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Analysis of Creatinine Value and Haemoglobin Value in Chronic Kidney Disease Patients with Hemodialysis

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Abstract

The purpose of this study was to determine the levels of creatinine and haemoglobin values in chronic renal failure patients undergoing hemodialysis based on gender. age. based on duration of illness and based on length of haemodialysis. Gender, education level, occupation, and comorbidities, creatinine value and haemoglobin value in blood. The results of this study can be concluded that there is a significant relationship between creatinine value and haemoglobin value in blood in patients with chronic kidney disease with hemodialysis (p= 0.040) the strength of the correlation is weak. The correlation direction shows a negative direction (r = -0.207), which means that the higher the creatinine value, the lower the haemoglobin value.

Keywords: Creatinine Value, Haemoglobin (Hb) Value, Chronic Kidney Disease Patients, Hemodialysis

A. INTRODUCTION

The prevalence of Chronic Kidney Diseases (CKD) is increasing every year in developing countries including Indonesia, which is estimated to have around 40-60 cases per million. population per year. Meanwhile in America, out of 142,488 patients, 90% underwent hemodialysis (Silviani, et al, 2011). There are even 200,000 dialysis and kidney transplants in patients with an increase of nearly 10% annually (Lardo and Nasution, 2004). According to Suryanto and Ulya (2007), hemodialysis is used as a therapy to replace deteriorating kidney function, however patients who undergo hemodialysis always experience anemia (80-95%). Even in 2005 based on research in three hospitals in Bandung from 40 respondents, 100% of respondents suffering from anemia with a hemoglobin level range from 7.1 to 9.7 g / dl (Roesli et al., 2005). The survival of hemodialysis patients varies because it is influenced by several factors, including age, gender, and length of time undergoing hemodialysis. In addition, the low survival rate of patients with hemodialysis and peritoneal dialysis is also affected due to inadequate hemodialysis factors and other factors outside hemodialysis such as nutritional status, psychosocial and comorbidities that accompany renal failure (Widiyatmoko, 2009). According to Rivai (2009), hypoalbuminemia is a common complication in chronic kidney disease. By doing hemodialysis therapy can also cause a hypoalbuminemia state which can worsen the survival of hemodialysis patients. Albumin levels less than 3.5 g / dl are among the major risk factors for mortality in hemodialysis patients. Kidney function can be easily evaluated by various laboratory tests. The initial step begins with a complete urinal examination, including examination of the urinary sediment. Measurement of serum creatinine levels is useful for the evaluation of renal function in general (Noer, 2006). Action hemodialysis in patients with chronic renal failure with high levels of urea and creatinine is a way to maintain continuity patient's life with the aim of reducing levels of urea, creatinine, and other toxic substances in the blood (Nugrahani, 2007). Chronic Kidney

Disease (CKD) is enormous medical, social and economic problems for patients and their families, especially in developing countries where there are limited resources to support failed patients, terminal kidney. Kidney disease is a non-communicable disease but it causes death and is expensive for treatment which continues throughout the patient's life (Alam and Hadibroto, 2007). Many patients cannot afford hemodialysis because of the high cost. If hemodialysis therapy stops without a doctor's recommendation, it can result in a fatal condition and even death (Nurini, et al., 2011). Based on the preliminary survey conducted by the author at Home. Until now, studies regarding the survival of hemodialysis patients were mainly seen from hemoglobin levels, albumin levels, and levels creatinine and payment status are still rare.

