



Blood Glucose Level Screening Among Pregnant Women At Bunda Mulia Hospital

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Abstract

Gestational diabetes mellitus (GDM) is a glucose tolerance disorder first identified during pregnancy that may lead to maternal and fetal complications if not detected early. This study aimed to describe blood glucose levels among pregnant women at Bunda Mulia Hospital. A descriptive study with a cross-sectional approach was applied. Samples were selected using consecutive sampling, involving 139 pregnant women who met the inclusion criteria during April to June 2026. Blood glucose levels were measured using the Point of Care Testing (POCT) method on capillary blood, then analyzed univariately and presented as frequency distribution. The results showed that 134 respondents (96.40%) had normal blood glucose levels and 5 respondents (3.60%) had abnormal levels, with a mean of 93.25 mg/dL, a minimum of 62 mg/dL, and a maximum of 233 mg/dL. It can be concluded that most pregnant women at Bunda Mulia Hospital had good blood glucose regulation, although a small proportion were at risk of GDM. The POCT method can be used as a rapid and practical early screening tool for detecting glucose tolerance disorders in pregnant women.

Keyword: Gestational Diabetes Mellitus, Blood Glucose, Pregnant Women, Point Of Care Testing, Screening

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1. Introduction

Glucose is the primary source of energy for human body cells and plays an important role in supporting various metabolic processes and physiological activities. Blood glucose levels are strictly regulated by the hormone insulin to remain within the normal range, allowing the organs and tissues of the body to function optimally. However, during pregnancy, the mother's body undergoes various physiological changes that may affect blood glucose homeostasis, making pregnant women a group that is particularly vulnerable to impaired glucose regulation (Putri, 2024).

These changes occur because fetal growth and development throughout pregnancy require a continuous supply of energy, thereby triggering metabolic adaptations in the maternal body, including increased insulin resistance due to the influence of placental hormones such as *human placental lactogen*, estrogen, and progesterone. These metabolic changes increase the risk of gestational diabetes mellitus (GDM), a disorder of glucose tolerance that is first diagnosed or develops during pregnancy. If GDM is not detected and properly managed, it may lead to various complications for both the mother and the fetus (Putri, 2024).

Gestational diabetes mellitus (GDM) is defined as a disorder of glucose tolerance that is first diagnosed or detected during pregnancy. This condition generally occurs because the body is unable to adequately compensate for the increased insulin resistance that develops during pregnancy (Putri, 2024). If GDM is not properly monitored and managed, various serious complications may arise, affecting both maternal and fetal health. In mothers, complications may include an increased risk of preeclampsia, ketonemia, and urinary tract infections, which may worsen pregnancy outcomes and increase the likelihood of cesarean delivery (Nugraha, 2023). Meanwhile, in fetuses and newborns, uncontrolled GDM may result in perinatal complications such as macrosomia, neonatal hypoglycemia, and neonatal jaundice (Nugraha, 2023). In addition, GDM may contribute to hypertension during pregnancy, polyhydramnios, excessive fetal growth, and an increased risk of preterm delivery. Therefore, early detection through routine and periodic blood glucose testing in pregnant women is essential (Nugraha, 2023).

Pregnant women with gestational diabetes mellitus rarely experience specific symptoms; therefore, screening is necessary. Early detection of GDM in pregnant women is important to ensure appropriate and timely management. In addition, early detection may contribute to improving maternal well-being both during pregnancy and after delivery, as well as promoting better health outcomes for the fetus and newborn (Arantika & Pratiwi, 2024).





The effects and complications of gestational diabetes mellitus include an increased risk of excessive weight gain, preeclampsia, cesarean delivery, and perinatal complications in newborns, such as macrosomia, neonatal hypoglycemia, and neonatal jaundice, as well as cardiovascular complications that may increase the risk of maternal mortality. A study reported that GDM not only increases the risk of cardiovascular disease among women with a family history of diabetes mellitus but may also increase the likelihood of cardiovascular events occurring at a younger age (Olii et al., 2024).

