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# Description of Serum Urea and Creatinine Levels Pre Hemodialysis and Post Hemodialysis at Royal Prima Hospital in Chronic Kidney Disease

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**ABSTRACT**

Chronic kidney failure describes as the gradual loss of kidney function and it is irreversible, to replace the loss of kidney function a therapy for kidney function is needed, which is hemodialysis. The objective of this research is to know the levels of urea and creatinine serum for pre hemodialysis and post hemodialysis at Royal Prima General Hospital Medan. The methods that are being used for this research are descriptive with 54 patients as samples. The results of this research loss of urea and creatinine serum levels, with the average urea level for pre hemodialysis being 128.11 mg/dL, and the average urea level for post hemodialysis is 43.26 mg/dL with 1,8% of patient with low urea level, 50% with normal urea level, and 48.2% with high urea level. The average creatine level for pre hemodialysis is 11.56 mg/dL, and the average creatine level is 4.3 mg/dL, with all of the patients still having a high creatinine level. The conclusion is there is a drop in both urea and creatinine serum levels, but the urea level for half of the patients did not go down to normal, and for the creatinine level there are none of the patients' creatinine levels that go down to normal.

## 1. Introduction

Chronic renal failure is a pathophysiological process that causes a progressive or gradual decline in renal function and is irreversible with various etiologies. Chronic renal failure is characterized by a breakdown of the kidney's filtering system, reducing the ability to remove toxic substances and excess fluids.[1]

The functions of the kidneys are to maintain electrolyte composition, volume stability, the osmolarity of extracellular fluid, and to excrete or excrete the final products or waste products of body metabolism, such as creatinine and urea. If the unused metabolism of the body is not successfully removed or there is a buildup in the body, the substances produced by the body can become toxic and have fatal consequences for the body.[1]

Kidney function will cause problems if it fails to function. The unused metabolic products such as creatinine and urea will increase or increase. If the ability of the kidneys to function is only 5% or below 5%, then hemodialysis therapy or kidney transplantation is needed by the patient.[1]

Chronic renal failure ranked 27th in the world's leading causes of death in 1990 and deaths from chronic kidney failure increased to 18th place in 2010. In the world, only about 1.9 million people actually receive hemodialysis treatment. or a kidney transplant. The prevalence of chronic kidney failure in Indonesia reaches 2% or around 500,000 people.[2]

The causes of chronic kidney failure in Indonesia vary, but the most frequent cause of chronic kidney

failure in Indonesia is diabetic nephropathy which reaches 52%, and hypertension which reaches 26%.[2] The characteristics of kidney disease in Indonesia are dominated by men with a difference of 10% more than women in 2016. Patients receiving hemodialysis treatment in Indonesia are increasing every year. There were about 17.000 new patients in 2014, and about 20.000 active patients, while in the following year in 2015 there were around 21.000 new patients and about 40.000 active patients, and in 2016 there was an increase again, namely around 25.000 new and active patients. about 53.000 active patients. When viewed by age in 2016, the ages of 45 - 54 were the most patients receiving hemodialysis for new patients and active patients, where both reached 30% of the number of patients receiving hemodialysis treatment.[2]

Patients who have chronic renal failure usually perform a complete blood count as an indicator of diagnosis, one of the parameters checked for diagnosis is the serum creatinine and urea levels in the patient. Creatinine and urea itself are the final products of metabolism that are no longer used. Creatinine and urea are chemical compounds that indicate how good or poor kidney function is, where the value of creatinine levels can be a marker or a judge of glomerular function. Creatinine and urea are produced and secreted in urine every day, where the normal value for creatinine excreted in the urine is below 1.5 mg /dL and the normal value for urea levels is between 10 - 50 mg / dL.[2]

Serum creatinine and urea levels must be considered as indicators to determine renal function damage so creatinine and urea levels should be checked before each hemodialysis therapy so that they can be used as a comparison between before hemodialysis and after hemodialysis.[2]

## 2. Methods

This research is a quantitative research type with a descriptive approach, namely a descriptive cross-sectional design to obtain serum urea and creatinine values during pre-hemodialysis and post-hemodialysis. The research was conducted in the hemodialysis unit of the Royal Prima Hospital with the time to collect the research data carried out in April - May 2020.

The research instrument used in this study was a medical record of the hemodialysis unit respondents at Royal Prima Hospital. The sample used was a patient undergoing hemodialysis therapy in the hemodialysis unit of the Royal Prima Medan General Hospital with 54 respondents.

## 3. Results and Discussion

### Characteristics of research samples

Based on table 1, it is found that there are many samples who carry out hemodialysis therapy at the Royal Prima Medan Hospital with an age above 50 years, there are 36 people with the oldest age is 75 years, while many samples who are under 50 years are 18 people with the youngest age is 19. Based on table 2 it can be seen that the sample who has female gender is more than the sample who has male gender, where many samples who have female gender are 56% while those who have male gender are 44%. Based on table 3, it can be seen that the erythrocyte levels in the sample are more likely to have low erythrocyte levels compared to samples with normal erythrocyte levels, where many samples with low erythrocyte levels are 87%, while samples with normal erythrocyte levels are 13%. Based on the data from table 4, it can be seen that the hemoglobin level in the sample with a low hemoglobin level compared to the money sample has a normal hemoglobin level, whereas many samples with a low hemoglobin level are 98.2% while the sample with normal erythrocyte levels is 1.8%. Based on table 5, it can be seen that the hematocrit levels in the sample with low hematocrit levels compared to the money samples had normal hematocrit levels, where many samples with low hemoglobin levels were 85.2% while the samples with normal erythrocyte levels were 14.8%.

