

Analysis of Blood Glucose Levels Before and After Hemodialization in Patients of Chronic Kidney Failure in Santa's Hospital Elisabeth Medan

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Abstract

Background: Chronic kidney failure is a condition characterized by structural or functional disorders of the kidneys. In Indonesia, patients with chronic kidney failure who underwent active hemodialysis in 2015 reached 30,554 patients. Blood glucose levels in this study is an assessment based on a decrease or increase before and after hemodialysis in patients with chronic kidney failure. This study aims to analyze the results of blood glucose levels in patients with chronic kidney failure before and after hemodialysis at the Santa Elisabeth Hospital Medan 2022 patient. **Method:** This study used an analytical descriptive method. The total population in this study are 178 people with a total sample of 64 people. Retrieval of data results is done by using automation tools. **Results:** The results of the study of examining blood glucose levels before and after hemodialysis showed that the average blood glucose level of respondents before hemodialysis were 131.27 mg/dl with a Standard Deviation of 26,441 and at this average it can be said that the respondent's blood glucose level was still low. within normal limits. The blood glucose level after hemodialysis is 123.69 mg/dl with a standard deviation of 26.82. It can be concluded that there is a change in the average blood glucose level before and after hemodialysis, which is 8 mg/dl. Blood glucose levels before and after hemodialysis in this study can be said to be in the normal category. s blood glucose level was still low. within normal limits. The blood glucose level after hemodialysis is 123.69 mg/dl with a standard deviation of 26.82.

Conclusion: It can be concluded that there is a change in the average blood glucose level before and after hemodialysis, which is 8 mg/dl. Blood glucose levels before

and after hemodialysis in this study can be said to be in the normal category.

Keywords: Blood Glucose Levels, Chronic Kidney Failure and Hemodialysis Difference

INTRODUCTION

Chronic kidney failure is a global public health problem with an increasing prevalence and incidence of kidney failure, poor prognosis and high costs. Chronic renal failure is a disease where there is a structural or functional disorder of the kidney that lasts more than 3 months which is characterized by kidney damage with a decrease in the glomerular filtration rate in the form of signs of damage, namely persistent proteinuria, blood abnormalities, imaging abnormalities, atologic abnormalities, and had kidney transplantation. [1]

Based on data from the World Health Organization (WHO) in 2012 patients with acute and chronic kidney failure reached 50%. The United States Renal Data System (USRDS) records that the total number of patients treated for End Stage Renal Disease (ESRD) was estimated at 3,010,000 in 2012 with a growth rate of 7% and an increase of 3,200,000 in 2013 with a growth rate of 6%. . In Indonesia, the prevalence of Chronic Kidney Failure based on a doctor's diagnosis in the population aged 15 years in 2013 was 2.0 and increased in 2018 by 3.8% or

around one million population. Meanwhile, in patients with chronic kidney failure who underwent hemodialysis in 2015 as many as 51,604 patients, then increased again in 2017 to 108,723 patients. [2]

Hemodialysis therapy is a high technology as kidney replacement therapy to remove metabolic wastes or certain toxins from the human blood circulation such as water, sodium, potassium, hydrogen, urea, creatinine, uric acid, and other substances through a semi-permeable membrane as a separator. blood and dialysate fluid in an artificial kidney where the process of diffusion, osmosis and ultrafiltration occurs. The dialyzer is a semi-permeable membrane or membrane. This membrane can be passed by water and certain substances or waste substances. This process is commonly called dialysis, which is the process of transferring water or substances. In hemodialysis blood sugar can decrease due to sugar leaving the body in dialysate fluid during hemodialysis.

