

DIFFERENCE NUMBER OF PRE ERYTHROCYTE CELLS AND POST HEMODIALYSIS PEOPLE WITH CHRONIC KIDNEY FAILURE

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DIFFERENCE NUMBER OF PRE ERYTHROCYTE CELLS AND POST HEMODIALYSIS PEOPLE WITH CHRONIC KIDNEY FAILURE

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Abstract

Patients suffering from reduced renal function are indicated by a reduction in the hormone erythropoietin. Hemodialysis is used as replacement therapy to replace deteriorating kidney function. The objectives of this research was to compare the difference in the mean number of erythrocyte cells pre and post hemodialysis to patients with chronic renal failure. This research used a pre-experimental method with one group pretest-posttest design. The sample were patients with chronic kidney failure in Rumah Sakit M. Yunus Bengkulu in 2018, as 38 patients were taken using accidental sampling technique. The results showed that the average number of erythrocyte cells pre hemodialysis was 4,056,000 cells / mm³, while the average number of erythrocyte cells mm³ was 3,816,000 cells / mm³ after statistical tests were obtained (P= 0.014). There is a difference average number of erythrocyte cells pre and post hemodialysis in patients with chronic renal failure in Rumah Sakit M. Yunus Bengkulu. Patients with chronic renal failure undergoing hemodialysis therapy are recommended to visit the laboratory regularly, to check the erythrocyte cell count and be given iron supplements to increase the number of erythrocyte cells.

Key Words: Erythrocyte cells, hemodialysis, chronic renal failure

INTRODUCTION

Chronic kidney failure is defined as condition in which the kidneys experience structural abnormalities or impaired function that has lasted more than three months. Chronic kidney failure is progressive and irreversible (at an advanced stage it cannot recover). In patients with chronic kidney failure, if kidney function has been greatly decreased, namely LFG ≤ 15 mL/minute^{1.73} m², it is necessary to do kidney replacement therapy such as hemodialysis, continuous ambulatory peritoneal dialysis, automated peritoneal dialysis and kidney transplantation to remove metabolic waste products and regulate fluid balance (Roesma et al, 2010).

Cases of chronic kidney disease (PGK) are currently increasing rapidly especially in developing countries. PGK has become a major health problem worldwide, because in addition to being a risk factor for heart and blood vessel disease will increase the number of pain and death (Nyoman, 2010). The number of people with kidney disorders has become a serious health

problem in the world. According to the World Health Organization (WHO) and the Global Burden of Disease (GBD), kidney and urinary tract disease has caused the deaths of about 850,000 people each year, indicating that the disease is ranked as the 12th highest mortality rate and the highest ranking to 17 disability rates (Saragih, 2010).

¹⁴ Chronic kidney failure is becoming a phenomenon in developed and developing countries. In Indonesia chronic kidney failure is a big problem. Prevalence increases by 10% per year, chronic kidney failure that is not well regulated can worsen towards end-stage kidney disease otherwise known as ESRD (End Stage Renal Disease). This end-stage requires permanent kidney replacement therapy dialysis or renal transplantation (Bakri, 2005). One of the functions of the kidneys is to produce the hormone erythropoietin which is useful for producing erythrocyte cells (red blood cells) and maintaining the balance of oxygen levels in the blood. In patients with decreased kidney function, the production of erythropoietin hormone is reduced, in addition to bone marrow function disorders affected the production of erythrocyte cells.

The decrease in red blood cells (erythrocytes) is caused by the main factor of erythropoietin deficiency (EPO) as a result of renal peritubular cells producing erythropoietin. Other factors that can also cause a decrease in red blood cells are the presence of erythropoiesis inhibitors, hemolytic anemia due to microangiopathy, iron deficiency, blood loss during blood collection left in the hemodialysis device (Ulya & Suryanto, 2007). Patients with chronic kidney failure have a risk of blood loss due to platelet dysfunction. The main cause of blood loss in these patients is from dialysis. Hemodialysis patients can lose 3-5 grams of iron per year. Normally, we lose 1-2 mg of iron per day, so iron loss on dialysis is 10-20 times more (Wilson, 2012). The incidence of chronic kidney failure in Indonesia according to hospital associations throughout Indonesia is about 50 people per one million population (Lukman et al, 2013).

Based on data obtained at RSUD Dr. M. Yunus Bengkulu the number of GJK cases in January to December 2016 was recorded as many as 98 to 170 people, January to December 2016 amounted to 130 to 149 people and until November 2017 there were 173 people undergoing Hemodialysis therapy. In connection with this, research was conducted on people with chronic kidney failure. The purpose of this study was to compare differences in the average number of pre erythrocytic cells and post hemodialysis in people with chronic kidney failure.

METHOD

Design and Research Subjects

The research design used in this study is a pre experiment through the design of one group pretest-posttest design, which is to compare the number of erythrocyte cells before and after hemodialysis therapy. The sample in this study was a chronic kidney failure patient who did hemodialysis at RSUD Dr. M. Yunus Bengkulu taken with an accidental sampling technique of 38 patients.

Instruments and Data Analysis Techniques

After the data is collected, then analyzed in the laboratory of Hematology Poltekkes Kemenkes Bengkulu.

