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by drg bayuindra

Submission date: 01-Aug-2020 06:55PM (UTC-0400)

Submission ID: 1358066439

File name: ama_8_scopus_Q2_the_influence_of_uric_acid_on_blood_pressure.doc (535.5K)

Word count: 2524

Character count: 15850

The Influence of Uric Acid Levels on Blood Pressure and Chronic Hypertension towards Hypertension Patient Proteinuria Levels (Overview of the Banjar Ethnic at the Cempaka Banjarmasin Health Center)

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Article History:

Submitted: 25.02.2020

Revised: 16.04.2020

Accepted: 07.05.2020

ABSTRACT

The Banjar community has a pattern of consumption of foods containing fat, carbohydrates and protein as a side dish everyday, so that it can be one of the risk factors for hyperuricemia that can increase blood pressure. The aim of this study is to determine the effect of uric acid on blood pressure and chronic hypertension on proteinuria levels in Banjarnese hypertension patients at Cempaka Health Center Banjarmasin. Method an observational analytic using cross sectional. A total of sample is 60 people. Data analysis using the Mann Whitney test for the effect of uric acid levels and the effect of chronic hypertension using the Chi Square test and then the correlation test. The significance value of blood uric acid levels to systolic blood pressure $p = 0.000$ and diastolic $p = 0.002$ and duration of hypertension to proteinuria levels were $p = 0.004$ and $r = 0.377$.

Conclusions: There is significant effect of uric acid levels on blood pressure and chronic hypertension on proteinuria levels in Banjarnese hypertension patients in Cempaka Banjarmasin Health Center with weak strength.

Keywords: Banjar, Urid acid, Chronic hypertension, Proteinuria, Blood pressure

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DOI: [10.31838/srp.2020.5.09](https://doi.org/10.31838/srp.2020.5.09)

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INTRODUCTION

Hypertension occupies the second highest position in South Kalimantan in 2013.¹ Banjarmasin City Health Office reported 16,²³⁴ people with hypertension in 2012, and in 2017 there were 76,548 people with total hypertension.^{2,3} In 2007, the prevalence of hypertension in Indonesia amounted to 31.7%. Largest contributor to the deaths of nearly 9.4 million deaths annually. One of largest contributor to the province of South Kalimantan hypertension is approximately 44.1% of patients with hypertension in London there are 17,556.^{4,5} In 2017, the City Health Office reported there were a total of 76.548 Banjarmasin patient soul hypertension.^{4,5} Patient with hypertension based on data taken as much as 26.5% of villagers Gadang suffer from hypertension.^{4,5}

Hypertension is a non-communicable cardiovascular disease, also called the silent killer because it often causes no symptoms and kills the sufferers quietly.⁶ Age, sex, genetics, food and lifestyle are risk factors that can affect blood pressure.¹ Banjar community daily days consuming side dishes that contain low fat, carbohydrate, protein and fiber.⁷ This can cause hyperuricemia which can trigger hypertension. Duration of hypertension if it occurs for a long time it will affect the levels of proteinuria. Hyperuricemia causes hypertension by increasing oxidative stress, activating

the RAA system, triggering endothelial dysfunction and peripheral vasoconstriction.⁸

Chronic hypertension can later affect various types of blood vessels, one of which is the blood vessels in the kidneys so that later it can cause sclerosis of blood vessels in the kidneys and cause a decrease in kidney function.⁹

Proteinuria is the most common clinical manifestation of decreased kidney function and is a screening for the severity of cardiovascular disease. Proteinuria is considered pathological if the levels are in the urine > 150 ml / 24 hours.^{10,11,12}

Hypertension in the Banjar tribe is also influenced by the presence of the eNOS3 gene which is thought to be a gene that has a connection with the incidence of hypertension. Glu298Asp is one of the polymorphisms of the eNOS3 gene which is often found in the Minang tribe who both inherit Malay genetics with the Banjar tribe.^{5,13,14,15}

RESEARCH METHODS

This type of research is observational analytic with cross sectional approach. The total sample of this study was 60 people.

Inclusion criteria included hypertensive patients of the Banjar tribe who were diagnosed with hypertension at 2

visits, aged 20-60 years, patients were willing to conduct interviews about the disease and were willing to sign a statement, not suffer from diabetes mellitus types 1 and 2, heart failure and chronic kidney failure. Exclusion criteria included patients who did not arrive at the time of blood collection, did not arrive at the examination of urinalysis, patients who came for the first time, patients who exercised 24 hours before urine collection, pregnant women and menopause.

