



Risk Factors Associated with Hypertension at Sadabuan Health Center 2021

Rini Amalia Batubara^(✉), Fitri Rahma Handayani, Arinil Hidayah, Nefonavrtilova Ritonga, Sakinah Yusro Pohan, and Khoirunnisah Hasibuan

Universitas Aufa Royhan di Kota Padangsidimpuan, Padangsidimpuan, Indonesia
riniamaliabatubara20@gmail.com

Abstract. Hypertension is a multifactorial disease arising due to various interaction factors. Increasing age will cause some physiological changes and increased peripheral resistance and sympathetic activity occurs in elderly. The aim of the study was to analyze the risk factors associated with hypertension at Sadabuan Health Center working area, Padangsidimpuan City in 2021. The study used a quantitative study with a cross sectional approach. The population was sufferers who received treatment at the Internal Medicine Clinic at Sadabuan Health Center. The sampling technique is non-probability sampling with 113 respondents. The finding showed that there was a relationship between family history (p value = 0,001), smoking (p value = 0,003), obesity (p value = 0,013) with the incidence of hypertension at Sadabuan Health Center working area, Padangsidimpuan City in 2021. It is expected that the society are be able to maintain blood pressure to stay in a normal state by doing regular physical activity, stopping smoking, reducing weight for obese ones to reduce the risk of hypertension.

Keywords: hypertension · smoking · obesity · family history

1 Introduction

Hypertension or better known as high blood pressure is an increase in blood pressure where systolic and diastolic are above the normal limit of 140/90 mmHg. Commonly, hypertension does not provide typical complaints and symptoms so many sufferers are unaware of it. Therefore, hypertension is a major risk factor for cardiovascular disease. Hypertension can cause stroke, myocardial infarction, heart failure, dementia, kidney failure, and visual impairment if it isn't properly treated [1].

Hypertension is a silent killer which symptoms can vary in each individual and almost the same as symptoms of other diseases. WHO (2015) data showed that around 1.13 billion people in the world were hypertension sufferers. It meant that one in three people in the world was diagnosed with hypertension. It is estimated that hypertension sufferers in the world will continue to increase every year. In 2025, there will be 1.5 billion hypertension sufferers. Every year, 9.4 million people die from hypertension and complications [2].

Hypertension is called The Silent Killer because this disease is a hidden killer and generally sufferers do not notice that they have hypertension before having their blood pressure checked. Furthermore, hypertension sufferers commonly do not experience any signs or symptoms before complications occur [3].

It will cause various complications in the long term, if it is not treated properly. Therefore, blood pressure must be lowered to normal limits so that complications do not occur such as kidney failure, heart disease, atherosclerotic plaques appearance in the cerebral arteries and arterioles causing arterial occlusion, ischemic injury and stroke if it lasts for a long time. The risk factors influencing the occurrence of hypertension are divided into two namely controllable and uncontrollable risk factors. Uncontrollable risk factors consist of genetic factors, gender, race and age. Controllable risk factors consist of obesity, inactivity, smoking, alcoholism, stress, excessive salt consumption, occupation, education and meal patterns [4]. According to HL Bloom, the factors influencing health are divided into four groups namely environment, behavior, health services and heredity [5].

The prevalence of hypertension in North Sumatra Province obtained from measuring blood pressure at the age of ≥ 18 years old was 24.7% in 2013. The prevalence of hypertension in males (23.6%) was lower than females (25.7%) [6]. Based on the 2019 Padangsidempuan Health Profile in blood pressure measurements in 6,071 people at the age of ≥ 15 years old, the second highest proportion of the prevalence of hypertension sufferers was in the Sadabuan Health Center working area and the lowest was in the Pintu Langit Health Center working area. Hypertension was the second place and included as the ten biggest diseases in the Health Center [7].

Based on the initial survey conducted by researchers at the Sadabuan Health Center, 13 from 15 hypertension sufferers at the Sadabuan Health Center were obese and smoking. Seven sufferers said they had a family history of hypertension. The variables of this study were investigated because at the time of the initial survey represented the incidence of hypertension risk factors at the Sadabuan Health Center Working Area, Padangsidempuan City.

1.1 Method

The study used quantitative research with a cross-sectional approach. It performed at the Sadabuan Health Center Working Area, Padangsidempuan City in 2021. The population was sufferers who received treatment at the Internal Medicine Clinic at Sadabuan Health Center. The sampling technique is non-probability sampling with 113 respondents. The instrument used in this study was a questionnaire based on theories and questions that must be answered by respondents. The questionnaire in this study was adopted from the study of Nophia (2017). Data analysis obtained from the findings of the study was conducted in univariate and bivariate by using the chi square test.

