Correlation of Ureum and Creatinine Levels in Tuberculosis Patients at Ciawi Public Health Center, Bogor District

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ABSTRACT	ARTICLE DETAILS
Tuberculosis is a disease caused by the bacteria Mycobacterium tuberculosis. Tuberculosis patients are required to undergo anti-tuberculosis drug therapy for a long period of time, resulting in the accumulation of metabolic waste in the body. Decreased excretion is characterized by an increase in urea and creatinine levels. The purpose of this study was to analyze the relationship between urea and creatinine levels in tuberculosis patients at the Ciawi Health Center, Bogor Regency. The design used is descriptive analysis with a cross-sectional approach. Examination of urea and creatinine levels using serum with an Erba Chem 5 V3 spectrophotometer. Data analysis used in the form of a chi square test. The results of the study showed a relationship between urea and creatinine levels in tuberculosis patients at the Ciawi Health Center, Bogor Regency based on gender with a p value of urea 0.011 and creatinine 0.005 (α <0.05), based on age with a p value of urea 0.004 and creatinine 0.030 (α <0.05) and there was no relationship based on the duration of treatment with a p value of 0.626 and 0.860 (α > 0.05). **KEYWORDS:** Creatinine Level, Urea Level, Tuberculosis	**Published On:** **19 September 2024** **Available on:** **https://ijpbms.com/**

INTRODUCTION

Tuberculosis is a chronic infectious disease caused by the bacteria Mycobacterium tuberculosis (Ministry of Health, 2019).

World Health Organization (WHO) data from 2019 revealed that 1.4 million people with tuberculosis died from this disease Tuberculosis positive patients are required to consume Anti-Tuberculosis Drugs (OAT) which are one of the most important components in undergoing treatment for this disease. Consumption of OAT in patients with positive tuberculosis itself is divided into 2 stages, namely the initial stage and the continuation stage. The initial stage of the drug is given for 2 months, the continuation stage of the drug will be given for a minimum of 4 months. The initial stage of the drug is given for 2 months, the continuation stage of the drug will be given for a minimum of 4 months. The period of drug consumption in the continuation stage is relatively longer than the initial stage, because it aims to kill the remaining germs, especially persistent germs (Ministry of Health, 2016). OAT therapy in the initial phase will be given a combination of isoniazid, rifampicin, pyrazinamide and ethambutol. The continuation phase of OAT therapy will be carried out by giving a combination of isoniazid and rifampicin (Hoagland et al., 2016).

The long treatment period makes tuberculosis patients have a high risk of developing other diseases. Long-term administration of OAT can damage organs such as the kidneys and become toxic substances in the body. The kidneys, if forced to work harder than normal, will affect the performance of kidney function. The body's metabolic waste that should be excreted along with urine will accumulate and result in decreased excretion and kidney function (Mansur, 2020). Many tuberculosis sufferers have felt the side effects of this OAT, treatment cannot be stopped because it risks making tuberculosis bacteria immune and difficult to cure (Carolus, 2017).

Observation of kidney function such as checking urea and creatinine levels is one of the important factors to determine the effects of OAT use (Effendi, 2019). Consumption of OAT for a long time can generally affect and increase urea and creatinine levels. Factors that affect the increase in urea and creatinine levels other than the duration of treatment can be caused by age and gender. Data that has been found shows that men have relatively higher urea and creatinine levels than women. The same pattern can also be found in patient age data showing that older ages generally have higher urea and creatinine levels when compared to patients with younger ages (Harrison, 2019).

Previous research conducted by Fery Harison (2019) on the description of urea and creatinine levels in patients with

pulmonary tuberculosis revealed that patients who received OAT therapy experienced an increase in urea and creatinine levels of 11.6% and 20.9%. Patients undergoing OAT therapy experienced an increase in urea and creatinine levels in the early phase of 30.0%. Another study conducted by Uli Kustiana (2018) on the description of creatinine in patients with tuberculosis stated that high creatinine levels in patients with tuberculosis occurred in the advanced phase of OAT treatment.

Routine kidney function examinations for tuberculosis patients need special attention because of the risks posed by OAT. The kidney function examination aims to be a step to avoid side effects caused by OAT and prevent complications of the disease in the patient's body. The problems that occurred made researchers interested in conducting a study entitled "Analysis of Urea and Creatinine Levels in Tuberculosis Patients at the Ciawi Health Center, Bogor Regency" with the aim of analyzing the relationship between the condition of the patient's kidney function obtained from the results of urea and creatinine level examinations based on gender, age and duration of treatment.

RESEARCH METHODS
Tool

The tools used in this study were the Erba Chem 5 V3 Spectrophotometer, Terumo brand syringe, tourniquet, alcohol swab, micropore, red vacutainer tube, yellow tip, blue tip, micropipette, centrifuge, serology tube.

Material

The materials used in this study were blood samples, standard solutions, distilled water, Erba creatinine reagent, Erba urea reagent.

Method

The design used in this study is descriptive analysis with a cross-sectional approach. The data used in this study are primary data obtained from the results of the examination of urea and creatinine levels using the kinetic method with an Erba Chem 5 V3 spectrophotometer, and informed consent for the study.

Data analysis

Data analysis is done by using the SPPS Statistic 28 For Windows application using univariate tests and bivariate tests using the Chi Square test which can be used to determine whether or not there is a significant relationship.

