Meditory
(The Journal Of Medical Laboratory)

COMPARISON OF IMMEDIATE AND TWO-HOUR DELAYED BLOOD GLUCOSE RESULTS IN PREGNANT WOMEN

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Abstract

Background: *Laboratory tests are needed to help diagnose a disease and get accurate test results. Blood glucose tests are intended for early detection and monitoring of blood glucose levels, especially in pregnant women. Delays in testing are still common, such as too many samples, limited staff, and damage to equipment. Blood glucose tests are done using serum samples and then tested with the Cobas C111 spectrophotometer.* ***Aims:*** *to determine whether there is variation in the blood glucose results in tests performed immediately and delayed by two hours in first-trimester pregnant women.* ***Methods:*** *This study is experimental. This is study used a total sampling technique of thirty samples.* ***The Results:*** *showed that twenty-one respondents were not indicated with Diabetes Mellitus and nine respondents tend to be indicated with Diabetes Mellitus in first trimester pregnant women. Average results of blood glucose levels using serum done immediately 93.67 mg/dL and serum delayed two hours 90.30 mg/dL. Paired Sample T-Test statistical test obtained a significance value of 0.000, which means the significance value of p-value <0.05.* ***Conclusions:*** *There's a difference in the results of blood glucose tests performed immediately and delayed two hours in first-trimester pregnant women.*
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Keywords: First-trimester pregnant women, Blood glucose level, Immediate examination, Two hour delay

1. Introduction

Blood chemistry examination in the laboratory that is often done is blood glucose examination. One of them is the examination of blood glucose which aims as a screening test (early detection) of Diabetes Mellitus disease, also useful monitoring the blood glucose levels of people with Diabetes. Random blood glucose is a blood glucose level test that can be done at any time, does not require the patient to fasting and one of the indicators of examination to determine a person's blood glucose levels.

Determination of blood glucose level is as standard for the diagnosis of Diabetes Mellitus, a disease caused by the failure of

blood glucose regulation or carbohydrate metabolism disorder in the body (1).

Diabetes mellitus is classified into three types, there were type one diabetes mellitus caused by the absence of insulin production at all, type two diabetes mellitus caused by insufficient and ineffective insulin work and gestational diabetes mellitus is diabetes mellitus that occurs during pregnancy (2). Pregnant women with Gestational Diabetes Mellitus almost never complain, so screening is necessary (3).

The most common specimen used for blood glucose testing is serum. This is because the blood glucose level in serum is more stable. If the serum is not directly centrifuged, glycolysis can occur which results in a decrease in the glucose level in the serum (4). Glycolysis can reduce serum blood glucose levels by 5-7% per hour at room temperature (5). Therefore, blood samples collected should be centrifuged immediately to ensure accurate glucose level results (6). Glycolysis can also decrease due to the influence of temperature and long storage (7).

Delayed examination is one of the phenomena that can occur in the laboratory. Delays can occur because they are collected first with other samples, so there are often delays in examining the first sample that arrives, usually in inpatients who are not immediately analyzed but are collected first. This occurs due to the large number of samples that must be analyzed, limited manpower, time-consuming shipping process, limited reagents and equipment damage (8).

Research conducted by Apriani and Umami, stated that the results of the delay of plasma and serum samples for two hours decreased blood glucose levels and no significant differences were found (9). Research by Rahmatunisa et al. stated that the results of the delay decreased blood glucose levels and there was significant difference in the results of blood glucose levels checked immediately and stored for twenty-four hours at a temperature of 2-8ºC (4). Based on the background description above, the authors conducted a study to determine whether there was a difference in the results of blood glucose testing done immediately and delayed two hours in Trimester I pregnant women.

2. Research Methods

This study is an experimental research. This study was conducted at YPK Mandiri Hospital Laboratory located in the Menteng area, Central Jakarta. This study used the Total Sampling Technique as many as thirty samples of Trimester I pregnant women who performed a blood glucose test at YPK Mandiri Hospital and were willing to be respondents. Independent variables in this study are the time of examination carried out immediately and the time of examination delayed by two hours. The dependent variable in the research is the result of the blood glucose level.

The collected samples were divided into two parts. The first part of the serum was directly examined. The second treatment of serum was allowed to stand for two hours. The examination of blood glucose levels using the GOD-PAP method. Data were then analyzed descriptively through the highest value, the lowest value, and the average of the results of the examination of blood glucose levels in serum that was done immediately and delayed for two hours and tested by statistical tests using the Paired Sample T-Test.

