

HYPERTENSION AND THE INCIDENCE OF OSTEOARTHRITIS IN BANJARBARU INDONESIA

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ABSTRAK

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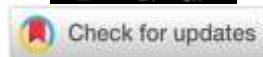
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Abstract:

Hypertension has been known as one of the leading causes of death in Indonesia. It's major complications, such as cerebrovascular and heart disease, are frequently associated with morbidity and disability. Recently, some research reports that hypertension had related to the incidence of osteoarthritis. However, this conclusion was lack of evidence. Hence, we conducted a study to determine the relationship between osteoarthritis incidence in hypertensive patients. This study used an observational analytic study with a cross-sectional design. A purposive sampling method was used, and 50 peoples in Cempaka Health Centre of Banjarbaru were chosen as the sample. Among them were 46 patients (92%) who had hypertension and 21 patients (42%) who had osteoarthritis. Hypertensive patients with osteoarthritis were 20 patients (40%), which is more than those without hypertension, as many as one patients (2%). Analysis using the Fisher's exact test obtained $p=0,630$ with a confidence level of 95%. Based on the research conducted, it can be concluded that hypertension had not been associated with osteoarthritis incidence.

Abstrak:

Hipertensi selama ini dikenal sebagai salah satu penyebab utama kematian di Indonesia. Komplikasi utamanya, seperti serebrovaskular a dan penyakit jantung, sering dikaitkan dengan morbiditas dan cacat. Baru-baru ini, beberapa penelitian melaporkan bahwa hipertensi telah terkait dengan insiden osteoartritis. Namun, kesimpulan ini kurangnya bukti. Oleh karena itu, kami melakukan penelitian untuk menentukan hubungan antara insiden osteoartritis pada pasien hipertensi. Penelitian ini menggunakan studi analitik observasional dengan desain penampang. Metode purposive sampling digunakan, dan 50 orang di Puskesmas Cempaka Banjarbaru dipilih sebagai sampel. Di antaranya adalah 46 pasien (92%) yang memiliki hipertensi dan 21 pasien (42%) yang memiliki osteoartritis. Pasien hipertensi dengan osteoartritis adalah 20 pasien (40%), yang lebih banyak daripada mereka yang tanpa hipertensi, sebanyak satu pasien (2%). Analisis menggunakan tes pasti Fisher diperoleh $p = 0.630$ dengan tingkat kepercayaan 95%. Berdasarkan penelitian yang dilakukan, dapat disimpulkan bahwa hipertensi belum dikaitkan dengan insiden osteoartritis.



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INTRODUCTION

Hypertension was one of the leading causes of death in Indonesia. It's complications such as cardiovascular attack, heart failure, chronic kidney failure, and coronary artery disease made high mortality. Indonesian Basic Health Research (RISKESDAS) 2013 stated that there were 25,8% of hypertensive patients in Indonesia, and there were 30,8%. In South Kalimantan province, became the highest prevalence of hypertension after Bangka province [1], [2], [3], [4], [5], [6].

Osteoarthritis (OA) is a chronic disease of synovial joints. Osteoarthritis is characterized by softening and disintegration of the joint cartilage followed by the formation of new cartilage in the bones at the edge of the joint (osteophytes), cyst formation, sclerosis in the subchondral bone, mild synovitis, and capsular fibrosis. This disease is characterized by clinical manifestations of pain during activity or after activity. It will disappear slowly, with short stiffness in the morning (<30 minutes), swelling, deformity, and loss of function in the affected joint. According to the 2013 RISKESDAS data, there were 11,9% of patients diagnosed with joint pain in Indonesia, while in South Kalimantan alone, there were 9,5% diagnosed [1], [7], [8].

Recently, hypertension was also associated with has a higher risk factor for osteoarthritis [9]. Several studies have shown that there was a relationship between hypertension and osteoarthritis. Zhuo's study stated that several epidemiological studies had proved osteoarthritis was more common in individuals with hypertension. The same was by Katz, who stated that there is a high probability that interconnected pathomechanisms affect both the vascular system and the joint system and explain the co-existence of these two diseases [10], [11]. However, some studies contradict the previous research conducted by Zhuo and Katz. Some of these studies include research conducted by Askari and Sanchez-Santos.

Both of these studies state that there is no significant relationship between hypertension and osteoarthritis [12], [13].

