

Hyperuricemia and Hypertension Screening in Residents of RT 004 / RW 009 Vim Village, Abepura District

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ABSTRACT

Hyperuricemia and Hypertension screening in Indonesia has received attention due to its association with various non-communicable diseases (NCDs) and metabolic syndromes, including cardiovascular disease and chronic kidney disease. Public health initiatives have been implemented to increase public awareness and early detection through blood tests for uric acid levels. This service aims to find and treat early residents of RT 004 / RW 009 Vim Village, Abepura District who are diagnosed with Hyperuricemia and Hypertension and provide counseling. The form of activity is screening residents of RT 004/RW 009 using Rapid Diagnosis test and digital tension tools as well as the provision of hypourisemia drugs and conducting counseling by actively going directly to the field to residents' homes which is carried out for a month. The results of the service found that out of the 74 residents screened, 53 residents (71.6%) were hyperuricemia and 58 residents (78.3%) were detected with hypertension. Of the 58 people who suffered from hypertension, 34 residents (82.9%) were ≥ 45 years old, 23 were male, and 23 (79.3%) were Papuans. Of the 53 residents who were detected with Hyperuricemia, 30 (73.2%) were ≥ 45 years old, 21 (72.4%) were male, and 47 were non-Papuan (72.3%). Hyperuricemia and Hypertension are classified as very high $>70\%$, this needs to be a concern for early detection and continuous counseling.

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INTRODUCTION

Hyperuricemia screening in Indonesia has received attention due to its association with various non-communicable diseases (NCDs) and metabolic syndromes, including cardiovascular disease and chronic kidney disease. Public health initiatives have been implemented to increase public awareness and early detection through blood tests for uric acid levels. For example, a study conducted in Tasikmalaya revealed that 15.6% of participants showed hyperuricemia, emphasizing the need for regular check-ups to prevent complications such as gout and kidney failure ^[1]. In addition, educational programs in community centers, such as the Asisi Church in Jakarta, highlight the importance of understanding risk factors and maintaining a healthy lifestyle, with all participants showing normal uric acid levels ^[2]. Furthermore, studies have shown a significant correlation between increased uric acid levels and congestive heart failure, suggesting that uric acid monitoring may serve as a clinical indicator for managing heart conditions ^[3]. Overall, these findings underscore the important role of screening and education in managing hyperuricemia and related health risks in Indonesia ^[4].

Hypertension and hyperuricemia are cardiovascular risk factors that are often undetected in the community. Community-based screening has been shown to be effective for early detection of these two conditions. In Indonesia, public health screening programs have been implemented in various regions with results showing a high prevalence of undiagnosed hypertension and hyperuricemia [5].

In the RT 004/RW 009 Vim Village, Abepura District, consumption patterns of high-purine foods such as offal, red meat, certain seafood, as well as the habit of lack of physical activity and lack of routine health check-ups are factors that have the potential to increase the risk of hyperuricemia. In addition, there is still limited knowledge of residents about the causes, early signs, and ways to prevent hyperuricemia causing this condition to often only be known after complaints of joint pain or swelling arise.

As an effort to overcome these problems, a promotive and preventive approach is needed through hyperuricemia screening and counseling activities. Uric acid screening serves to detect early residents who have high uric acid levels, both those who are symptomatic and those who have not shown symptoms. With early detection, the risk of complications can be reduced and treatment can be carried out faster and more precisely.

METHOD

This activity uses a cross sectional design (Potong Lintang) which is the most common design used for public health screening programs [6], [7]. The cross-sectional design allows for the measurement of the prevalence of hypertension and hyperuricemia at one specific point in time with a relatively simple and efficient procedure [8].

The population in this activity is residents of RT 004/RW 009 VIM Village, Abepura District. Based on the literature, the minimum age of screening participants is generally 30 years old [9], [10]. A sample of 74 people was taken using convenience sampling techniques [11]. The sample size in a small-scale community screening program with a limited community is 68-99 participants, so the number of screening participants of 74 is sufficient [12].