The results of Riskesdas 2013 also stated that one of the risk factors for kidney disease is Diabetes Mellitus. In people with diabetes mellitus, high

blood sugar levels that exceed normal limits can injure and damage the capillaries in the kidneys. As a result, the nephrons experience a lack of oxygen intake and clean blood so that the dirty blood in the body cannot be properly filtered. This can interfere with the body's metabolism as a whole because there will be a buildup of metabolic fluids and salts in the kidneys so that the kidneys cannot filter the fluids and salts, so hemodialysis is carried out for patients with chronic kidney failure. [3]

The decrease in blood glucose levels in patients with kidney failure can be detected by conducting laboratory examinations so that researchers can analyze the results of blood glucose levels to determine the decrease in results, so researchers are interested in examining blood glucose levels before and after hemodialysis at Santa Elisabeth Hospital Medan in 2022.

METHOD

1. Study Design

The research design is a comprehensive plan of the research covering the things that the writer will do, starting from making hypotheses and their operational implications to the final analysis, the data which are then concluded and given suggestions. A research design states both the structure of the research problem and the plan of investigation that will be

used to obtain empirical evidence about the relationships in the problem.

This type of research uses a descriptive approach, according to Soejono and Abdurrahman descriptive method can be interpreted as a problem solving procedure that is investigated by describing / describing the state of the subject / object of research (a person, institution, community and others) at the present time based on the facts that appear or as is. [4]

2. Population and Sample

2.1. Population

The population in this study was obtained from the Medical Records of the Santa Elisabeth Hospital Medan, namely all patients with Chronic Kidney Failure at the Santa Elisabeth Hospital Medan who underwent hemodialysis in January and February 2022 as many as 178 people.

2.2. Sample

For a known population, the Taro Yamane formula can be used to calculate the required number of samples.

From the results of these calculations, the number of samples taken was 64 people from a total population of 178 people in Outpatients in January and February 2022 at Santa Elisabeth Hospital Medan.

Sampling in this study was based on inclusion criteria, including:

- Outpatient Patients with Chronic Kidney Failure with Hemodialysis
- Researchers only perform hemodialysis once
- Blood samples are taken provided that the blood is

3. Study Variabel

According to (Setiadi, 2015: 95) "Research variables are all forms that are determined by the researcher to be studied so that information is obtained about it through an examination conducted by the researcher, then the researcher draws conclusions". The variables in this study were blood glucose levels before and after hemodialysis in patients with kidney failure at Santa Elisabeth Hospital Medan.

4. Operational Definition of Variables

Research Variables and Operational Definitions Analysis of Blood Glucose Levels Before and After Hemodialysis in Patients with Chronic Kidney Failure.

With research variables Blood Glucose Levels and operational definitions, analysis of blood glucose levels before and after hemodialysis in patients with chronic kidney failure is an assessment based on a quantitative decrease/increase in blood glucose before and after hemodialysis in patients with chronic kidney failure.

5. Study Instruments

5.1. Validity

Validity is a reliability that is owned in a measurement or instrument used. To find out that an instrument is valid, the instrument must be relevant both in terms of content, method and objectives. The principle of validity is measurement and observation, which means the principle of instrument reliability in making measurements to produce data. Researchers want to measure blood glucose levels, it is impossible for researchers to use a thermometer, but use a tool that should be used in their research. So, before the researcher conducts an examination, he first conducts an examination carried out before the research is carried out.

5.2. Reliability

Reliability is the similarity of the results of measurements or observations even though they have been measured or observed many times at different times. Efforts made by researchers to improve the reliability of measuring instruments are:

- Check the tool before use
- Pay attention to the principle of automation by choosing a tool that has been calibrated.
- Make improvements to the instrument in the form of a questionnaire sheet to document the measurement results.

6. Data Analysis

In quantitative research, the data analysis techniques used usually use statistics. The statistic used in this research is Descriptive Statistics of Frequency Distribution. Frequency distribution analysis technique is an analysis of data by describing or describing the data that has been collected as it is without intending to make conclusions that apply to the public. The frequency distribution analysis technique will describe or describe the Mean, Standard Deviation, CI, Minimum and Maximum using a computerized program after which the data will be presented

7. Research Ethics

The code of ethics for this research, according to the Health Research Ethics Commission, is No: 023/KEPK-SE/PE-DT/IV/2022 with the title Analysis of Blood Glucose Levels Before and After Hemodialysis at Santa Elisabeth Hospital, Medan in 2022.

