

Volume 6, Issue 1, March 2021, pp. 31–36 ISSN 2502-4825 (print), ISSN 2502-9495 (online)

Prevalence and Associated Factors of Hypertension Among Outpatients

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ARTICLE INFO

Article history:

$A\ B\ S\ T\ R\ A\ C\ T$

Received December 16, 2020 Accepted February 20, 2021 Published April 15, 2021

Keyword:

Hypertension Body mass index Diet pattern Smoking habit Hypertension is a major independent risk factor for coronary artery disease, stroke, heart failure and kidney failure. The prevalence rate of hypertension in North Sumatra is relatively high, namely 29.19%. Meanwhile, the Medan City Health Office recorded the number of hypertensive sufferers as many as 51,354 people from 2008 to 2014. A preliminary study at the Bandung Medan Hospital shows that hypertension is the 10 largest outpatient disease in 2016-2018. This study aims to determine the prevalence and risk factors for hypertension in patients referred to first-level health facilities at Bandung Hospital. This type of research is a quantitative descriptive study with a cross-sectional design. Sampling was carried out by a purposive sampling method, with the criteria being hypertensive outpatients visiting the Bandung Hospital for a month (7 November-6 December 2019). The sample size in this study was 92 people. Primary data collection was obtained through direct measurement of blood pressure and distributing questionnaires to assess risk factors using a modified WHO STEPS instrument. In measuring blood pressure, a sphygmomanometer is used and also checks medical records. The results of this study indicate that there are 65.2% of outpatients diagnosed with hypertension. Chi-square statistical test showed that body mass index (0.000) and vegetable dietary habits (0.902) influence the occurrence of hypertension. After adjusting for confounding factors, only body mass index still affected hypertension incidence (OR=5.61; 95% CI=1,686-18,659). Diet and smoking habits do not show a significant effect on risk factors for hypertension.

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Prevalensi dan Faktor Terkait Hipertensi di Antara Pasien Rawat Jalan

A B S T R A K

Hipertensi merupakan faktor risiko utama yang bersifat independent untuk penyakit arteri koroner, stroke, gagal jantung, dan gagal ginjal. Angka prevalensi hipertensi di Sumatera Utara cukup tinggi yaitu sebesar 29,19%. Sementara itu Dinas Kesehatan Kota Medan mencatat jumlah penderita penyakit hipertensi sebanyak 51.354 orang sepanjang tahun 2008 sampai dengan 2014. Studi pendahuluan di Rumah Sakit Bandung Medan menunjukkan bahwa penyakit hipertensi merupakan 10 penyakit terbesar rawat jalan pada tahun 2016-2018. Penelitian ini bertujuan untuk mengetahui prevalensi dan faktor resiko terjadinya hipertensi pada pasien rujukan fasilitas kesehatan tingkat pertama di Rumah Sakit Bandung. Jenis penelitian ini adalah penelitian deskriptif kuantitatif dengan rancangan cross-sectional. Pengambilan sampel dilakukan dengan metode purposive sampling dengan kriteria adalah pasien rawat jalan hipertensi yang berkunjung di Rumah Sakit Bandung Medan selama sebulan (7 November-6 Desember 2019). Besar sampel pada penelitian ini sejumlah 92 orang. Pengumpulan data primer diperoleh melalui pengukuran langsung tekanan darah dan membagikan kuesioner untuk menilai faktor resiko dengan

Kata kunci:

Hipertensi Indeks Massa Tubuh Pola Diet Kebiasaan Merokok

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DOI: https://doi.org/10.30604/jika.v6i1.412

menggunakan modifikasi instrumen WHO STEPS. Dalam pengukuran tekanan darah digunakan sfigmomanometer dan juga memeriksa rekam medis. Hasil penelitian ini menunjukkan terdapat 65.2 % pasien rawat jalan yang terdiagnosa hipertensi. Uji statistik dengan Chi-square menunjukkan indeks masa tubuh (0,000) dan kebiasaan diet sayur (0,902) yang mempengaruhi terjadinya hipertensi. Setelah dilakukannya penyesuaian terhadap faktor-faktor perancu, hanya indeks masa tubuh yang tetap mempengaruhi kejadian hipertensi (OR=5.61; CI 95%=1.686-18.659). Pola diet dan kebiasaan merokok tidak menunjukkan pengaruh yang signifikan sebagai faktor resiko hipertensi.