The procedure for implementing the activity begins with registration by filling out a demographic data form, then after getting an explanation of the objectives, procedures and minimum risks of screening, participants sign informed consent. Then participants were screened for blood pressure using a digital tension device of the Omron brand and screened for uric acid using the Nesco Multichek1 brand RDT test kit [13]. Hypertension indicators for community screening use the classification of JNC VII or JNC VIII with the standard of Normal if blood pressure is systole <120 mm/hg and diastole <80mm/hg [14]. Meanwhile, the hyperuricemia indicator uses a standard of >7 mg/dL for men and >6 mg/dL for women [15].

RESULTS

Table 1. Characteristics of Hypertension Screening Residents of RT 004 RW 009 VIM Village, Abepura District
1. Karakteristik yang di screening Hipertensi Residents of RT 004 RW 009 VIM Village, Abepura District

Characteristics	Hypertension	%	Normal	%	Total	%
Mother's Age						
>= 45 years	34	82,9	7	17,1	41	100
<45 years	24	72,7	9	27,3	33	100
Gender						
Male	23	79,3	6	20,7	29	100
Women	35	77,8	10	45	45	100
Suku						
Papua	8	88,9	1	11,1	9	100
Non-Papuan	50	76,9	15	23,1	65	100
Total	58	78,4	16	21,6	74	100

Based on the table above, it is known that the highest residents suffering from hypertension are >=45 years old 34 (82.9%), Male Gender 23 (79.3%), Papuan Tribe (88.9%),

Table 2. Characteristics of residents with hyperuricemia residents of RT 004 RW 009 VIM Village Abepura District

Characteristics	Hyperuricemia	%	Normal	%	Total	%
Age's Mother						
≥ 45 Years	30	73,2	11	26,8	41	100
<45 Years	23	69,7	10	30,3	33	100
Gender						
Male	21	72,4	8	27,6	29	100
Women	32	71,1	13	28,9	45	100
Tribe						
Papua	6	66,7	3	33,3	9	100
Non-Papuan	47	72,3	18	27,7	65	100
Total	53	71,6	21	28,4	74	100

Based on the table above, it is known that the residents who were detected with Hyperuricemia were 30 (73.2%) ≥45 years old, 21 (72.4%) male, and 47 non-Papuan tribes (72.3%).

DISCUSSION

Hypertension Screening

The screening results showed that the highest proportion of hypertension sufferers was in the age group of ≥45 years, which was 34 people (82.9%). These findings are in line with the concept of pathophysiology of aging, where with age there are structural changes in blood vessels, including a decrease in the elasticity of the artery walls, thickening of the intima-media tunica, and an increase in aortic stiffness (arterial stiffness). These changes directly contribute to increased systolic blood pressure and dilation of pulse pressure ^[16].

These findings are supported by the research of Peltzer and Phaswana-Mafuya ^[17] which shows that old age is one of the most consistent determinants of the incidence of hypertension in the adult population. In line with that, Dai et al. ^[18] In his study of the elderly in Ghana it was found that the prevalence of hypertension increased significantly in the age group over 45 years and was closely related to the accumulation of long-term metabolic risk factors.

In addition to biological factors, this age group is also more exposed to cumulative risk factors in the long term, such as a diet high in sodium, lack of physical activity, psychosocial stress, and a history of other metabolic diseases ^[19]. The high rate of hypertension at the age of ≥45 in this region indicates the need for early detection programs focused on the middle age group and the elderly, including regular blood pressure monitoring and education on lifestyle changes.

Based on the screening results, male hypertension patients were recorded as many as 23 people (79.3%), higher than women. The predominance of the incidence of hypertension in men has long been recognized in the scientific literature. Reckelhoff ^[20] in his seminal study explained that the difference in blood pressure regulation between men and women is influenced by hormonal mechanisms, where estrogen in women of reproductive age provides a cardiovascular protective effect through the vasodilation pathway and inhibition of the renin-angiotensin-aldosterone (RAAS) system.