RESULT

The results of the T-Dependent test analysis were obtained a value of p (0.014) smaller than 0.05 and the correlation coefficient value is close to 1 with a p value of 0.000 smaller than 0.05 which means H_0 is accepted or H_a rejected i.e. there is a difference in the number of pre erythrocyte cells and post hemodialysis in chronic kidney failure patients at RSUD Dr. M. Yunus Bengkulu with an average number of differences of 2,487,5000 cells /mm³. The analysis data is presented in Table 1 below.

Tabel 1. Dependent T Test Results

Erythrocyte cell count	N	Mean	Standard deviation	Standar error	P Value
Pre hemodialysis	38	4.056	7,074	1,148	
Post hemodialysis	38	3.816	7,501	1,217	0,014

Tabel 2. Correlation Results

Erythrocyte cell count	N	Correlation	Sig (p value)
Pre dan post hemodialysis	38	0,667	0,000

DISCUSSION

After the hemodialysis process, there were 28 people or 74% who experienced a decrease in erythrocyte cells. The distribution of pre and post hemodialysis erythrocyte cells in male and female kidney failure patients

showed differences. In addition, because there are more male patients, gender can affect the acceptance of a person's sick condition. The male sex is more likely to accept the condition of the pain than the female, which makes female patients less likely to arrive late to the health service. The delay affects the implementation of hemodialysis initiation.

The study used tests to determine the comparison or difference in the average number of erythrocyte cells with dependent T tests (two interconnected variables). Before using the comparison test between data variables obtained by the data normality test, this data normality test aims to measure whether the data obtained has a normal distribution so that it can be used in the next statistical test. The use of dependent T test in this skin is obtained the average number of erythrocyte cells pre hemodialysis which is 4,056,000 cells / mm³ while the average number of erythrocyte cells post hemodialysis which is 3,816,000 cells / mm³ this shows that there is an average difference in the number of erythrocytes pre and post hemodialysis cells in patients with chronic kidney failure which is 248·700 cells/mm³. Thus, it can be said that there is a decrease in the number of erythrocyte cells before and after hemodialysis, this is in line with the theory and results of previous studies.

Previous research by Umroatul Ulya (2005) on differences in the number of erythrocyte cells and levels of Hb pre and post hemodialysis in patients with chronic kidney failure at PKU Muhammadiyah Yogyakarta Hospital from the results of research found a decrease in the number of erythrocyte cells on average in pre and post hemodialysis and patients experiencing anemia due to decreased levels of Hb. The main cause of decrease in the number of erythrocyte cells in patients with chronic kidney failure is less erythropoietin production, Chronic kidney failure patients will perform hemodialysis therapy to improve their health status. Hemodialysis is an effective arrangement for kidney failure. But the production of erythropoietin did not improve which resulted in a decrease in the number of erythrocyte cells continuing.

Based on the average difference in the number of pre- erythrocyte cells and post hemodialysis, patients who perform hemodialysis therapy are at risk of a decrease in the number of erythrocyte cells, hemodialysis patients can lose blood on average 4.6 L / year, blood loss through the gastrointestinal tract, often taken for laboratory examination, blood loss during the taking of the deceased in the hemodialysis device and if the patient who gets hemodialysis therapy, Then water-soluble vitamins will be lost through the dialysis membrane. In addition, hemodialysis can cause a loss of 3-5 grams of iron per year. Normally, we lose 1-2 mg of iron per day, so iron loss in dialysis patients is 10-20 times more.

In addition to hemodialysis therapy in the hemodialysis installation of RSUD Dr. M. Yunus Bengkulu patients routinely perform epo (erythropoietin) and iron supplements with certain doses, as well as perform blood transfusions in patients with hemoglobin <10 gr/dl and hematocrit <30%. This can help increase the number of erythrocyte cells in patients who experience a decreased number of erythrocyte cells. An increase in the number of erythrocyte cells in patients after hemodialysis therapy can occur due to the routine consumption of EPO drugs and iron supplements, the process of hemodialysis that runs well (minimal blood collection), in addition to the delay in examination causes an increase in the results of the examination, erythrocytes will experience various changes in its morphology, Homogenization of blood with imperfect anticoagulants or delay in homogenization causes the formation of blood clots so that when examining with fractional staining of the blood clot read as blood cells. Preferably in the work done as soon as possible and not delayed, but if the circumstances where there must be a delay then it should be considered the deadline of delay. The limit of delay in checking the number of erythrocyte cells is less than 6 hours.

Red blood cells are cells that have the special function of transporting oxygen to body tissues and aiding the removal of carbon dioxide and processes produced by the metabolism of body tissues. Unlike the other two cells, red blood cells are hemoglobin solution wrappers that make up 95% of the total protein in red blood cells in the absence of cell organelles and cell nuclei (Sofro, 2012). Hematological examination in patients with hemodialysis therapy, especially examination of the average erythrocyte cell count decreased, this is due to inadequate production of eritropoitin, shortening of the life age of red blood cells and nutritional deficiencies.

CONCLUSIONS AND SUGGESTIONS

There is a difference in the average number of pre erythrocyte cells and post hemodialysis in patients with chronic kidney failure in RSUD Dr. M. Yunus Bengkulu in 2016. Patients with chronic kidney failure who undergo hemodialysis therapy are advised to regularly check themselves into the laboratory, especially on examination of the number of erythrocyte cells and given iron supplements to increase the number of erythrocyte cells.

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PAGE 1

PAGE 2

PAGE 3

PAGE 4

PAGE 5

PAGE 6
