentages for Information Source are based only on respondents who reported having been exposed to information (n=59).

### ***Gestational Diabetes Mellitus Knowledge and Prevention Behavior***

As presented in Table 2, just over half of the pregnant women (51.8%) demonstrated good knowledge regarding GDM. Conversely, 48.2% had poor knowledge. Meanwhile, regarding preventive practices, the analysis reveals that most respondents (54.2%) exhibited poor GDM prevention practices. In contrast, 45.8% had good prevention practices.

**Table 2.** Frequency Distribution of GDM Knowledge and Prevention Practice.

|                            | Category | n  | %    |
|----------------------------|----------|----|------|
| Knowledge about GDM        | Good     | 43 | 51.8 |
|                            | Poor     | 40 | 48.2 |
| Prevention Behavior of GDM | Good     | 38 | 45.8 |
|                            | Poor     | 45 | 54.2 |

### ***Relationship between Knowledge and Prevention Practices Regarding GDM***

This study aimed to determine the association between pregnant women's knowledge of GDM and their GDM prevention practices. The researcher also analyses characteristics as variables confounded to reduce bias. The results of the Chi-Square analysis are summarized in Table 3.

**Table 3.** The Relationship between Knowledge and Prevention Behavior of Gestational Diabetes Mellitus.

| Knowledge | Prevention Behavior |      |      |      | $\chi^2$ | p value | OR (95% CI)        |
|-----------|---------------------|------|------|------|----------|---------|--------------------|
|           | Poor                |      | Good |      |          |         |                    |
|           | n                   | %    | n    | %    |          |         |                    |
| Poor      | 33                  | 39.8 | 7    | 8.4  | 24.882   | < 0.001 | 12.18 (4.25-34.91) |
| Good      | 12                  | 14.5 | 31   | 37.3 |          |         |                    |

Based on chi-square results between characteristics and Gestational Diabetes Mellitus prevention behavior, it was found that two characteristics had a relationship with the GDM prevention practices. There is a significant relationship between the age of pregnant women with Gestational Diabetes Mellitus prevention practices, with a p-value = 0.019 ( $p < 0.05$ ). Respondents with an age of  $\geq 25$  years tend to have better preventive practices than respondents aged  $< 25$  years. From the table above, it can be seen that a family history of Diabetes Mellitus is also significantly associated with preventive behavior. The p-value shows a value of 0.021 ( $p < 0.05$ ), where pregnant women who have



a family history of Diabetes Mellitus, the majority show good Gestational Diabetes Mellitus prevention behavior as well. While other characteristic variables, such as the latest education, employment status, gestational age, number of pregnancies, parity, birth weight of the last child, history of stillbirth, history of Cesarean delivery, and source of DM information, did not show a significant relationship with Gestational Diabetes Mellitus prevention behavior.

The chi-square analysis revealed a significant relationship between knowledge and GDM prevention practices ( $p < 0.001$ ). Specifically, pregnant women with poor knowledge were predominantly associated with poor prevention practices, accounting for 39.8% of all respondents. Conversely, 37.3% of pregnant women with good knowledge also demonstrated good prevention practices. Further analysis, using Odds Ratio (OR), indicated an OR of 12.18 (95% CI: 4.25-34.91). This suggests that pregnant women with good knowledge were 12.18 times more likely to exhibit good prevention practices. This finding underscores the critical role in influencing the quality of diabetes prevention practices among pregnant women.

### ***Factors Influencing Prevention Behavior Of Gestational Diabetes Mellitus***

This study employed multivariate logistic regression to identify independent factors associated with GDM prevention behavior. The results of the logistic regression analysis are presented in Table 4.

Following the initial chi-square tests, which indicated a significant association between age ( $p = 0.019$ ) and family history of Diabetes Mellitus (DM) ( $p = 0.021$ ) with GDM prevention behavior, further analysis was conducted using logistic regression. The logistic regression analysis revealed that knowledge of GDM was significantly associated with prevention behavior among pregnant women ( $p < 0.001$ ). However, after controlling for other variables, age and family history of DM were no longer significantly related to prevention practices, with  $p$  values of  $p = 0.169$  and  $p = 0.428$ , respectively.