This study was approved by the Research Ethics Committee of the Faculty of Medicine, University of Lambung Mangkurat. The data obtained will be analyzed using the

Mann-Whitney and Chi Square statistical tests and continued by the correlation test in the SPSS program version 25.0

RESULT AND DISCUSSION

This research was conducted after respondents were willing to follow the research procedures and fill out a questionnaire, after that it was continued with blood pressure measurement and blood uric acid examination and urine examination in hypertensive patients of the Banjar tribe.

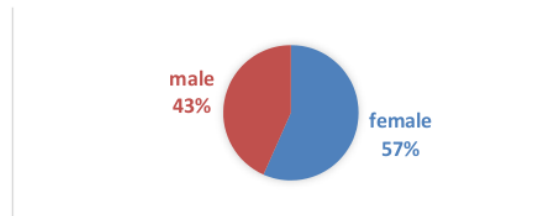


Figure 1: Characteristics subject by gender

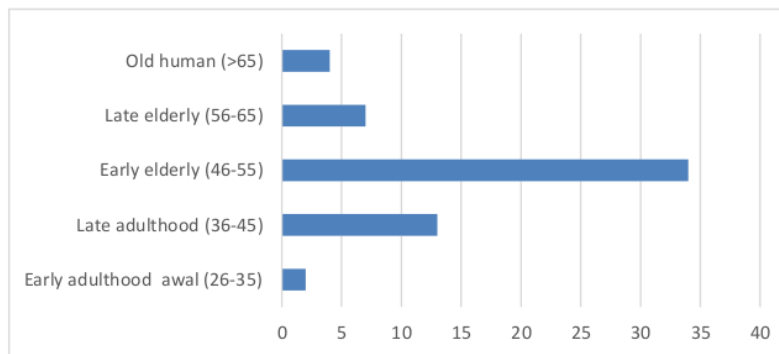


Figure 2: Characteristics subject by age

Table 1: Characteristics of Research Subjects Based on Uric Acid, Proteinuria, Chronic Hypertension, Blood Pressure, and Age

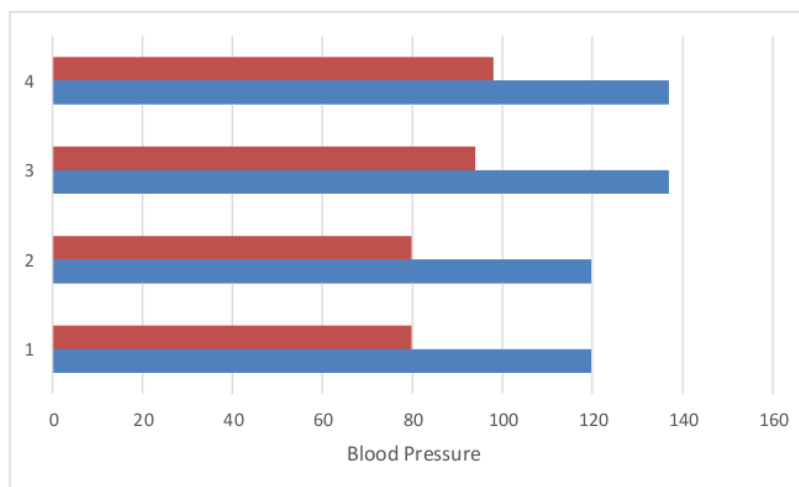
Characteristics	N=60	(%)
Uric Acid		
Normal	30	50,0
Hyperuricemia	30	50,0
Proteinuria		
Positive	16	26,7
Negative	44	73,3
Chronic Hypertension		
>5 years	30	50,0
≤5 years	30	50,0
Blood Pressure		
Normal	30	50,0
Hypertension	30	50,0
Age (Years)*		
Early adulthood (26-35)	2	3,3
Late adulthood (36-45)	13	21,7
Early elderly (46-55)	34	56,7

Late elderly (56-65)	7	11,7
Old human (>65)	4	6,7

Information: * = age grouping based on the 2009 RI Ministry of Health
% = percentage; n = number of research subjects

Table 2: Mean Uric Acid Levels on Blood Pressure of Banjar Tribe Hypertension Patients

Uric Acid	Normal		Hypertension	
	Systolic	Diastolic	Systolic	Diastolic
Normal	120	80	137	94
Hyperuricemia	80	120	137	98



■ Diastolic
■ Systolic

1. Normotension with normal uric acid
2. Normotension with hyperuricemia
3. Hypertension with normal uric acid
4. Hypertension with hyperuricemia

Figure 3: Average Blood pressure on normotension and hypertension with normal uric acid and hyperuricemia

Table 3: Effect of chronic hypertension on proteinuria levels on hypertension patients

Variable	Proteinuria		Total value	OR	p-value
	Positive	Negative			
Chronic Hypertension				6,882 (1,707- 27,752)	0,00 4
> 5 years	13	17	30		
≤ 5 years	3	27	30		
Total	16	44	60		