Kidney failure is a condition in which the kidneys lose their ability to maintain the volume and composition of body fluids in a state of normal food intake. Chronic kidney failure progresses slowly for three months or more and can lead to permanent kidney failure. Until now, there are three types of therapy available, namely hemodialysis, peritoneal dialysis and kidney transplantation (Baradero, 2008). Hemodialysis is the transfer of the patient's blood from his body through a dialyzer which occurs by diffusion and ultrafiltration, then the blood returns to the patient's body. The purpose of hemodialysis is to clean the blood from metabolic waste products and excess water (Smeltzer, 2006; Baradero, 2008). Although hemodialysis is a fairly effective therapy for patients with chronic renal failure, after undergoing hemodialysis some complications can also be found, such as anemia, increased bleeding tendency and infection. This anemia can be caused due to blood loss due to taking blood for laboratory tests or blood trapped or left in the hemodialysis device, as well as deficiency of iron and other nutrients (Sekarwana, 2004; Afsar, 2010). To evaluate anemia in patients with chronic renal failure, the National Kidney Foundation recommends laboratory tests that include complete blood counts (hemoglobin level, erythrocyte index, leukocyte count and type, and platelet count), absolute reticulocyte count, ferritin level, transferrin saturation, vitamin B12 levels. and folic acid levels. Anemia is a hemoglobin level of ≤ 12 g / dl in women and ≤ 13.0 g / dl in menopausal men and women (NKF, 2006). Based on the severity (severity), anemia is classified into the criteria of mild, moderate and severe (WHO, 2011). Several studies that have been conducted to determine anemia in patients with chronic renal failure after undergoing hemodialysis include Afshar (2010), Bhatta (2011), Runtung (2013). Research also shows the incidence of anemia in patients with chronic kidney failure is influenced by age, sex, duration of illness, and duration of hemodialysis (Balalio, 2012; Oktiadewi, 2012, Adiatma, 2014). However, from the available data, it shows that there are still few studies that discuss the severity of anemia in patients with chronic kidney diseases. From the above background, a study was conducted to determine hemoglobin levels in chronic renal failure patients undergoing hemodialysis. The purpose of this study was to determine the levels of creatinine and hemoglobin values in chronic kidney diseases patients undergoing hemodialysis based on gender. age. based on duration of illness and based on length of hemodialysis. Gender, Education Level, Occupation, and Complementary Diseases, Value of Creatinine and Value of Hemoglobin in Blood.

2.METHOD

This research is an observational study using a case control research design. The population in this study are all inpatients of chronic kidney diseases undergoing hemodialysis in a hospital in Semarang. A total of 139 respondents were taken as samples. The data collection process was carried out by observing data from medical records using a research instrument in the form of a check list. The research location at the hospital in Semarang City The independent variables are the levels of hemoglobin, creatinine and the status of payment for the dependent variable is the death of a chronic kidney diseases patient undergoing hemodialysis in the hospital. To analyze the data, the T-Independent test was used on the variable hemoglobin levels and creatinine, as well as chi square test on variable levels of creatinine and hemoglobin values in chronic renal failure patients undergoing hemodialysis based on gender. age. based on duration of illness and based on length of hemodialysis. Gender, Education Level, Occupation, and Complementary Diseases, Value of Creatinine and Value of Hemoglobin in Blood

3.   RESULT AND DISCUSSION

The sample characteristics of 139 people are described in the table below

Table 1. Description of Respondent Characteristics: Gender, Education Level, Occupation, and Complementary Diseases

No	Characteristic		Total	
			n	%
1.	Gender			
	a.	Male	92	66,2
	b.	Female	47	33,8
2.	Education			
	a.	Elementary school	30	18,2
	b.	Junior high school	20	10,0
	c.	Senior high school	50	36,4
	d.	University	39	35,5
3.	Working			
	a.	Private	96	81,8
	b.	Public	13	5,5
	c.	Retired	30	12,7
4.	Comorbid Diseases			
	a.	No comorbid	75	59,1
	b.	Hypertension	20	15,5
	c.	Diabetes mellitus	25	19,1
	d.	Hypertension and Diabetes Mellitus	1	0,9
	e.	Hypertension and Kidney stone	9	2,7
	f.	Renal Cysts	9	2,7

From Table 1 above, it is explained that the number of patients with chronic kidney disease with hemodialysis consists of 92 (66.2%) male respondents and 47 (33.8%) female respondents. The domination of the respondents' education level is high school (36.4%) and tertiary education (35.5%).