Table 1. The Distribution of Respondents by Age

Age	Frequency (n)	Percentage (%)
36–45	3	2,7
46–55	82	72,6
56–65	27	23,9
>65	1	0,9
Total	113	100,0

Table 2. The Distribution of Respondents by Gender

Gender	Frequency (n)	Percentage (%)
Male	57	50,4
Female	56	49,6
Total	113	100,0

Table 3. The Distribution of Respondents' Family History

Family History	Frequency (n)	Percentage (%)
Yes	51	45,1
No	62	54,9
Total	113	100,0

2 Findings

Univariate Analysis

Age Overview

Based on the Table 1 showed that the majority of the respondents was in the 46–55 age interval with 82 respondents (72.6%). The minority was > 65 years with one respondent (0.9%).

Gender Overview

Based on the Table 2, it could be seen that the majority of respondents were male with 57 respondents (50.4%), while the minority was female with 56 respondents (49.6%).

Family History Overview

Table 4. The Distribution of Respondents Based on Smoking

Smoking	Frequency (n)	Percentage (%)
Yes	57	50,4
No	56	49,6
Jumlah	113	100,0

Table 5. The Distribution of Respondents by Obesity

Obesity	Frequency (n)	Percentage (%)
Yes	52	46,0
No	61	54,0
Total	113	100,0

Table 6. The Distribution of Respondents Based on Hypertension

Hypertension	Frequency (n)	Percentage (%)
Ya	63	55,8
Tidak	50	44,2
Total	113	100,0

Based on the Table 3 showed that the majority of respondents who did not have a family history of hypertension was 62 respondents (54.9%) and had a family history of hypertension with 51 respondents (45.1%).

Smoking Overview

Based on the Table 4, it could be seen that the majority based on smoking was 57 respondents (50.4%) and the minority was 56 respondents (49.6%).

Obesity Overview

Based on the Table 5, it showed that the majority by obesity was 61 respondents (54%) and the minority was 52 respondents (46%).

Hypertension Overview

Based on the Table 6, it could be seen that hypertension sufferers were 63 respondents (55.8%) and the ones who not sufferers were 50 respondents (44.2%).

Table 7. The Cross Tabulation of Family History with Hypertension

Family History	Hypertension				Total	P
	Yes		No			
	n	%	N	%		
Yes	38	74,5	13	25,5	51	0,001
No	25	40,3	37	59,7	62	
Total	63	55,8	50	44,2	113	

Table 8. The Cross Tabulation of Smoking with Hypertension

Smoking	Hypertension				Total	P
	Yes		No			
	n	%	N	%		
Yes	40	70,2	17	29,8	57	0,003
No	23	41,1	33	58,9	56	
Total	63	55,8	50	44,2	113	

Bivariate Analysis

The Relationship of Family History with Hypertension

In Table 7, it could be seen that the hypertension sufferers who had a family history were 38 people (74.5%) and hypertension sufferers who did not have a family history were 37 people (59.7%).

Then, Chi-square test results obtained p value (0,001) < (0.05) so Ha was accepted and H0 was rejected. Thus, there was a relationship between family history and the incidence of hypertension at the Sadabuan Health Center Working Area, Padangsidimpuan City in 2021.

The Relationship of Smoking with Hypertension

Based on the Table 8, it showed that there were 40 hypertension sufferers (70.2%) who smoke while there were 33 hypertension sufferers (58.9%) who did not smoke. The finding of statistical test obtained p value (0,003) < (0.05) so that Ha was accepted and H0 was rejected. Thus, there was a relationship between smoking and the incidence of hypertension at the Sadabuan Health Center Working Area, Padangsidimpuan City in 2021.

The Relationship of Obesity with Hypertension

In Table 9, it could be seen that there were 36 obese respondents (69.2%) who were not hypertension sufferers while there were 34 respondents (55.7%) who were not hypertension sufferers. The findings of statistical tests obtained p value (0,013) < (0.05) so

Table 9. The Cross-tabulation of Obesity with Hypertension

Obesity	Hypertension				Total	P
	Yes		No			
	n	%	n	%		
Yes	36	69,2	16	30,8	52	0,013
No	27	44,3	34	55,7	61	
Total	63	55,8	50	44,2	113	

that H_a was accepted and H_0 was rejected. Thus, there was a relationship between obesity and the incidence of hypertension at the Sadabuan Health Center Work Area, Padangsidimpuan City in 2021.