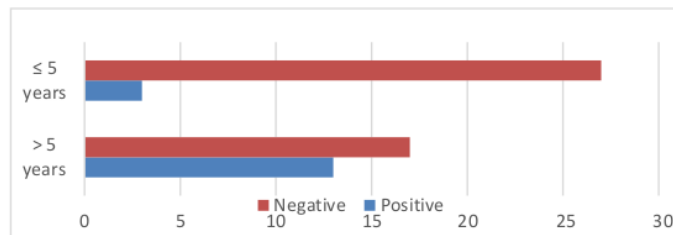


Figure 4: Effect of chronic hypertension on proteinuria levels on hypertension patients

Table 2 and Figure 3 shows the mean blood pressure in the hyperuricemia group obtained higher results than the AUN group. This can be caused by endothelial dysfunction that occurs due to increased reactive oxygen species (ROS), decreased nitric oxide (NO), and the formation of oxidants by the enzyme xanthine oxidase.¹⁶

The results of the Mann Whitney test analysis in the AUN group and the hyperuricemia group obtained a mean difference in blood pressure with a value of $p = 0,000$ for systolic and a value of $p = 0.002$ for diastolic.

Pramadya research in 2010, found a significant relationship between hyperuricemia with hypertension, obtained systolic and diastolic blood pressure results with uric acid levels $p = 0.000.8$ Assob et al 2014 research also showed a positive relationship between uric acid obtained $p = 0.001$ for systolic and $p = 0.001$ for diastolic.¹⁷ However, the 2015 Najiyah et al study obtained different results, where blood uric acid levels did not have a significant relationship with systolic blood pressure $p = 0.442$ and diastolic $p = 0.976$. This might have happened because most of the samples had controlled hypertension so that the prooxidant effect of gout did not significantly cause an increase in blood pressure.¹⁸

Table 3 and Figure 4 shows that the hypertension duration group > 5 years had the most negative proteinuria category, amounting to 17 people, while positive proteinuria numbered 13 people. The old group of hypertension ≤ 5 years had the most negative proteinuria category, amounting to 27 people, while positive proteinuria numbered 3 people. The results of the analysis using the Chi Square test and the significance value of 0.004 ($p < 0.05$) which statistically shows the influence of hypertension duration on proteinuria levels in hypertensive patients with an Odds Ratio of 6.882, which means that people with hypertension have a risk of 6.882 times greater experiencing proteinuria. Then proceed with the phi correlation test to determine the strength of correlation and the results obtained are weak correlation with a correlation value of $r = 0.377$.

Data analysis by Chi Square method on hypertension was found to have a significant relationship ($p = 0.004$) on proteinuria levels. This is consistent with the study of Okumura N, et al in 2014 which explains that there is a positive relationship between proteinuria and the incidence of hypertension ($p < 0.001$).¹⁹ These results are also in line with the study of Silva PR, et al. hypertension compared with the control group ($p < 0.001$).²⁰

Based on the correlation test the results obtained with a weak correlation strength ($r = 0.377$). This could be due to the majority of samples taking anti-hypertensive drugs. According to Viazzi F, et al (2018) antihypertensive drugs of

angiotensin converting enzyme inhibitors (ACE-is) and angiotensin receptors blockers (ARBs) groups are drugs that can protect the kidneys by slowing the progression of kidney disease and reducing the incidence of proteinuria.²¹ When systolic pressure > 180 mmHg and diastolic pressure > 120 mmHg, this can potentially result in target organ damage while the average blood pressure of the sample is 150/90 mmHg.²²

Long-term hypertension can cause various disorders of the organs, one of which is the kidney organ. Increased pressure and chronic strain on the arterioles and glomeruli can cause sclerosis of the glomeruli blood vessels or often called glomerulosclerosis. If this happens for a long time it can cause more damage to the nephrons that are still in good condition. Then this can cause the formation of more sclerotic lesions so that it can result in glomerular obliteration, which in turn will cause a more severe decline in kidney function, and can be characterized by the presence of proteinuria.^{9,23}

The limitation of this study is that researchers have not been able to control several confounding variables that can affect blood uric acid levels and duration of hypertension such as antihyperuricemia drugs, antihypertensive drugs and lifestyle (food, smoking, alcohol, and physical activity).

CONCLUSION

The conclusions of this study are:

1. There is an influence of blood uric acid levels on blood pressure in hypertensive patients in the Banjar tribe.
2. There is a long-standing influence of hypertension on proteinuria levels in Banjar tribal hypertension patients with weak correlation strength.

Further research needs to be done with the addition of research time, and can control the confounding variables so as to reduce the bias in research and get more accurate results. As well as for health to better consider urine examination as a routine examination of hypertensive patients.

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