Because of this, research was conducted to find an association between hypertension and osteoarthritis in hypertensive patients. The study was conducted on hypertensive patients. The result of this study was important to justify previous report regarding relation between two disease to give some prognostic factor in hypertension patient.

RESEARCH METHOD

This research was analytic observational with a cross-sectional design. Research ethics was issued by the Health Research Ethics Commission of the Faculty of Medicine, University of Lambung Mangkurat Banjarmasin (No.954/KEPK-FK UNLAM / EC / IX / 2018). The population in this study were all patients treated at the Cempaka Health Center in Banjarmasin City. The sample size was determined using Fraenkel and Wallen equation for correlational research. Sampling was done by purposive sampling method with inclusion criteria and exclusion criteria. Inclusion criteria are aged > 50 years and willing to be respondents by agreeing to informed consent after getting a full explanation. Exclusion criteria are patients with a history of trauma to the thigh area, knee, and leg and patients with a history of intrasynovial injection. Research had been held in two months from March to May 2019 at Community Health Centre of Cempaka Banjarmasin city.

The patient's blood pressure data was taken by blood pressure measurement method carried out by health workers using a sphygmomanometer with a lying position after resting for at least 5 minutes. The diagnosis of osteoarthritis is made using a scoring system using criteria from the American College of Rheumatology for osteoarthritis.

The data obtained were processed using the data analysis program assistance using statistical tests of Fisher's exact with a confidence level of 95%.

RESULTS AND ANALYSIS

Based on Table 1, it can be seen that more research subjects experienced hypertension than those without hypertension. Also, more patients do not experience osteoarthritis compared to those who have osteoarthritis. Cross-tabulation of the relationship between hypertension and the incidence of osteoarthritis in patients at Community Health Centre of Cempaka Banjarmasin city. can be seen in table 2. Based on Table 2, it can be seen that there are cells that have an expected count < 5 , so they cannot use the chi-square test because there are requirements that do not fulfill. The test that can be used is Fisher's exact test. The results of the analysis using Fisher's exact test can be seen in table 3. After calculating and processing the data using the Fisher's exact test with a confidence level of 95%, the value $p = 0,630$ is obtained. The Fisher's exact test results show that the value of $p > 0,05$, so it can be concluded that there is no significant relationship between hypertension and the incidence of osteoarthritis in patients at Puskesmas Cempaka Kota Banjarmasin.

Table 1.
Distribution of Research Subjects Based on The Incidence of Hypertension and The Incidence of Osteoarthritis

		Frequency	%
Hypertension	Hypertension	46	92
	Not hypertension	4	8
Osteoarthritis	Osteoarthritis	21	42
	Not osteoarthritis	29	58

Table 2.
Cross-tabulation of the Relationship between Hypertension and Osteoarthritis in Patients at Community Health Centre of Cempaka Banjarmasin city

		Hyper-tension	Not hyper-tension	Total
Osteo-arthritis	Count	20	1	21
	Expected c.	19,3	1,7	21,0
Not osteo-arthritis	Count	26	3	29
	Expected c.	26,7	2,3	29,0
Total	Count	46	4	50
	Expected c.	46,0	4,0	50,0

Table 3.
Fisher's Exact Test

Value	Df	Asymptomatic Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Fisher's exact test			,630	,436

DISCUSSION

Some report had proposed that hypertension has a harmful impact on the joints. A study stated that systemic hypertension of blood vessels would disrupt blood flow to the bone. This will decrease nutrition to the cartilage and will cause osteoarthritis [14].

In this study, we found no association between the incidence of osteoarthritis and the incidence of hypertension. Several possibilities led to this study not showing an association between hypertension and the incidence of osteoarthritis in this study. The first possibility is the patient's consumption of anti-hypertensive drugs. The second is the body mass index (body mass index; BMI) of the patient. Some reports state that the consumption of antihypertensive drugs has a close relationship with the occurrence of osteoarthritis. Among the causes is an anti-pain effect on one of the antihypertensive drugs that are often used, namely β -blockers. In Valdes et al. study, it was stated that β -blockers could reduce pain because of the mechanism that inhibits the release of adrenaline and noradrenaline [15]. Adrenaline and nor-