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INTRODUCTION

The high prevalence of hypertension is a challenge for public health because it is a risk factor for cardiovascular and kidney disease. Hypertension is also identified as a major risk factor for death and the cause of mortality due to disabilities, premature death, disabling diseases, and road injuries (disability-adjusted life year) (GBD 2013 Risk Factors Collaborators, 2015).

Early mortality and disability rates throughout the world can be reduced by reducing the prevalence of hypertension. Global data estimated that 26.4% of the global adult population or 972 million people had hypertension in 2000. Since 2000, reports have shown that the prevalence of hypertension is increasing in low- and middle-income countries, while it is stable or decreasing in low- and middleincome countries, high-income countries (Mills et al., 2016). Hypertension usually does not show symptoms, so it is often not realized that sometimes sufferers experience headaches, respiratory problems, dizziness, chest pain, palpitations, or nosebleeds (Lugo-Mata et al., 2017).

Systolic blood pressure increases with life expectancy. After diabetes, hypertension is the main and most common cause of end-stage renal failure which continues to increase in number (Kumar, 2013). Uncontrolled hypertension can lead to ventricular hypertrophy, heart failure, hypertensive retinopathy, stroke, and chronic kidney failure (Lugo-Mata et al., 2017). Epidemiology helps understand the risk factors involved and formulating prevention strategies, both for primary prevention and secondary prevention of associated complications (Kumar, 2013).

The prevalence of hypertension varies significantly between countries and between regions within the same country. Thus, there is a need to assess the epidemiology (prevalence and risk factors) of hypertension in different settings. Investigating the epidemiology of hypertension is very important for health planners and academics and physicians (Omar et al., 2020).

In Indonesia, the prevalence of hypertension recorded in Riskesdas 2018 has increased in the 25-44 year age group by 31.6%, the 25-34 year age group by 20.1%, and the 18-24 year age group by 13.2% compared to Riskesdas 2013 data. The data shows a significant increase in each age group. The highest figure was in South Kalimantan (44.1%) and the lowest was in Papua (22.2%). The prevalence rate of hypertension in North Sumatra is quite high, namely, 29.19% (Kementerian Kesehatan, 2018). Meanwhile, Medan City Health Office recorded the number of hypertension sufferers as many as 51,354 people from 2008 to 2014 (Dinas Kesehatan Kota Medan, 2015). Information about the prevalence of hypertension, awareness-raising, treatment, and control in various countries and different types of communities is needed to form the basis for monitoring and developing new strategies for optimizing hypertension control (Chow et al., 2013). Various risk factors associated with hypertension include individual age, smoking, alcohol consumption, and obesity (Bushara et al., 2015). Lifestyle is a trigger factor for hypertension and even exacerbates the incidence of hypertension itself (Susanto, 2015).

From the results of pre-research observations conducted at the Bandung Medan Hospital, it is known that hypertension is the 10 largest outpatient disease in 2016-2018. Bandung Medan Hospital is a type C hospital called a referral hospital for primary care facilities around Medan Petisah and is guided by the BPJS Kesehatan tiered referral system. The patients referred were patients with hypertension with complications, resistant hypertension, and hypertensive crisis. Hypertension referral criteria follow the regulations in the Minister of Health Regulation No.5 of 2014 concerning Clinical Practice Guidelines for Doctors in Primary Care Facilities.

In order to plan a health program that is useful for reducing the prevalence of hypertension and preventing disability, it is important to examine the prevalence and factors that influence the occurrence of hypertension, especially for referral patients to first-level health facilities around Medan Petisah District at Bandung Medan Hospital. Another objective is to determine the role of each risk factor for hypertension in all referral patients. Given the fact that the composition of the population in North Sumatra is diverse, the research is focused on sociodemographic factors.

METHOD

This research is a descriptive quantitative study with a cross-sectional design. This study aims to analyze the prevalence of hypertension in patients referred to Bandung Medan Hospital and the magnitude of the probability of risk factors for the onset of hypertension. The sample involved in this study were 92 people. Sampling was carried out by purposive sampling method with the criteria being hypertensive outpatients visiting Bandung Medan Hospital for a month from November 7 to December 6, 2019. The entire sample was willing to participate in this research by

filling out informed consent and following the research until it was completed.