3 DISCUSSION

The Relationship of Family History with Hypertension

The findings showed that hypertension sufferers who had a family history were 38 (74.5%) and respondents who were not hypertension sufferers who did not have a family history of hypertension sufferers were 37 respondents (59.7%). The finding of Chi-square test obtained p value (0,001) < (0.05) so that H_a was accepted and H_0 was rejected. Thus, there was a relationship between family history and the incidence of hypertension at the Sadabuan Health Center Work Area, Padangsidimpuan City in 2021.

It is in line with the findings of Maulidina, et al. [8], there were more hypertension sufferers with a family history (58%) than respondents with no family history (38.2%). The findings of the Chi-Square test showed that there was a significant relationship between family history and the incidence of hypertension (p value = 0,033). The findings of calculation of the Ration Prevalence (RP) showed that respondents with a family history had 1,518 times to experience hypertension than respondents with no family history (95% CI 1.038 – 2.221).

In this study, the close relatives were father, mother and siblings. If there was one of the family members whose family history of hypertension then a person would have a risk of developing hypertension. In addition, if many family members had a family history of hypertension then this person would have a greater chance of developing hypertension.

The findings of this study proved that heredity had an important role determining how much a person tended to hypertension sufferers. However, if it was left alone without any intervention, then along with the environment would cause hypertension causing signs and symptoms. Knowing that having a family history of hypertension, you should regularly check your blood pressure and avoid an unhealthy lifestyle in order to prevent hypertension.

The Relationship of Smoking with Hypertension

The findings showed that there were 40 hypertension sufferers (70.2%) who smoke

while there were 33 hypertension sufferers (58.9%) who did not smoke. The finding of statistical test obtained p value (0,003) < (0.05) so that H_a was accepted and H_0 was rejected. Thus, there was a relationship between smoking and the incidence of hypertension at Sadabuan Health Center Working Area, Padangsidimpuan City in 2021.

Several factors influencing the incidence of hypertension included factors (age, gender), obesity from drugs (steroids, painkillers) and comorbid characteristics [9]. Based on research by Elvivin, Lestari & Ibrahim (2016) [10], regarding the analysis of risk factors for the habit of consuming salt, alcohol, smoking and drinking coffee on the incidence of hypertension, it showed that smoking and coffee drinking were the risk factors for hypertension on the fishing communities of Bajo tribe, Tasipi Island, Muna West Regency in Indonesia.

According to Suprihatin, smoking had a huge role in increasing blood pressure. It was caused by the nicotine in cigarettes triggering the adrenaline hormone which lead to increase of blood pressure. Nicotine was absorbed by the blood vessels in the lungs and circulated throughout other bloodstreams causing blood vessels constriction. It caused the heart work harder to pump blood around the body through narrowing blood vessels [11].

Smoking influenced the incidence of hypertension. Toxic chemicals such as nicotine and carbon monoxide were inhaled through cigarettes entering the bloodstream. Then, it could damage the endothelial lining of the arteries leading to atherosclerosis and high blood pressure. In an autopsy study, it was verified a close relationship between smoking habits and the presence of atherosclerosis in all blood vessels. Smoking in hypertension sufferers further would increase the damage risk to the arteries [12].

Based on the findings of Adriaanz Rottie, & Lolong (2016) [13] hypertension sufferers were also advised not to smoke, because smoking could damage the endothelial lining of blood vessels. In cigarettes there were nicotine and carbon dioxide causing the blood vessels elasticity to decrease and increasing blood pressure.

Furthermore, the findings of Firmansyah & Rustam (2017) [14] from 68 respondents (60.3%) were smokers and 27 respondents (39.7%) were not smokers. The finding of the study was the smoking habit with blood pressure on hypertension sufferers obtained p value = 0,014. It indicated a relationship between smoking habit factors and blood pressure on hypertension sufferers at Palembang Health Center. In line with the research conducted by Rahmayani, the risk factors for the incidence of primary hypertension at the age of 20–55 years in the internal medicine polyclinic of Regional General Hospital of 45 Kuningan, the finding obtained a p value of 0,001. It meant that there was a relationship between smoking habits and the incidence of hypertension. The risk of experiencing primary hypertension for respondents who had smoking habit was 14 times greater than non-smokers (POR = 14,375[12]).

The Relationship of Obesity with Hypertension

The finding showed that there were 36 obese respondents (69.2%) of hypertension sufferers while there were 34 respondents (55.7%) of non-hypertension sufferers. The findings of statistical tests obtained p value (0,013) < (0.05) so that H_a was accepted and H_0 was rejected. Thus, there was a relationship between obesity and the incidence of hypertension at the Sadabuan Health Center Working Area, Padangsidimpuan City in 2021.