adrenaline are substances that carry out the functions of the autonomic nervous system. When there are obstacles to the release of adrenaline and noradrenaline, the nervous system functions autonomy will also be inhibited [16]. The interaction between the autonomic nervous system and pain is very different between acute and chronic pain. In acute pain, sympathetic stimuli relieve pain. Whereas in chronic pain, there is an increase in pain intensity and reduce the pain threshold. Increased blood pressure under normal conditions is associated with pain inhibition, but in patients with chronic low back pain, the opposite occurs, namely an increased insensitivity to pain. The occurrence of these opposites is expressed due to changes in baroreceptor function, which regulates blood pressure through changes in sympathetic flow [15]. It is well known that osteoarthritis is a chronic degenerative disease and is one of the causes of the most frequent chronic pain [16], [17], [18], 19]. Use of drugs anti-hypertension that inhibits the sympathetic nervous system stimulation will reduce the pain that is felt.

Besides the consumption of anti-hypertensive drugs, the second possibility is that BMI can also influence this study's results. Hypertension and osteoarthritis have the same risk factors, namely weight gain. This is also stated in a study conducted by Zhang et al., which says that hypertension and osteoarthritis have the same risk factors, namely age, obesity, and chronic inflammation [20].

Research conducted by Mungreiphy et al. stated that blood pressure and BMI had a significant positive correlation. Systolic and diastolic blood pressure will increase with increasing BMI, and patients with BMI over normal or obese are more likely to have hypertension [21]. This is related to the occurrence of several mechanisms of increasing blood pressure due to obesity. Some of these mechanisms include increased sympathetic nervous system activity, sodium retention, increased renin – angiotensin - aldosterone system

activity, and disruption of vascular endothelial function [20] [21].

Besides being associated with hypertension, BMI is also associated with osteoarthritis. A study conducted by Zheng et al., it was stated that obesity is a strong risk factor for osteoarthritis. With each addition of a BMI of 5 kg/m², the risk of osteoarthritis will also increase by 35% [22]. Some mechanisms of the relationship between BMI and osteoarthritis include, there is a deviation from the function of adiponectin and an increased burden on the knee joint [20].

This study results are convenient with the results of a previous study conducted by Linda Wijayanti in 2017 that there was no relationship between hypertension and the severity of osteoarthritis. This is related to the history of consumption of anti-hypertensive drugs by patients. An anti-nociceptive effect blocks the receptor and is associated with a decrease in joint pain scores measured using the WOMAC scale [23].

Another study that supports this study's results is the study conducted by Askari, et al. Stated that there was no significant relationship between hypertension and osteoarthritis (Wald statistic = 3,75; OR = 3,32; 95%, CI = 0,986-11,21, p = 0,053) [12]. Sanchez-Santos, et al. In their study also stated that there was no significant relationship between hypertension and osteoarthritis [13].

The study conducted by Yoshimura et al. Also states that between hypertension and osteoarthritis there is no significant relationship. Only overweight or overweight has a significant relationship with osteoarthritis among the variables studied. But in this study, after being separated by sex, hypertension in men had a significant association with osteoarthritis (OR 1,61; 95% CI 1,03-2,53; p = 0.38) [24].

Niu et al., In their study, stated that initially, hypertension had a significant relationship with osteoarthritis. But after adjusting for BMI, the relationship was weak and insignificant [25]. The statement

of Niu et al. was supported by the results of a study conducted by Morović-Vergles et al., which stated that BMI had a strong association with the prevalence of hypertension in osteoarthritis patients [26]. In contrast to research conducted by Monira Hussain et al., who noted that the relationship between hypertension and osteoarthritis remained significant both before an adjustment and after adjustment for BMI [27].

This study has several limitations, including researchers conducting research using a cross-sectional design, making it difficult to determine the cause and effect because data collection is done simultaneously. Also, the variables in this study are not homogeneous, and the samples used between the categories that are examined are not balanced, thus affecting the results of the study. Researchers did not know what antihypertensive drugs were consumed by patients and only knew whether patients were taking antihypertensive drugs or not. Researchers could not ascertain what type of antihypertensive drugs affected. The researchers also did not know the BMI of the patients because the average patient did not know how much weight and height, so the researchers could not ascertain whether or not BMI affected the results of this study.

CONCLUSION

There is no relationship between hypertension and the incidence of osteoarthritis in patients in Banjarmasin City ($p = 0,630$). However, larger samples are needed for further research and using a case-control or cohort design. Another suggestion is to pay more attention to existing confounding variables and make appropriate criteria so that the samples obtained are more homogeneous.

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