3. Results and Discussions

Table 1. Distribution by Gestational Age

Gestational Age (Week)	Quantity
1-4	8
5-8	14
9-12	8
Total	30

Source: Primary Data (2023)

Based on Table 1, the distribution of gestational age is mostly 5-8 weeks, with a total of 14 women, then the gestational age of 1-4 weeks and 9-12 weeks, with a total of 8 each women.

Table 2. Distribution of Instant Blood Glucose Levels

Time of Examination of Intermittent Blood Glucose Level (mg/dL)	Minimum	Maximum	Mean
Immediately	71 mg/dL	123 mg/dL	93.67 mg/dL
Delay Two Hours	67 mg/dL	120 mg/dL	90.30 mg/dL

Source: Primary Data (2023)

Based on Table 2, the distribution of blood glucose levels had an average of 93.67 mg/dL with a minimum levels of 71 mg/dL and a maximum levels of 123 mg/dL in the immediate examination, then the blood glucose levels delayed for 2 hours had an average of 90.30 mg/dL with a minimum levels of 67 mg/dL and a maximum levels of 120 mg/dL.

Table 3. Distribution of Blood Glucose Levels Based on DM Criteria

GDS level (mg/dL)	Quantity	Description
<100	21	Not DM
100-199	9	Not Definitely DM
>200	0	DM

Source: Primary Data (2023)

Based on Table 3, twenty-one respondents were not indicated with Diabetes Mellitus with a blood glucose level <100 mg/dL and nine respondents tended to be indicated with Diabetes Mellitus with a blood glucose level ranging from 100-199 mg/dL in the sample immediately done and delayed for two hours (10).

Table 4. Paired Sample T-Test Results

Test of Paired		
Mean difference	**Immediately**	**Delayed by Two hours**
Sig.	0.000	0.000

Source: Primary Data (2023)

Based on Table 4, the Paired Sample T-Test results showed that the Sig value. 0.000 where the p value is <0.05, which indicates a significant difference in blood glucose levels at the time of immediate and delayed for two hours.

The results of the sample examination that was done immediately had an average value of 93.67 mg/dL and those that were delayed for two hours had an average value of 90.30 mg/dL. The results of the study based on the distribution of current blood glucose criteria showed twenty one respondents who were not indicated by Diabetes Mellitus with a current blood glucose level of <100 mg/dL and 9 respondents tended to be indicated by Diabetes Mellitus with a current blood glucose level ranging from 100-199 mg/dL in samples done immediately and delayed for two hours (10). Gestational diabetes mellitus is diabetes mellitus that occurs during pregnancy (2). Pregnant women with Gestational Diabetes Mellitus rarely give complaints, so screening is necessary. Early detection is needed to recognize Gestational Diabetes Mellitus and manage it as effectively as possible, especially in pregnant women with risk factors (3). Factors that increase the risk of gestational diabetes mellitus: obesity, previous history of gestational diabetes mellitus, family history of diabetes, recurrent abortions, history of delivery with congenital anomalies or babies weighing >four kilograms, and history of pre-eclampsia. Patients who have these danger factors need to be further evaluated after the standard diagnosis of Diabetes Mellitus at the first antenatal visit (11).

The Paired Sample T-Test test results have a Sig value. 0.000 which means there is a significant difference. This study is in line with previous research on differences in variations in length of delay there is a significant difference and a decrease in blood glucose levels (12). The results showed that samples that were left or

delayed at room temperature for two hours showed a decrease in blood glucose. Room temperature is one of the factors affecting the concentration of serum glucose levels. This result is by Sacher's statement that samples stored at room temperature will experience a decrease in blood glucose levels by 1-2% per hour (13). This decrease can be caused by glycolysis, which is the metabolic breakdown of a six-carbon atom glucose molecule to produce two three-carbon atom pyruvate molecules (14). The decrease in glucose levels can occur both inside and outside the body. The decrease in glucose levels that occurs outside the body is after the blood sample is removed. Without the addition of glycolysis inhibitors, components in the blood, namely erythrocytes, platelets that use glucose as a food source can reduce blood glucose levels (1). Therefore, blood glucose examination should be done as soon as possible so that the results obtained are optimal according to the patient's condition (4).

4. Conclusions

Based on the results of the study, it can be concluded that: blood glucose levels during the delayed examination decreased. There is a significant difference in the results of pregnant women in Trimester I with the study of blood glucose examination immediate and delayed two hours.

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