Pregnant women who did not previously have diabetes may experience hormonal changes that lead to increased blood glucose levels. This condition is known as gestational diabetes, in which pregnancy-related hormones may cause an increase in blood glucose levels in pregnant women (Sahayati & Rahmuniyati, 2022). The increasing prevalence of diabetes mellitus worldwide is a growing concern. According to the World Health Organization (WHO), diabetes mellitus affects a large population worldwide (Rinanda et al., 2022).

Gestational diabetes mellitus can be prevented and managed by identifying existing risk factors and preventing the emergence of additional risk factors. Initial management of GDM involves lifestyle interventions, including medical nutrition therapy and regular physical activity. Patients are also advised to monitor their blood glucose levels frequently at home to ensure that glycemic targets are achieved (Adli, 2021).

In this study, blood glucose levels among pregnant women at Bunda Mulia Hospital were measured using the *Point-of-Care Testing* (POCT) method. This method was selected because it offers practicality, rapid test results, and ease of implementation in clinical settings without requiring complex sample preparation procedures, as required in conventional laboratory methods. Through this study, it is expected that a real-world description of blood glucose levels among pregnant women at Bunda Mulia Hospital can be obtained, providing initial information for healthcare professionals in identifying pregnant women who are at risk of impaired glucose tolerance or GDM at an early stage. The findings may also serve as an evaluation tool for the hospital to improve the quality of blood glucose testing services for pregnant women, particularly regarding the effectiveness of POCT as a routine screening method in obstetric clinics and emergency departments. Furthermore, the findings are expected to provide a basis for future research aimed at developing more structured programs for the early detection and management of GDM, thereby minimizing the risk of maternal and fetal complications through timely and appropriate interventions.





2. Research Methods

This study employed an observational research design with a *cross-sectional* approach (Saimi, 2026), which aimed to screen blood glucose levels among pregnant women at Bunda Mulia Hospital without administering any intervention or assessing causal relationships between variables. Data collection was conducted during a specific period, in which each subject was measured once for the variable under investigation, namely blood glucose levels measured using the Point-of-Care Testing (POCT) method. This approach was selected because it was consistent with the primary objective of the study, which was to provide an overall screening profile of normal and abnormal blood glucose levels among pregnant women examined at the hospital. The findings can therefore serve as preliminary information for screening and monitoring the risk of gestational diabetes mellitus in healthcare facilities (Swarjana & SKM, 2023).

This study was conducted over a three-month period, from April 1, 2026, to June 30, 2026. This period included the preparation stage, data collection, measurement of blood glucose levels among pregnant women using the POCT method, and recording of research results. The study was conducted at Bunda Mulia Hospital, which served as the location for sample collection and blood glucose examinations among the pregnant women participating in the study. Bunda Mulia Hospital was selected as the study site based on the availability of subjects who met the research criteria and the feasibility of conducting blood glucose examinations directly within the healthcare facility.

The population in this study consisted of all pregnant women in their third trimester who underwent examinations or visited Bunda Mulia Hospital during the study period, from April 1, 2026, to June 30, 2026. The population was defined as all pregnant women who visited the healthcare facility during the study period and met the predetermined observation criteria, totaling 139 respondents.

The sample consisted of third-trimester pregnant women who met the research criteria and were willing to participate in blood glucose testing using the POCT method. The sampling technique used was *non-probability sampling* with a *consecutive sampling* method, in which participants were selected based on predetermined inclusion and exclusion criteria. The inclusion criteria were pregnant women who visited Bunda Mulia Hospital during the study period, were willing to participate as respondents, and consented to capillary blood sampling for blood glucose testing. The exclusion criteria included pregnant women who declined to participate, pregnant women whose condition did not permit capillary blood sampling, or those with incomplete examination results. The total sample consisted of all third-trimester pregnant women who met these criteria during the study period, totaling 139 pregnant women.





The main variable in this study was blood glucose level among third-trimester pregnant women examined at Bunda Mulia Hospital using the POCT method. This variable was quantitative, expressed in mg/dL, and subsequently categorized into normal and abnormal blood glucose levels based on the reference values used in the study.

The instruments and materials used in this study consisted of a POCT blood glucose meter (glucometer, ACCU-CHEK) equipped with blood glucose test strips. In addition, disposable lancets were used for capillary blood sampling from the fingertip, cotton or alcohol swabs were used to disinfect the puncture site before blood collection, and disposable medical gloves were used as personal protective equipment for the examiner. After blood collection, dry cotton or a plaster was used to cover the puncture site to prevent further bleeding and maintain cleanliness of the puncture area.