RESULT

The results of the study were obtained on patients with chronic kidney failure who underwent hemodialysis therapy in the hemodialysis room at Santa Elisabeth Hospital Medan in 2022 with 64 respondents.

Table 1 Results of Blood Glucose Levels Before and After Hemodialysis Action Hemodialysis Room Santa Elisabeth Hospital Medan 2022

Blood Glucose Level	Frequency (f)	Percentage (%)
KGD Before HD		
Hypoglycemia=<73 mg/dL	0	0
Normal=74-179 mg/dL	60	98.3
Hyperglycemia=>180 mg/dL	4	6.3
Total	64	100
KGD After HD		
Hypoglycemia=<73 mg/dL	1	1.6
Normal=74-179 mg/dL	62	96.9
Hyperglycemia=>180 mg/dL	1	1.6
Total	64	100

Based on table 1, the highest blood glucose level before hemodialysis was 74-179 mg/dl, ie 60 people (98.3%) and it was said to be normal and the least

was > 180 mg/dl, namely 4 people, (6.3%) and it was said to be hyperglycemia. . And the highest blood glucose level after hemodialysis

was 74-179 mg/dl, which was 62 people (96.9%) and was said to be normal. The blood glucose level at

least <73 mg/dl is 1 person (1.6%) and is said to be hypoglycemic and at a value > 180 mg/dl is 1 person (1.6%).

Table 2 Statistical Results based on Blood Glucose Levels Before Hemodialysis Action Hemodialysis Room Santa Elisabeth Hospital Medan in 2022

Category	N	Min	Max	mean	St. Deviation	95% CI
Before Hemodialysis	64	85	188	131.27	26,441	124.66-137.87

Table 2 shows that from 64 respondents, the average blood glucose level before hemodialysis was 131.27 mg/dl with SD 26,441. The lowest score was 85 and the highest score was 188. The interval estimation

results at the 95% confidence level believed that the average blood glucose level before hemodialysis in the Santa Elisabeth Hospital Medan in 2022 was 124.66-137.87.

Table 3 Statistical Results based on Blood Glucose Levels After Hemodialysis Action Hemodialysis Room Santa Elisabeth Hospital Medan in 2022

Category	N	Min	Max	mean	St. Deviation	95% CI
After Hemodialysis	64	72	185	123.69	26,827	116.99-130,139

Table 3 shows that from 64 respondents, the average blood glucose level after hemodialysis was 123.69 mg/dl with SD 26,827. The lowest score was 72 and the glucose level after hemodialysis in the Santa Elisabeth Hospital Medan in 2022 was 116.99-130.

highest score was 185. The interval estimation results at a 95% confidence level believed that the average blood

Table 4 Distribution of Frequency Conclusions from the results of blood glucose levels after hemodialysis

Blood Glucose Level	Frequency (f)	Percentage (%)
Go on	24	37.5
Down	40	62.5
Total	64	100

Based on table 4, it was found that most of the blood glucose levels after hemodialysis decreased, namely 40 people (62.5%) and blood glucose levels that did not decrease or increase after hemodialysis were 24 people (37.5%).

DISCUSSION

Analysis of the results of blood glucose levels before hemodialysis in patients with chronic kidney failure

Results of Blood Glucose Levels Before hemodialysis is an examination that is carried out by taking samples before hemodialysis and then examined by researchers. Based on table 5.1 before hemodialysis, the highest blood glucose level was 74-179 mg/dl, namely 60 people (98.3%) and it was said to be normal and the least was > 180 mg/dl, namely 4 people (6.3%) these results called hyperglycemia. Examination of blood glucose levels before hemodialysis is carried out to provide an assessment before undergoing hemodialysis. Blood glucose levels before

hemodialysis in this study can be said to be in the normal category. This is used to prevent excessive glucose loss.