### Results of sample observation based on research variables

Based on table 6, which is the result of research with a total sample of 54 people, it is known that in as many as 54 samples who had not undergone hemodialysis therapy, all patients had urea levels

above the normal value, with an average value of 128.11 mg / dL. After undergoing hemodialysis therapy, it was found that 1 sample (1.8%) had low urea levels, 27 samples (50%) had normal serum levels, and 26 samples (48.2%) still had high urea levels. The average urea level after undergoing hemodialysis therapy was 43.26 mg / dL, with normal values for urea levels of 15 - 38 mg / dL.

Based on table 7 which is the result of research with a total sample size of 54 people, it is known that as many as 54 samples who have not undergone hemodialysis therapy have a high serum creatinine level, with an average value of 11.56 mg / dL. After undergoing hemodialysis therapy, serum creatinine levels in all samples were still high. The average creatinine level after undergoing hemodialysis therapy was 4.3 mg / dL, with normal creatinine levels of 0.55 - 1.3 mg / dL.

Table 1. Age of study samples

| Variable | Total | % |
|---|---|---|
| Age > 50 years | 36 | 66.6 |
| Age < 50 years | 18 | 33.4 |

Table 2. Gender of the research sample

| Gender | Total | % |
|---|---|---|
| Male | 24 | 44 |
| Female | 30 | 56 |

Table 3. Erythrocyte research sample

| Variable | Total | % |
|---|---|---|
| Normal erythrocyte | 7 | 13 |
| Low erythrocyte | 47 | 87 |

Table 4. Hemoglobin research sample

| Variable | Total | % |
|---|---|---|
| Normal hemoglobin | 1 | 1.8 |
| Low hemoglobin | 53 | 98.2 |

Table 5. Hematocrit research sample

| Variable | Total | % |
|---|---|---|
| Normal Hematocrit | 8 | 14.8 |
| Low Hematocrit | 46 | 85.2 |

Table 6. Distribution of uruem levels

| Variable | Pre-Hemodialysis | | Post-Hemodialysis | |
|---|---|---|---|---|
| | n | % | n | % |
| Low | 0 | 0 | 1 | 1.8 |
| Normal | 0 | 0 | 27 | 50 |
| High | 54 | 100 | 26 | 48.2 |
| Total | 54 | 100 | 54 | 100 |

Table 7. Distribution of serum creatinine levels

| Variable | Pre-Hemodialysis | | Post-Hemodialysis | |
|---|---|---|---|---|
| | n | % | n | % |
| Low | 0 | 0 | 0 | 0 |
| Normal | 0 | 0 | 0 | 0 |
| High | 54 | 100 | 54 | 100 |
| Total | 54 | 100 | 54 | 100 % |

From the results of research examining urea levels in patients undergoing hemodialysis therapy in the hemodialysis unit of Royal Prima Medan Hospital with a large number of samples taken were 54 patients with the sampling technique used was the consecutive sampling technique. The urea level values of pre hemodialysis patients obtained were all samples had a high urea value of 54 samples, where the normal value of urea levels was around 15 - 38 mg / dL with an average uruem value of 128.11 mg / dL. While the value of urea levels of post hemodialysis patients obtained was 1 sample had low urea levels (1.8%), 27 samples had normal urea levels (50%), with the remaining 26 samples still having high levels of urea. (48.2%) with an average post-hemodialysis urea value of 43.26 mg / dL.

Ureum is the result of protein and amino acid catabolism, which is the product of the liver which will be filtered by the glomerulus. If kidney function decreases, the ability of the kidneys to excrete urea also decreases where the ability of the glomerulus to filter decreases, which will result in a buildup of uruem in the patient's blood.

The results of the research on creatinine level examination in patients undergoing hemodialysis therapy in the hemodialysis unit of the Royal Prima Hospital Medan with 54 samples taken. The pre-hemodialysis patient serum creatinine level values obtained were all samples had high creatinine values as many as 54 samples with the average result of creatinine levels obtained was 11.56 mg / dL. Post-hemodialysis serum creatinine levels were still in the high category where the normal serum creatinine levels ranged from 0.55 to 1.3 mg / dL, and the post-hemodialysis creatinine average values obtained were 4.3 mg / dL. where even though the serum creatinine value of all samples has not yet reached normal values, there is a significant decrease in serum creatinine values.

Creatinine itself is a metabolism from muscle creatine, which is synthesized by the liver and is found in the skeleton of muscle and blood to be excreted by the kidneys in urine. Creatinine to be excreted depends on muscle activity. Creatinine is filtered by the glomerulus. Creatinine values that are above normal after hemodialysis therapy illustrate that there are other variables that cause high creatinine levels such as body weight, comorbidities, and even the adequacy of hemodialysis itself. Just like urea, if there is impaired or decreased kidney function, creatinine buildup will occur in the body.

## 4. Conclusion

Post hemodialysis creatinine values decreased creatinine levels but there were no patients whose creatinine levels reached normal values.

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