Blood sampling and blood glucose measurement in this study were performed using the POCT method with capillary blood obtained from the fingertip. Before the examination, the research subjects were provided with an explanation regarding the purpose and procedures of the examination and were asked to provide consent in accordance with the principle of *informed consent*. Subsequently, all required instruments and materials, including the POCT glucometer and test strips, disposable lancets, cotton or alcohol swabs, medical gloves, and research data recording sheets, were prepared according to the applicable standard operating procedures.

The examination procedure began by cleaning the fingertip with cotton or an alcohol swab and allowing the area to dry. The fingertip was then punctured using a disposable lancet to obtain capillary blood. An adequate blood drop was subsequently applied to the glucometer test strip according to the manufacturer's instructions. The test strip containing the blood sample was processed by the device, and after several seconds, the blood glucose level in mg/dL was displayed on the glucometer screen.

The blood glucose value displayed on the device was then recorded on the research data sheet along with the subject's identification code and examination time for subsequent data processing and analysis. After the examination, the puncture site was covered with dry cotton or a plaster, and all disposable materials were discarded in designated medical waste containers in accordance with occupational safety procedures. The entire blood sampling and examination process was performed in accordance with POCT standard operating procedures and aseptic principles to ensure that the results obtained were valid and scientifically accountable.

The data obtained from blood glucose examinations among pregnant women using the POCT method were initially edited, checked for completeness, and recorded to ensure that the collected data were complete, clear, and ready for analysis. The data were





subsequently organized and grouped according to the research variables, followed by tabulation to facilitate the presentation of the findings in the form of frequency distribution tables.

Data analysis was performed using univariate analysis because this study was descriptive in nature and aimed to describe blood glucose levels among pregnant women without examining relationships between variables. The examination results were presented as frequencies and percentages and, where appropriate, were supplemented with the mean, minimum, and maximum blood glucose levels. Blood glucose levels were subsequently categorized as normal or abnormal based on the reference values applied in the study, allowing the distribution of blood glucose levels among pregnant women at Bunda Mulia Hospital to be presented clearly and systematically.

This study was designed and conducted in accordance with the ethical principles of health research, including respect for autonomy, beneficence, non-maleficence, and justice. Before blood glucose testing was performed, each prospective research subject was provided with clear information regarding the purpose of the study, the examination procedures, potential discomfort that might occur, and the use of the research findings. After receiving the explanation, subjects were asked to provide consent to participate through an informed consent process, and only pregnant women who agreed to participate were included in the study.

The confidentiality of subjects' identities and personal data was maintained by assigning codes to the data sheets and excluding full names or other identifying information from the research report. Examination results were used solely for scientific purposes and service quality improvement and were not published in a form that could reveal individual identities. The study was also conducted after obtaining permission from Bunda Mulia Hospital and Politeknik Piksi Ganesha.

3. Research Results and Discussion

a. Result

The general characteristics of the respondents in this study are presented in Table 1. During the study period, 139 pregnant women met the inclusion criteria and agreed to participate as respondents. Based on age, most respondents were in the 20–35-year age group, comprising 103 respondents (74.10%), followed by those aged >35 years, with 28 respondents (20.14%), and those aged <20 years, with 8 respondents (5.75%). Based on parity, most respondents were multigravida, accounting for 99 respondents (71.22%), while 40 respondents (28.77%) were primigravida. This distribution indicates that the majority of respondents were within the optimal reproductive age range, although some respondents were in age groups considered at higher risk, namely <20 years and >35 years.



**Table 1.** Frequency Distribution of Respondent Characteristics

Characteristic	Category	Frequency (n)	Percentage (%)
Maternal age	<20 years	8	5.75
	20–35 years	103	74.10
	>35 years	28	20.14
Parity	Primigravida	40	28.77
	Multigravida	99	71.22
Total		139	100

The results of blood glucose screening among pregnant women at Bunda Mulia Hospital using the POCT method are presented in **Table 2**. The examination results showed that, of the 139 respondents, 134 pregnant women (96.40%) had blood glucose levels classified as normal, whereas 5 pregnant women (3.60%) had abnormal blood glucose levels based on the reference range of 70–180 mg/dL.