The analysis revealed that GDM Knowledge was a significant predictor of GDM prevention practices ( $p < 0.001$ ). This indicates that good GDM knowledge is strongly associated with a higher likelihood of adopting good prevention practices, explaining 77.1% of the variance in pregnant women's diabetes prevention behavior after adjusting for age and family history of DM. This means that while age and family history of DM showed a statistical relationship in bivariate analysis, knowledge exerted a stronger influence when considered together with these factors. This can be interpreted to mean that 77.1% of GDM prevention behavior in pregnant women in this study was influenced by their knowledge regarding GDM. In this multivariate model age and family History of DM were not statistically significant predictors of GDM prevention behavior.



**Table 4.** Multivariate Logistic Regression.

| Variables            | B      | S.E   | Wald   | Df | P value |
|----------------------|--------|-------|--------|----|---------|
| Age                  | 0.914  | 0.665 | 1.892  | 1  | 0.169   |
| Family History of DM | 0.732  | 0.923 | 0.629  | 1  | 0.428   |
| GDM Knowledge        | 2.312  | 0.555 | 17.371 | 1  | < 0.001 |
| Constant             | -6.190 | 1.619 | 14.611 | 1  | < 0.001 |

a. -2 Log likelihood = 84.822

b. Overall percentage = 77.1%

## DISCUSSION

### *Relationship between Knowledge and Prevention Practices Regarding GDM among Pregnant Women.*

The findings in this study showed that knowledge had a significant relationship to the preventive behavior of GDM ( $\chi^2 = 24.882$ ; p-value < 0.001). It was found that, in general, there are still many pregnant women in Bogor City who do not know about diabetes mellitus in pregnancy, and they also do not understand that pregnant women are at risk of developing diabetes during pregnancy. Although based on the results revealed that the average knowledge score of pregnant women is more likely to have good knowledge. This results because some respondents already understand about general Diabetes Mellitus, such as Type-2 DM, but they do not understand about GDM in spesific.

The correlation between knowledge and behavior practices regarding GDM can be seen in that the majority of pregnant women with poor knowledge have poor Gestational Diabetes prevention behavior, which is 39.8%. Vice versa, most pregnant women with good knowledge have good preventive behavior at 37.3%. This finding is consistent with some previous studies. Tan et al. (2023) in China demonstrated a strong association between maternal knowledge and preventive practices related to GDM (p < 0.001). Similarly, Muflihah & Nisa (2024) in Semarang, Indonesia, reported a significant correlation between knowledge and behavior regarding diabetes mellitus prevention (p = 0.028). In line with this, a study in Zambia found a significant correlation between knowledge scores and preventive practice scores concerning GDM (p = 0.008) (Yizukanji & Mwanakasale, 2018). A more recent study by Baharuddin et al. (2024) in Malaysia also confirmed that maternal knowledge significantly influenced family planning behavior among women at risk of GDM (p < 0.001).

From a theoretical standpoint, these findings align with Green's Precede-Proceed behavioral model, which categorizes knowledge as a predisposing factor that influences the development of health behavior (Irwan, 2017). According to this framework, practice or behavior change is unlikely to occur without the presence of sufficient knowledge that shapes attitudes, beliefs, and motivations. Therefore, improving maternal knowledge about GDM, including its definition, causes, risks, complications, and prevention strategies, is a critical intervention point for antenatal care. With knowledge of these aspects, mothers will be more aware of what to do and what to avoid during their pregnancy to ensure the well-being of their pregnancy. These metabolic disorders that can occur during pregnancy can be prevented through early diagnosis and proper treatment. However, a lack of awareness among pregnant women

regarding the severity of diabetes in pregnancy and its preventive measures will result in poor control and self-management of this insulin metabolic disorder. Therefore, mothers need proper knowledge about gestational diabetes so that they can help mothers to be more vigilant and carry out behavioral practices such as controlling blood sugar levels properly during pregnancy (Wimalajeewa & Hettiaratchi, 2021).