Analysis of the results of blood glucose levels after hemodialysis in patients with chronic kidney failure

Results of Blood Glucose Levels After hemodialysis is an examination where samples are taken after hemodialysis and then examined by researchers. The highest blood glucose level after hemodialysis was 74-179 mg/dl, namely 62 people (96.9%) and was said to be normal. The blood glucose level at least <73 mg/dl is 1 person (1.6%) and is said to be hypoglycemic. The results of blood glucose levels after hemodialysis decreased by 40 people (62.5%) and these results were still within normal limits. Hemodialysis action that can cause the elimination of metabolic wastes to be easier with the help of hemodialysis tools that are used to help the kidneys so that they become faster,

Analysis of the results of blood glucose levels before and after hemodialysis in patients with chronic kidney failure

The results of the average blood sugar levels before and after hemodialysis showed that the average blood glucose level before hemodialysis was 131.27 mg/dl. The average blood glucose level after hemodialysis was 123.69 mg/dl. The results of the average blood glucose levels in respondents after hemodialysis showed a difference, which was lower when compared to the average blood glucose levels before respondents underwent hemodialysis. From this value, it shows that there is an average change in blood glucose levels before and after hemodialysis, which is 8 mg/dl. From the results of measuring blood sugar levels on the research sample, it was found that patients undergoing hemodialysis were included in the normal category.

This is supported by research on decreasing blood glucose levels previously done by Elya Hartini, et al. (2012) about the effect of hemodialysis on reducing blood glucose levels in diabetic patients. In the Hemodialysis Room of Dr.H.Abdul Moeloek Regional General Hospital, Lampung. [5] [6] [7]

Province, the results showed that the blood sugar levels of respondents before hemodialysis were the same between 293 mg/dl as many as 20 people (50%) and > 293 mg/dl as many as 20 people. (50.0%), after hemodialysis was 293 mg/dl as many as 25 people (62.5%). Therefore, there is an effect of hemodialysis on blood sugar levels in patients between before and after hemodialysis (by 17 mg/dl).

The action of hemodialysis using glucose-free dialysate (glucose-free dialysate). The meaning of the above statement is that the amount of glucose will shift from the blood to the dialysate compartment, an estimated 25-30 g per hemodialysis procedure. Loss of glucose during hemodialysis procedures may cause dialysis-associated symptoms after hemodialysis. In patients undergoing hemodialysis therapy, the symptoms that often occur are decreased consciousness or shortness of breath, dilerium convulsions to coma, patients undergoing hemodialysis, prone to hypoglycemia. The influencing factors are decreased gluconeogenesis in the kidneys, reduced insulin secretion, poor food intake. less due to uremia, improved insulin resistance during hemodialysis.[5][6][7]

CONCLUSION

Based on the results of the analysis of blood glucose levels before and after hemodialysis in patients with chronic kidney failure at Santa Elisabeth Hospital Medan in 2022. It can be concluded that the average blood glucose level in respondents before hemodialysis was 131.27 mg/dl with SD 26,441 and on this average it can be said that the respondent's blood glucose level is still within normal limits. The blood glucose level after hemodialysis is 123.69 mg/dl with SD 26,827 and on this average it can be said that the respondent's blood glucose level is still within normal limits but has decreased.

This value indicates that there is a difference in the average blood sugar level of the respondents before and after hemodialysis, which is 8 mg/dl. Hemodialysis in patients with chronic kidney failure can cause a decrease in blood glucose levels. Examination of blood glucose levels before hemodialysis is carried out to provide an assessment before undergoing hemodialysis. Blood glucose levels before and after hemodialysis in this study can be said to be in the normal category.

CONFLICT OF INTEREST

The author declares that there is no conflict of interest in this study.

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