The majority of respondents work as entrepreneurs or work as employees in private companies. 65% of the respondents' comorbidities were uncomplicated, namely the patient only suffered from chronic kidney disease.

Table 2. Description of Respondent Characteristics: Age, Value of Creatinine and Value of Haemoglobin in Blood

No	Characterictic	Mean±SD	Min	Max
1.	Age (years)	52±11,48	28	80
2.	Creatinine (mg/dL)	9,53±3,318	1,1	18,4
3.	Hemoglobin (gr/dL)	9,2±1,395	6,6	12,9

From table 3 above, information is obtained that the average age of the respondents is 52 years, with the lowest age being 28 years and the highest being 80 years. The creatinine value shows an abnormal value with an average value of 9.53 mg / dl, while the mean haemoglobin value is 9.2 gr / dl.

Table 3.Analysis of the Relationship between Creatinine Value in Blood and Haemoglobin Value in Chronic Kidney Disease Patients with Hemodialysis

Variable		p value	r value
Creatinin Value	Haemoglobin	0,040	-0,207

From table 3 above, it is found that there is a significant relationship between creatinine values and haemoglobin values in blood in patients with chronic kidney disease with haemodialysis (p = 0.040), the strength of the correlation is weak. The correlation direction shows a negative direction (r = - 0.207), which means that the higher the creatinine value, the lower the haemoglobin value.

The number of incidence of chronic renal failure at a young age can be due to the patient's lifestyle that is not well before undergoing hemodialysis. According to Cahyono (2008), modern chronic disease appears as a consequence from lifestyle changes. Muharni's (2009) states that the patient's lifestyle before undergoing the majority of hemodialysis therapy is not good (80%) and when viewed from physical activity the majority is not good (77.50%), the majority of substance use was not good (85%), and the majority of the dietary patterns were not good (87.5%). The number of patients with chronic kidney failure who undergo hemodialysis in the hospital for the male gender is more than that female gender. This can be due to the bad lifestyle of male patients, so when have kidney failure tends to be more serious and must undergo hemodialysis. Based on research Benedict, et al., (2003) one of the behaviours that have a serious risk to health is smoking. Shankar, et al., (2006), stated that smoking behavior puts a person at risk of suffering from chronic kidney diseases times higher than individuals who don't smoke. Based on the results of the study, both groups had haemoglobin levels which is not normal so that both are at risk, but in the group who died had haemoglobin levels lower than the living group, namely 7.89 gr / dl and 8.18 gr / dl, respectively.

Difference in average in both groups only a little, so that the results obtained no difference between the two. All respondents before undergoing hemodialysis had abnormal haemoglobin levels, and after undergoing hemodialysis most of the respondents had lower haemoglobin levels than before. The results of this study are not in accordance with the results of research by Hamid and Azmi (2009) which states that haemoglobin greatly affects the survival of hemodialysis patients.