Interestingly, although most respondents demonstrated a general understanding of diabetes, the study revealed a low level of specific awareness regarding Gestational Diabetes Mellitus (GDM). Participants with good knowledge of GDM were more likely to engage in preventive practices (37.3%), whereas those with poor knowledge showed significantly lower levels of preventive behavior (39.8%). This discrepancy underscores a critical gap in maternal health education. The low awareness of GDM identified in this study presents a pressing public health concern. Without adequate knowledge, pregnant women may fail to recognize early symptoms, delay seeking medical attention, or neglect recommended preventive actions—thereby increasing the risk of adverse outcomes for both mother and fetus. Inadequate understanding of GDM also contributes to poor self-regulation and ineffective management of metabolic disturbances, which can escalate into serious complications such as preeclampsia, macrosomia, or even stillbirth.

It is also important to note that while knowledge emerged as the strongest and most direct predictor of GDM preventive behavior in the multivariate analysis, the bivariate analysis revealed significant associations between two characteristics of respondents – age ( $p\text{-value}=0.019$ ), and family history of diabetes mellitus ( $p\text{-value}=0.021$ ) - and preventive behavior. Although these variables did not remain statistically significant in the adjusted model, they may still influence health behavior indirectly or act as moderating or interacting factors. For instance, older maternal age may be associated with greater health awareness or motivation to engage in preventive practices, while a family history of diabetes could increase personal risk perception and influence the readiness to adopt healthier behaviors. These findings suggest that knowledge alone, although central, does not operate in isolation, and that sociodemographic and familial factors may shape how knowledge is acquired, interpreted, and applied in daily life

After controlling for age and family history of DM, knowledge about GDM is still a dominant factor related to preventive behavior of GDM. It showed that it is important to enhance the knowledge of pregnant women and their families about GDM, thereby ensuring that pregnant women are aware of preventing diabetes mellitus during pregnancy.

The researcher acknowledges some limitations encountered during the execution of this study:

1. This study employed a cross-sectional design, meaning that data collection was conducted at a single point in time using only a questionnaire. This design limits the ability to establish cause-and-effect relationships or observe changes in behavior over time.
2. The researchers did not conduct in-depth observations of pregnant mothers' GDM prevention practices over a specified period. Consequently, prevention behavior scores were based solely on

self-reported answers from the respondents, which may not always accurately reflect actual practices.

3. Data collection took place while respondents were waiting in line for antenatal care. The conditions at the location were not always conducive, leading to some respondents completing the questionnaire with reduced focus. This raises the possibility of misunderstandings in their responses to the questionnaire items.

## CONCLUSION

There is a significant relationship between knowledge and preventive behavior of GDM among pregnant women. This study provides strong empirical support for the practical theory proposed by Lawrence Green, which identifies knowledge as a key predisposing factor influencing individual health behavior. These findings confirm that maternal knowledge is significantly related to preventive behavior of Gestational Diabetes Mellitus, even when controlling for other potentially influential factors such as age and family history of diabetes. While age and genetic predisposition initially appeared significant in bivariate analysis, their influence diminished in logistic regression, further reinforcing the central role of knowledge. Health promotion programs targeting GDM prevention should prioritize educational components, particularly for women of reproductive age. Antenatal care services must include comprehensive, culturally appropriate, and easily accessible information about GDM, its risk factors, complications, and preventive strategies.

We recommend that future studies should explore interaction effects between knowledge and individual characteristics—such as age, education level, or risk perception—to better understand the pathways through which GDM preventive behaviors are formed. Additionally, qualitative research could provide deeper insights into how women with a family history of diabetes perceive their risk and make health-related decisions. Understanding these nuanced influences can help tailor educational interventions to be more responsive to individual differences and lived experiences.

## AUTHOR CONTRIBUTION

**Salmah Nurrahmah:** Developing the Proposal, Collecting Data, Analyzing, and Writing the First Draft of the Manuscript.

**Irma Nurbaeti:** The Study's Conception and Design, Data Acquisition, Revised the Final Draft, and Gave Final Approval of the Version to be Published.

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## CONFLICT OF INTEREST

There is no conflict of interest in this research.

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