Table 2. Frequency Distribution of Blood Glucose Levels

Blood Glucose Category	Reference Value (mg/dL)	Frequency (n)	Percentage (%)
Normal	70–180	134	96.40
Abnormal	>180	5	3.60
Total		139	100

Based on the measurements, the blood glucose levels among respondents ranged from a minimum of 62 mg/dL to a maximum of 233 mg/dL, with a mean value of 91.15 ± 26.86 mg/dL. This mean value indicates that, overall, the blood glucose levels of pregnant women in this study were within the normal range. The descriptive statistics of blood glucose levels are presented in Table 3.

Table 3. Descriptive Statistics of Blood Glucose Levels

Parameter	Blood Glucose Level (mg/dL)
Minimum	62
Maximum	233
Mean $\pm$ SD	91.15 26.86





b. Discussion

The results showed that most third-trimester pregnant women at Bunda Mulia Hospital had blood glucose levels within the normal category, comprising 134 respondents (96.40%), while a small proportion, consisting of 5 respondents (3.60%), had abnormal blood glucose levels. These findings indicate that, in general, blood glucose regulation among pregnant women at the hospital was within the normal range. Nevertheless, the risk of gestational diabetes mellitus (GDM) should remain a concern, considering that some respondents had blood glucose levels outside the reference range.

Physiologically, this condition can be explained by metabolic changes that occur during pregnancy. Increased insulin resistance during pregnancy is influenced by placental hormones such as *human placental lactogen*, estrogen, and progesterone. In most pregnant women, the pancreas is still able to compensate for the increased insulin resistance by increasing insulin secretion, thereby maintaining blood glucose levels within the normal range. In contrast, in some pregnant women, this compensatory response may be inadequate, resulting in hyperglycemia, as reflected by blood glucose levels above the reference value.

The mean blood glucose level in this study was 91.15 ± 26.86 mg/dL, indicating that the overall distribution of blood glucose levels was within the normal range. However, the relatively wide range, from 62 mg/dL to 233 mg/dL, demonstrates individual variation that should be considered. The minimum value of 62 mg/dL may indicate a possible hypoglycemic condition in some respondents, whereas the maximum value of 233 mg/dL indicates that some pregnant women had significant hyperglycemia and may require further evaluation for GDM. This variation highlights the importance of interpreting blood glucose levels individually rather than relying solely on the group mean.

The finding that most respondents had normal blood glucose levels is consistent with several previous studies reporting that the majority of pregnant women had blood glucose levels within the normal range during routine antenatal examinations. Differences in the proportion of abnormal blood glucose levels among studies may be influenced by population characteristics, examination methods, and the reference values applied. Therefore, the findings of this study should be compared cautiously with other studies that use comparable examination methods and reference thresholds.

Several studies have reported that risk factors such as maternal age above 35 years, obesity, and a family history of diabetes mellitus contribute to impaired glucose tolerance during pregnancy. However, it should be emphasized that this study was





descriptive in nature and did not analyze the association between these risk factors and blood glucose levels. Therefore, these factors are presented only as contextual information for understanding the findings and not as results of statistical analysis. Further research examining the relationship between risk factors and hyperglycemia among pregnant women may provide valuable insight.

The findings of this study have practical implications, particularly regarding the use of POCT as a rapid, convenient, and efficient method for blood glucose screening. The practicality of this method enables early identification of pregnant women who may be at risk of impaired glucose tolerance, allowing appropriate follow-up and diagnostic confirmation to be conducted promptly to prevent maternal and fetal complications. Therefore, routine blood glucose testing among pregnant women may serve as an initial step in identifying the risk of GDM at an early stage, particularly in healthcare facilities with limited access to conventional laboratory testing.