Data collection was carried out by measuring blood pressure directly and distributing questionnaires to assess risk factors using a modified WHO STEPS instrument. STEPS is a flexible tool used to assess risk factors for noncommunicable diseases and each implementing country can adjust it according to their respective needs. In this study, researchers modified the WHO STEPS instrument by dividing it into 3 aspects: demographic, habitual, and physical. Parameters measured included gender, age, history of diabetes, body mass index, hypertension criteria, pharmacological management, referral hospital management, and referral poly management. In measuring blood pressure, researchers used a sphygmomanometer and also checked medical records.

Data analysis was carried out starting by analyzing the characteristics/description to determine each variable's frequency distribution. Furthermore, the Chi-square test is

Table 1 Characteristics of respondents (n=92)

used to determine whether there is a relationship between risk factors and hypertension incidence in the study subjects. The next stage of the analysis is to conduct a logistic regression test that aims to obtain the OR (Odds Ratio) value, which describes the estimated probability of risk factors for hypertension incidence. All data analyzes were performed using the IBM SPSS Statistics 25 software.

RESULTS AND DISCUSSION

This study involved 92 people as research subjects and was focused on looking at the factors that play a role in the incidence of hypertension in first-level health facility referral patients around Medan Petisah District at Bandung Medan Hospital. Most of the respondents in this study were women, as many as 59 people (64.1%), while the remaining 33 people (35.9%) were men.

Variables	Total	Percentage
Sex		
Female	59	64.1
Male	33	35.9
Education		
No education	1	1.1
Elementary School	17	18.5
Elementary School did not complete	2	2.2
Junior High School	24	26.1
Senior High School	31	33.7
College	17	18.5
Profession		
Housewives	50	54.3
Retired	12	13
Self-employed	22	23.9
Private employees	5	5.4
Civil servants	2	2.2
Unemployment	1	1.1
Smoke habit		
Never smoker	60	65.2
Current smoker	22	23.9
Ex-smoker	10	10.9
Incidence of hypertension		
Hypertension	60	65,2
Not hypertension	32	34,8

Most respondents with the latest high school education level were 31 people (33.7%) and the least number of respondents came from respondents who did not have education which was only 1 person (1.1%). Housewives are the occupation of the majority of respondents, namely 50 people (54.3%) and at least only 1 person (1.1%) of respondents who are unemployed. As many as 60 people (65.2%) had never smoked (never smoker). Meanwhile, the least amount of respondents was ten people (10.9%) who were ex-smokers. More patients who had hypertension were 60 (65.2%). Meanwhile, the remaining 32 people (34.8%) were not patients diagnosed with hypertension.

The results of measuring the Body Mass Index (BMI) obtained the mean or average height, weight, and body mass index of the respondents in this study were 1.57 meters, 63.65 kg, and 25.66 kg / m2, respectively. Meanwhile, the standard deviation (SD) for height, weight, and body mass index were 0.08 meters, 63.65 kg, and 25.66 kg / m2, respectively. This means that about 68% of respondents in

this study had a height of 1.57 ± 0.08 meters (1.49-1.65 meters), a bodyweight of 63.65 ± 11.84 kg (51-81-75.49 kg) and a body mass index of 25.66 ± 3.77 kg / m2 (21.89-29.43 kg / m2).

The mean length of smoking in the current smoker and ex-smoker groups of respondents was 32.72 years and 41.90 years, while the standard deviation values were 8.64 years in the current smoker group and 5.32 years in the ex-smoker group. This means that 68% of respondents from the current smoker group had smoked for 32.72 ± 8.64 years (24.08 - 41.36 years) while in the group of respondents who had previously smoked (ex-smoker) 68% of these respondents had smoked for 41.90 \pm 5.32 years (36.59 - 47.22 years).

The average measurement of each smoking habit group was 24 cigarettes/day in the current smoker group and 22 cigarettes/day in the ex-smoker group. This means that 50% of respondents who come from the current smoker group have a habit of smoking \leq 24 cigarettes/day while the rest have smoking habits >24 cigarettes/day. In the ex-smoker group, 50% of respondents had the habit of smoking less frequently, namely < 22 cigarettes/day previously, while the

remaining 50% of this respondent group used to smoke > 22 cigarettes/day.