A high haemoglobin level will lead to better survival than patients who have a low hemoglobin level. According to Yendriwati (2002), the decrease in haemoglobin levels is due to etiological factors of blood loss which is more in hemodialysis patients such as frequent blood sampling, reduced blood due to the hemodialysis process or the level of kidney damage that is more severe. The results of this study indicate that patients who have abnormal albumin levels do not have a risk of premature death.The results of this study are inconsistent with the results of research by Hamid and Azmi (2009) which state albumin levels is an important predictor of survival for hemodialysis patients. This research also differs from opinion Silviani, et al., (2011), which states that albumin is a predictor of mortality and morbidity. patients with chronic renal failure. Although not related, most respondents have abnormal albumin levels. Most of the patients had low albumin levels especially after they undergo hemodialysis which does not rule out the possibility of micro albuminuria. This is in line with the theory of Nugrahani (2007), which states that the average value of the patient's blood albumin hemodialysis is still below normal. The low albumin value of these hemodialysis patients is also affected by low daily protein intake can also be influenced by other factors such as inflammation and comorbidities. Comorbidities in hemodialysis patients include predisposed Diabetes Mellitus experiencing albuminuria due to the process of albumin degradation and excretion so that these patients be greater risk of having abnormal albumin values. So that low albumin is not the cause major death of hemodialysis patients. Based on the results of the study, creatinine levels in the group died higher (13.11 gr / dl) than the live group (10.90). The difference in mean is sufficient high so that the results obtained there were differences between the two groups. This research is not in accordance with the NKF theory K / DOQI (2000) which states that the mortality rate for hemodialysis patients has a greater risk if the creatinine level in the blood is below 9-11 mg / dl. An increase in creatinine levels in the blood indicates a decrease in kidney function. This condition is dangerous because it can poison other organs, therefore patients with kidney failure must undergo hemodialysis so that creatinine levels in the blood decrease. Increasing creatinine levels in the blood of patients with kidney failure can be due to frequent consumption of beef and consuming drugs including vitamin C, cephalosporin class antibiotics, and aminoglycosides, so that patients should be able to reduce their consumption of food or drugs (Indriasari, 2009). To refer from the research of Hamid and Azmi (2009) which states that chronic kidney failure patients undergo hemodialysis with a creatinine level> 9.7 g / dl can affect patient survival. Research Kaliahpan (2010) states that there is a significant difference in the levels of urea and creatinine before and after undergoing hemodialysis, which is a decrease in creatinine levels in the blood after undergoing hemodialysis. This is in line with Muzasti's (2010) study, which states that there is a relationship between hemodialysis duration with the patient's life expectancy. The longer the patient is on hemodialysis therapy, the longer the hope is his life. So it can be concluded that adherence to hemodialysis can reduce the patient's creatinine levels so that his survival increases.

Based on the results of the study, the status of patient payments was not associated with the death of patients with chronic renal failure. Chronic renal failure patients undergoing hemodialysis are predominantly general and Community Health Insurance. In both the case and control groups the

number of general and Community Health Insurance patients was almost the same. Meanwhile, Askes patients only a small proportion, both in the case and control groups. Health insurance patients in this study were considered as referents or factors that were not risky because they can take advantage of social health insurance facilities to undergo hemodialysis. Unlike the general patient who has to bear all hemodialysis costs. The ability to pay for patients depends on their income. In addition, it can also affect patient compliance to undergo hemodialysis. Such as research conducted by Fitriani (2009) about the experience of chronic renal failure patients undergoing hemodialysis. The results show that one of the factors that influence compliance with hemodialysis is economic. Community Health Insurance patient also can take advantage of hemodialysis facilities at no cost. But this usually affects the service facilities given by the hospital to the patient. For example, patients do not get intravenous fluids in the form of amino acid intake such as obtained by Askes patients. Patients usually come from communities with low economic status. Although they can take advantage hemodialysis facilities are free, but the transportation costs for routine hemodialysis must also be borne by the patient. Although patient It's free to use Community Health Insurance, but if the patient is unable to provide transport money, then the patient won't come on hemodialysis. This is supported by Muzasti (2010) who states that the inability to pay for hemodialysis costs and transportation costs can lead to patient non-compliance with routine hemodialysis on schedule can increase mortality.

4.   CONCLUSION

The results of this study can be concluded that there is a significant relationship between the value of creatinine and the value of hemoglobin in the blood in patients with chronic kidney disease with hemodialysis (p value = 0.030), the strength of the correlation is weak. The correlation direction shows a negative direction (R = -0.207), which means that the higher the creatinine value, the lower the hemoglobin value. For the community, it is expected that they pay more attention to their lifestyle in an effort to maintain and improve health, especially in consuming foods or drugs that can increase creatinine levels and is harmful to the kidneys. For hospitals, especially in hemodialysis clinics, it can improve services and pay more attention to the patient's condition seen
of the creatinine levels of patients undergoing hemodialysis thus expected to increase their survival. For other researchers, it can be developed with more complex variables that have not been studied, for example the level of compliance patients, food intake, nutritional status, lifestyle, and so on
so that it can be seen other factors related to death in chronic kidney diseases patients.

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