This study has several limitations. First, the *cross-sectional* design only assessed blood glucose levels at a single point in time and did not evaluate causal relationships between variables. Second, the sample was limited to a single hospital; therefore, the findings cannot be generalized to the broader population of pregnant women. Third, POCT is a rapid screening method and is not considered the gold standard for laboratory glucose measurement; therefore, abnormal findings should be confirmed using an appropriate laboratory method, such as the enzymatic hexokinase method. Fourth, potential confounding factors, such as the respondents' most recent food intake, were not strictly controlled during random blood glucose measurement. Therefore, the findings should be interpreted as an initial description and followed by further studies involving larger and more diverse populations, prospective study designs, and confirmation using gold-standard laboratory methods (Abduh et al., 2023).

4. Conclusion

Based on the results of the study and data analysis regarding the frequency distribution of blood glucose levels among 139 third-trimester pregnant women at Bunda Mulia Hospital, it can be concluded that, in general, the blood glucose levels of the pregnant women were within the normal range. The mean blood glucose level was 93.25 mg/dL, with the lowest value being 62 mg/dL and the highest value being 233 mg/dL.

The majority of respondents, consisting of 134 pregnant women (96.40%), had blood glucose levels within the normal range, indicating that most third-trimester pregnant women at Bunda Mulia Hospital had good blood glucose regulation. Meanwhile, 5 respondents (3.60%) were identified as having abnormal blood glucose levels and may therefore be at risk of impaired glucose tolerance or gestational diabetes mellitus.





These findings indicate that blood glucose measurement using the POCT method can be utilized as a rapid and practical initial screening tool for identifying pregnant women who may be at risk. However, the findings of this study provide an initial description and should be followed up by further research involving a larger sample, a prospective study design, and confirmation using gold-standard laboratory methods.

References

- Abduh, M., Alawiyah, T., Apriansyah, G., Sirodj, R. A., & Afgani, M. W. (2023). Survey design: Cross sectional dalam penelitian kualitatif. *Jurnal Pendidikan Sains Dan Komputer*, 3(01), 31–39.
- Adli, F. K. (2021). Diabetes Melitus Gestasional: Diagnosis dan Faktor Risiko. *Jurnal Medika Hutama*, 3(01 Oktober), 1545–1551.
- Arantika, F., & Pratiwi, F. (2019). *Patologi Kehamilan (Memahami berbagai Penyakit dan Komplikasi Kehamilan)*. Yogyakarta: Pustaka Baru Press.
- NUGRAHA, A. (2023). A MANAJEMEN DIABETES MELITUS DALAM KEHAMILAN. *Jurnal Medika Hutama*, 4(04 Juli), 3585–3601.
- Olii, N., Astuti, E. R., Tompunuh, M. M., Ibrahim, F., Podungge, Y., Yulianingsih, E., Temenggung, I., Anjarwati, P., Mahmud, P. A., & Malipi10, R. (2024). Skrining Diabetes Melitus Gestasional Melalui Pemeriksaan Glukosa Darah Pada Ibu Hamil. *JMM (Jurnal Masy. Mandiri)*, 8(2), 2352.
- Putri, N. N. (2024). *GAMBARAN KADAR GLUKOSA DARAH SEWAKTU PADA IBU HAMIL DI RSUD PRINGSEWU 2023*. Poltekkes Kemenkes Tanjungkarang.
- Rinanda, P. D., Delvika, B., Nurhidayarnis, S., Abror, N., & Hidayat, A. (2022). Perbandingan Klasifikasi Antara Naive Bayes dan K-Nearest Neighbor Terhadap Resiko Diabetes pada Ibu Hamil: comparison of classification between Naive Bayes and k-nearest neighbor on diabetes risk in pregnant women. *MALCOM: Indonesian Journal of Machine Learning and Computer Science*, 2(2), 68–75.
- SAHAYATI, S. R. I., & Rahmuniyati, M. E. (2022). Pemeriksaan Gula Darah pada Ibu Hamil Sebagai Deteksi Awal Diabetes Gestasional. *Jurnal Pengabdian Kesehatan Masyarakat*, 1(2), 62–68.
- Saimi, S. (2026). Epidemiologi dan Metodologi Penelitian dalam Riset Kesehatan. *AMU Press*, 1–489.
- Swarjana, I. K., & SKM, M. P. H. (2023). *Metodologi penelitian kesehatan: Edisi terbaru*. Penerbit Andi.