Table 2

Distribution of respondents based on Body Mass	Index (BMI), duration	of smoking, frequency of	of smoking, and diet of fruits and
vegetables			

Characteristics	Mean	SD	Min.	Max.
Height (m)	1.57	0.08	1.45	1.75
Weight (kg)	63.65	11.84	37	90
Body Mass Index (kg/m ²)	25.66	3.77	17.60	37.78
Duration of smoking				
Current smoker	32.72	8.64	14	49
Ex-smoker	41.90	5.32	32	48
Smoking frequency (cigarettes/day)				
Current smoker	24	7.50	0	36
Ex-smoker	22	6.00	16	24
Fruit and vegetable diet				
Fruit diet (times/week)	1.13	0.37	1	3
Vegetable diet (times/week)	2.19	0.43	1	3

The average vegetable diet (2.19 times/week) of respondents was higher than the average fruit diet (1.13 times/week). Although the fruit and vegetable diet habits

have the same minimum and maximum values, the two's mean and standard deviation are different.

Table 3

Chi-square test on risk factors for the incidence of hypertension

	Incidence of hypertens			
Risk factors	Not hypertension Hypertension		— p-value	
Age	••	••		
≤ 58 years	14	34	0,237	
> 58 years	18	26		
Sex				
Male	13	20	0,487	
Female	19	40		
Education				
No education	1	0		
Elementary School	9	8		
Elementary School did not complete	2	0	0.082	
Junior High School	6	18		
Senior High School	9	22		
College	5	12		
Profession				
Housewives	15	35		
Retired	5	7		
Self-employed	8	14	0.229	
Private employees	1	4		
Civil servants	2	0		
Unemployment	1	0		
Body Mass Index				
≤ 25.66 kg/m ²	24	18	0.000	
> 25.66 kg/m ²	8	42		
Smoke habit				
Never smoker	21	39		
Current smoker	7	15	0.902	
Ex-smoker	4	6		
Fruit diet				
≤ 1 time/week	30	51	0.218	
> 1 time/week	2	9		
Vegetable diet				
≤ 2 time/week	30	43	0.013	
> 2 time/week	2	17		

Chi-square test results showed no statistically significant relationship between age (0.237), gender (0.487), education level (0.082), occupation (0.229), smoking habits (0.902), and fruit diet (0.218). Meanwhile, statistically, the incidence of hypertension in this study subjects was more related to the

Body Mass Index variable (0.000) and the vegetable diet (0.013). The statistical analysis was then followed by a logistic regression that aimed to determine the magnitude of the influence of risk factors on the incidence of hypertension by considering confounding factors.

	Incidence of	Incidence of hypertension		OR (CI (95%)	
Risk factors	Not hypertension	Hypertension	Unadjusted	Adjusted	
Body Mass Index					
≤ 25.66 kg/m ²	24	18	1	1	
> 25.66 kg/m ²	8	42	7 (2.648-18.506)	5.610 (1.686-18.659)	
Smoke habit					
Never smoker	21	39	1	1	
Current smoker	7	15	1.154 (0.407-3.272)	4.207 (0.547-32.338)	
Ex-smoker	4	6	0.808 (0.205-3.185)	3.904 (0.390-39.051)	
Fruit diet					
≤ 1 time/week	30	51	0.378 (0.076 - 1.866)	1.413 (0.241-8.287)	
> 1 time/week	2	9	1	1	
Vegetable diet					
≤ 2 time/week	30	43	0.169 (0.36-0.785)	2.618 (0.473-14.492)	
> 2 time/week	2	17	1	1	

Table 4Logistic regression test on the factors of hypertension

The body mass index found an Unadjusted Odd Ratio value of 7 (95% CI: 2.648-18.506), which means that people with a body mass index> 25.66 kg / m2 are 7 times more likely to develop hypertension compared to people with BMI \leq 25.66 kg / m2. Then, after adjusting the test model to confounding factors, the OR value was adjusted (Adjusted Odd Ratio) to 5,610 (95% CI: 1,686-18,659), which means that by adjusting for confounding factors, people with BMI> 25.66 kg / m2 is 5.6 times more likely to develop hypertension than people with BMI \leq 25.66 kg / m2.

Research results reported by Singh et al. (2017) in the urban community group in Varanasi showed that respondents who were overweight (25-29.9 kg / m2) and obese (35-> 40 kg / m2) showed a tendency to experience hypertension with the large OR values in these respondents respectively. 1.99 (95% CI: 1-3.97) for overweight and 3.57 (95% CI: 1.59-8.00) for obesity. Landi et al. (2018) stated that body weight and BMI are easy to measure and are simple and effective tools to detect hypertension's risk. This anthropometric measurement is suitable for use in a comprehensive public health strategy.