Maranon and Reckelhoff ^[21] further elaborate that in men, the classical activation of the pro-inflammatory and vasoconstrictive RAAS pathway without being balanced by similar hormonal protection becomes the biological basis for why men have a higher risk of hypertension from adulthood to middle age. Di Giosia et al. ^[22] In its comprehensive review it reinforces these findings by pointing out epidemiological, pathophysiological, and therapeutic responses to hypertension between the two sexes.

On the other hand, behavioral factors also play a significant role. Goyal et al. ^[23] It is confirmed that men tend to have smoking habits, alcohol consumption, irregular diets, and are less likely to use health services for regular check-ups than women. This lifestyle worsens the cardiovascular risk profile and contributes to the high prevalence of hypertension in this group. Therefore, promotive and preventive interventions need to be directed specifically at men of productive to middle age in this region.

The screening results showed that Papuans were the group with the highest proportion of hypertension, which was 88.9%. The high number needs to be understood in a multifactorial context that includes genetic, diet, and cultural aspects.

Ishida et al. ^[24] conducted a field survey of the indigenous Papuan population of the highlands of Papua, Indonesia, and found that although systolic blood pressure did not increase linearly with age in this population, arterial stiffness still increased significantly, indicating vascular changes that underlie the risk of hypertension. Bela et al. ^[25] specifically examined the diets of indigenous Papuans compared to non-Papuans and found that high consumption of animal fats, low fiber, and low consumption of fruits and vegetables in indigenous Papuans contributed significantly to the incidence of hypertension. This finding is reinforced by Asmuruf et al. ^[26] which identified diet-related risk factors as the main determinants of hypertension incidence in the community in Sorong, West Papua.

In addition to diet, low access and utilization of health facilities are factors that aggravate this condition. Wahidin et al. ^[26] The district/city level analysis in Indonesia shows that the prevalence of hypertension in the Papua region is relatively high and closely related to the limitations of early detection systems and control of risk factors at the community level. Kristina et al. ^[26] emphasizes the need for a culturally sensitive health promotion approach in the Papua region, as evidenced by a community-based health education program in Jayapura that has succeeded in increasing public knowledge about hypertension prevention.

The high prevalence of hypertension among Papuans in this region underscores the importance of a health approach that considers local cultural values so that screening and education programs can be accepted and implemented effectively by the community.

1. Screening Hyperuricemia

The results of the screening showed that the highest proportion of hyperuricemia sufferers was in the age group of ≥ 45 years, which was 30 people (73.2%). The high incidence of hyperuricemia in this age group can be explained through physiological mechanisms that occur along with the aging process. As we age, there is a decrease in kidney function which leads to a reduction in the capacity to excrete uric acid through urine. Wang et al. ^[27] In his study, it was stated that age-related decrease in glomerular filtration rate (LFG) was the main factor explaining the high prevalence of hyperuricemia in the elderly, as the kidneys that experienced decreased function were unable to remove excess uric acid efficiently.

Lu et al. ^[28] In his study of the contemporary epidemiology of hyperuricemia in community elderly in Beijing found that the prevalence of hyperuricemia increases consistently in the middle and upper age groups, and is associated with changes in purine metabolism, increased body mass index, as well as metabolic syndrome that generally accumulates in middle age. Similar findings were reported by Yu et al. ^[29] in the elderly peasant and fisher population in Taiwan, where age is a significant independent risk factor for the occurrence of hyperuricemia after multivariate analysis.

In addition to decreased kidney function, at the age of ≥ 45 years there is also an increase in faster cell turnover, an increase in the consumption of certain drugs such as diuretics and low-dose aspirin that can inhibit venous excretion, as well as dietary changes towards higher consumption of animal protein and foods high in purine ^[30]. This reinforces the need for nutrition screening and education interventions aimed specifically at the middle age group and the elderly in the region.