RESULTS AND DISCUSSION

This study was conducted at the Ciawi Health Center Laboratory, Bogor Regency with the aim of determining the relationship between urea and creatinine levels in tuberculosis patients.

This study was conducted by providing Informed Consent to prospective respondents who were undergoing early and late phases of OAT therapy. 30 Respondents were then taken venous blood of 3 ml and will be examined for urea and creatinine levels using an Erba Chem 5 V3 spectrophotometer.

The results of the study on the examination of urea levels in tuberculosis patients from 30 respondents showed that high urea levels were most common in males as many as 8 respondents (88.9%) and the highest creatinine levels were in males as many as 7 respondents (100.0%). The results of the univariate test based on age showed that high urea levels were more common in the age group between 20-60 years as many as 5 respondents (55.6%) and 4 respondents (57.1%) high creatinine levels with the age group 20-60 years. The results of the univariate test based on the duration of treatment showed that increased urea and creatinine levels occurred in patients undergoing OAT therapy in the early phase as many as 6 respondents (66.7%) at urea levels and 3 respondents (42.9%) at high creatinine levels.

This research is in line with the research results of M. Fery Harison (2019) who revealed that patients undergoing OAT therapy experienced kidney damage, which showed high urea levels as many as
5 people (11.6%) and 9 people (20.9%) had high creatinine levels.

The kidneys are organs that function as excretory organs to remove substances left over from the metabolic process such as urea, creatinine and uric acid. Decreased kidney function can be seen from the increase in urea and creatinine levels. High urea levels can be caused by several factors such as prerenal factors where the patient experiences shock, decreased blood to the kidneys, dehydration, and burns to trauma. Renal factors such as acute kidney failure, renal cortex necrosis, and due to factors consuming nephrotoxic drugs. Post-renal factors that occur due to narrowing or blockage of the urethra due to prostate hypertrophy (Nanda, 2015). High creatinine levels can be caused by changes in muscle mass, heavy physical activity, consuming drugs, age, and gender (Verdiansah, 2016).

The results of the study that have been conducted with statistical tests in the form of Chi Square with a P value on the relationship between urea and creatinine levels based on gender, age and duration of treatment show that the P value based on gender is 0.011 on urea levels and 0.005 on creatinine levels. The P value based on age is 0.004 on urea and 0.030 on creatinine levels. The P value based on duration of treatment is 0.626 on urea levels and 0.860 on creatinine levels.

The results of this study are in line with Vivi Efendi (2019) who revealed that there was an increase in urea and creatinine levels in tuberculosis patients based on gender, age as many as male with the results of 16 respondents (32%) urea levels and 12 respondents (24%) creatinine levels. Age shows that the 41-60 group experienced more increases in urea levels as many as 15 respondents (30%) and creatinine levels 9 respondents. The results of this study are in line with M. Fery Harison (2019) who showed that early phase tuberculosis patients experienced an increase of 3 respondents (30.0%) in urea and creatinine levels.

Male gender is one of the factors that can increase urea and creatinine levels. Factors that cause increased urea levels are fatigue due to heavy activity that can affect muscle

mass, irregular eating patterns or having a habit of smoking, alcoholic beverages, and drinks containing caffeine, so that they can affect kidney function. Vivi Effendi (2019) revealed that men who smoke have a chance of kidney damage because it can reduce kidney function in the process of cleaning creatinine clearance, and alcohol is also a trigger for kidney damage, the more often you drink alcoholic beverages, the more it reduces kidney function.

Age is one of the factors that affect the increase in urea and creatinine levels because the body has begun to lose some nephrons where the function of the nephron is as an important filter for the kidneys, if kidney function decreases there will be an increase in urea and creatinine levels. Drugs can affect the increase in urea and creatinine levels, if tuberculosis patients do not have discipline in consuming OAT and do not follow the doctor's recommendations, it can also affect kidney function.

CONCLUSION

There is a relationship between urea and creatinine levels in tuberculosis patients at the Ciawi Health Center, Bogor Regency based on gender with a p value of urea levels of 0.011 and creatinine levels (α <0.05), based on age with a p value of urea levels of 0.004 and creatinine levels of 0.030 (α <0.05). There is no relationship between urea and creatinine levels in tuberculosis patients at the Ciawi Health Center, Bogor Regency based on the duration of treatment p value of urea levels of 0.626 and creatinine levels of 0.860 (α >0.05).

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ATTACHMENT

Table 1. Frequency Distribution of Urea and Creatinine Levels in TB Patients

No	Variables	Urea				Creatinine			
		Normal		Tall		Normal		Tall	
1.	TypeSex	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
	- Man	8	38.1	8	88.9	9	39.1	7	100.0
	- Woman	13	61.9	1	11.1	14	60.9	0	0.0
2.	Age								
	- Teenager	1	4.8	0	0.0	1	4.3	0	0.0
	- Mature	20	95.2	5	55.6	21	91.3	4	57.1
	- Elderly	0	0.0	4	44.4	1	4.3	3	42.9
3.	Long Treatment								
	- Initial Phase	12	57.1	6	66.7	14	60.9	4	57.1
	- Advanced Phase	9	42.9	3	33.3	9	39.1	3	42.9

Table 2. Relationship between Urea and Creatinine Levels in TB Patients

No.	Inspection	Variables	Mark *P Value*
1.	Urea	Gender	0.011
		Age	0.004
		Duration of Treatment	0.626
		Gender	0.005
2.	Creatinine	Age	0.030
		Duration of Treatment	0.860