The rhythm of the heart tends to increase in obese people because of the large body mass. The arterial wall pressure becomes more significant due to the large volume of blood that must be circulated to carry oxygen and nutrients throughout the body. Increased Body Mass Index (BMI) is a risk factor for high blood pressure, metabolic syndrome, abnormalities in blood vessel wall thickness, endothelial dysfunction, and left ventricular hypertrophy (Mauliza, 2018). The significantly increased prevalence of obesity makes BMI recommended when predicting and detecting hypertension (Landi et al., 2018).

Smoking habits did not affect hypertension incidence either before or after adjusting the analysis model for confounding factors. There was no upper limit value of OR> 1) and lower limit OR <1. In all categories of smoking habits, outpatients had more hypertension than outpatients who were not diagnosed with hypertension. In the group of outpatients diagnosed with hypertension, most respondents came from among those who had never smoked, and the least was from former smokers.

This study's results contradict the results of research conducted by Mohammed et al. (2015) in the urban population in Bangladesh, where there is a significant relationship between smoking and the occurrence of hypertension. The group of respondents who smoked conventional cigarettes (smoky) had a binomial OR value of 4.78 (95% CI: 3.62-6.32) with a multinomial OR of 3.47 (2.85-

5.19). Meanwhile, the group of respondents who smoked smokeless (smokeless) had a binomial OR value of 3.62 (95% CI: 2.74-4.78) and multinomial OR 3.61 (2.33-4.14).

A study of 28,577 men from longitudinal survey data in China showed no significant association between the effects of smoking on the risk of respiratory disease, hypertension and myocardial infarction in the age group under 35 years. However, in the age group between 36-55 years and 56-80 years, smoking affects the risk of respiratory disease, hypertension and myocardial infarction. This means that the risk of respiratory disease, hypertension and myocardial infarction increases with age (Gao et al., 2017). These contradictory research results can be caused by various things, including the research respondents' characteristics and the research location. Besides, the cross-sectional research model cannot describe the causal relationship because the observation of risk factors and outcomes is observed at the same time.

In the multivariate analysis on fruit diet habits, it was found that upper limit value of the OR both unadjusted and adjusted OR> 1 and the lower limit of the OR both unadjusted and adjusted OR <1. From these OR values, it can be concluded that the fruit diet habits do not affect the occurrence of hypertension both before and after adjusting the analysis model to confounding factors.

The study results showed that more respondents had a dietary habit of fruits and vegetables that was rarer, both in the hypertensive group and those without hypertension. The fact shows that more respondents consumed fruit ≤ 1 time/week in the group diagnosed with hypertension (51 people) and those who were not diagnosed with hypertension (30 people). Just like the fruit diet habits, the vegetable diet habits also showed the same thing, more respondents had a vegetable diet habit that was less frequent $(\leq 2 \text{ times/week})$ as many as 30 people in the patient group who were not diagnosed with hypertension and as many as 43 people in the group respondents diagnosed with hypertension. Likewise, for the vegetable diet habits, the OR value before adjusting for confounding factors was 0.169 (95% CI: 0.36-0.785), which means that respondents who had vegetable diet habits that were less frequent (≤ 2 times/week) tended to prevent the occurrence hypertension of 5.91 times compared to those who have more frequent vegetable diet habits (> 2x/week).

Mohammed et al. (2015) also showed the same results where low fruit and vegetable consumption did not significantly affect the incidence of hypertension. This can be seen from the OR values reported in the form of binomial and multinomial ORs. The group with a low fruit consumption level showed a binomial OR value of 1.18 (0.97-1.66) and a multinomial OR of 0.99 (0.29-1.41), while the group with a low level of vegetable consumption showed a binomial OR value of 1.07 (95% CI: 0.97-1.85) and the multinomial OR was 0.87 (95% CI: 0.41-1.33). The same conclusion in the study of Zhou et al. (2018) showed that the habit of consuming fresh vegetables was not related to the incidence of hypertension (OR = 0.935; 95% CI = 0.0875-0.998).

CONCLUSIONS AND RECOMMENDATIONS

This study concluded that 65.2% of outpatients were diagnosed with hypertension at Bandung Medan Hospital in December 2019. The chi-square statistical test results showed that body mass index (0,000) and vegetable dietary habits (0.902) influenced the occurrence of hypertension. After adjusting for confounding factors, only body mass index still influenced the incidence of hypertension (OR = 5.61; 95% CI = 1,686-18,659).

Declaration of Conflicting Interests

The authors declared that no potential conflicts of interests with respect to the authorship and publication of this article.

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