2. Hyperuricemia by Gender

Based on the screening results, male hyperuricemia patients were recorded as many as 21 people (72.4%), higher than women. The predominance of the incidence of hyperuricemia in men has a strong biological basis. Wang and Charchar ^[27] prove that differences in uric acid levels between males and females begin to form in adolescence, where higher testosterone levels in males are associated with decreased renal urinary excretion and increased uric acid production. On the other hand, in pre-menopausal women, the hormone estrogen plays a role in increasing uric excretion through the renal tubules so that blood uric acid levels are lower.

Li et al. ^[31] In a 2013–2016 NHANES study examined the dose-response relationship between sex hormones and hyperuricemia in different sexes, and found that in men, high testosterone levels were consistently positively correlated with increased serum uric acid levels, reinforcing the role of androgens as biological risk factors for hyperuricemia in men. Winder et al. ^[30] in the population study PolSenior also confirmed that males had a higher prevalence of hyperuricemia than females in all age groups studied.

Di luar faktor hormonal, perilaku hidup laki-laki yang cenderung lebih sering mengonsumsi makanan tinggi purin seperti daging merah, jeroan, makanan laut, serta minuman beralkohol—terutama bir yang mengandung guanisin sebagai prekursor asam urat turut memperparah risiko hiperurisemia ^[32]. Oleh karena itu, program intervensi gizi dan promosi gaya hidup sehat perlu diprioritaskan pada kelompok laki-laki dewasa dan paruh baya di wilayah ini.

3. Hyperuricemia by Tribe

The screening results showed that non-Papuan ethnic residents were the group with the highest proportion of hyperuricemia, which was 72.3%. These findings are interesting to study because they reflect the role of the diet and lifestyle of ethnic immigrants (Non-Papuans) who settled in the Kotaraja area. Non-Papuan groups in Papua generally consist of people from various tribes in Indonesia such as Javanese, Bugis, Makassar, Minahasa, and Maluku, who generally have more varied food consumption patterns and higher purine content than the traditional diet of the Papuan tribe.

Boleu et al.^[33] in his study of indigenous ethnic communities in North Halmahera, Papua, he found a relationship between uric acid levels and nutritional status and consumption patterns in certain ethnic communities in the Papua region and beyond. Meanwhile, Wulandari^[34] in his study in Sukoharjo, Central Java, identified that the consumption pattern of foods high in purine is the most dominant factor that affects the incidence of hyperuricemia in non-indigenous communities in Indonesia.

Annita and Handayani^[35] reinforce these findings by showing a meaningful relationship between a diet high in purines—particularly consumption of offal, red meat, anchovies, and nuts—and increased uric acid levels in people with gout arthritis. Hensen and Raka Putra^[36] specifically examined the relationship between purine consumption and hyperuricemia in Balinese in tourism areas, and found that exposure to fatty and high-purine foods that are increasing with tourism-based lifestyle changes contribute significantly to the incidence of hyperuricemia. Similar conditions can occur in non-Papuans in Kotaraja who are exposed to urban food consumption patterns that are higher in purine content.

Marnata et al. also found that the frequency of consumption of purine-containing foods significantly correlated with the incidence of hyperuricemia in Indonesian adults. In addition to diet, low physical activity and lack of adequate water consumption in urban populations further exacerbate the risk of hyperuricemia in non-Papuan groups in this region.^[37]

CONCLUSION

The results of the service found that the prevalence of hypertension was 58 residents (78.3%) and hyperuricemia was found in 53 residents (71.6%) who had hyperuricemia and was classified as very high because >70%. Patients with hypertension and hyperuricemia are dominated by the age of > 45 years, the male gender and for hypertension are dominated by the Papuan tribe and Hyperuricemia is dominated by the Non-Papuan tribe.

The results of the screening found a prevalence rate of >70 percent, proving that screening activities do indeed need to be carried out routinely for at-risk community groups, such as the residents of RT 004/RW 009 VIM village, because they are a group of people living in urban areas, who are exposed to a lot of ready-to-eat food, frozen food which is of course very risky of hypertension and hyperuricemia.

Emphatically, the results of this screening prove that screening is necessary, in addition to diagnosing hypertension and hyperuricemia early, the public also gets additional knowledge about the need to regulate diet and lifestyle.

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