In the study of Sulastri et al., (2012) [15] conducted sample of 204 respondents showed that more than half of hypertension sufferers were obese (56.6%) and central obesity (54.9%). There was a significant relationship between obesity and the incidence of hypertension ($p < 0.05$; OR = 1.82) and central obesity with hypertension ($p < 0.05$; OR = 2.72). The independent sample T-test showed significant results ($p < 0.05$). There was a difference in the average of BMI ($p = 0.025$) between hypertension and non-hypertension sufferers. It was a difference in the mean LP ($p = 0,002$) between hypertension and non- hypertension sufferers. The finding of the study concluded that there was a relationship between the incidence of obesity and central obesity with hypertension.

In the study of Kautsar, Syam, & Salam (2014) [16] conducted of 71 respondents, it was 49 (69%) were obese and 22 (31%) were overweight. The relationship between obesity (based on BMI) and blood pressure showed that obese respondents were more likely to suffer from high blood pressure (hypertension) while overweight respondents had more normal blood pressure. It could be concluded that there was a tendency for obese person to suffer from high blood pressure (hypertension).

Obesity could cause hypertension through various mechanisms either directly or indirectly. Directly, obesity could cause an increase in cardiac output because the greater the body mass, the more amount of blood circulating thereby increasing cardiac output. Indirectly, it was through the stimulation of the activity of the sympathetic nervous system and the Renin Angiotensin Aldosterone System (RAAS) by mediators such as hormones, cytokines, adipokines, etc. One of them was the hormone aldosterone closely related to water and sodium retention leading to increase the amount of blood [15]. The hypertension was also caused by foods containing lots of cholesterol, protein and excess salt but low in food fiber. Cholesterol included as a family of fat. It was one of the components of fat itself [17]. Its function in the body, excess cholesterol would cause it to stick in blood vessels causing plaque which lead to risk for hypertension [18].

Acknowledgments. Thanks to health workers for their cooperation and assistance during data collection. Special thanks to Sadabuan Health Center for its continued encouragement and support.

Authors' Contributions. All authors have read and agreed to the final version of this manuscript and have equally contributed to its content.

References

1. I. W. W. Muhammad Hafiz Bin Mohd, "Faktor-Faktor Yang Berhubungan Dengan Kejadian Hipertensi Pada Kelompok Lanjut Usia Di Wilayah Kerja Upt Puskesmas Petang I Kabupaten Badung Tahun 2016." <https://ojs.unud.ac.id/index.php/eum/article/view/21559> (accessed Apr. 15, 2022).
2. Kementerian Kesehatan Republik Indonesia, "Hipertensi Membunuh Diam-diam, Ketahui Tekanan Darah Anda," 2018. .
3. M. Nadjib Bustan, *Epidemiologi Penyakit Tidak Menular*. Jakarta: PT. Rineka Cipta, 2015.

4. Kementerian Kesehatan Republik Indonesia, “Pusat Pelatihan SDM Kesehatan | Kementerian Kesehatan Republik Indonesia | Puslat SDM,” 2018. <https://puslatsdmk.kemkes.go.id/> (accessed Apr. 15, 2022).
5. S. Notoatmodjo, *Promosi Kesehatan dan Perilaku Kesehatan (edisi revisi 2012)*. 2012.
6. Dinas Kesehatan Provinsi Sumatera Utara, “Profil kesehatan Sumatera Utara,” 2019. .
7. Dinas Kesehatan Padangsidimpuan, “Profil Kesehatan Dinas Kesehatan Kota Padangsidimpuan Tahun 2018,” 2019.
8. I. S. Fatharani Maulidina, Nanny Harmani, “Faktor-Faktor yang Berhubungan dengan Kejadian Hipertensi di Wilayah Kerja Puskesmas Jati Luhur Bekasi Tahun 2018,” *ARKESMAS (Arsip Kesehat. Masyarakat)*, vol. 4, no. 1, pp. 149–155, 2019, <https://doi.org/10.22236/ARKESMAS.V4I1.3141>.
9. R. Naseem *et al.*, “Prevalence and characteristics of resistant hypertensive patients in an Asian population,” *Indian Heart J.*, vol. 69, no. 4, pp. 442–446, 2017, <https://doi.org/10.1016/J.IHJ.2017.01.012>.
10. H. Lestari and K. Ibrahim, “Risk Factor Analysis Consumption Ofsalt , Consumption Of Alcohol, Drinkingcoffee And Smoking Habits Of Hypertensi Occurrence Of Fishermen Bajo Interest On The Island Tasipi Muna District West 2015,” 2016.
11. A. Suprihatin, “Hubungan Antara Kebiasaan Merokok, Aktivitas Fisik, Riwayat Keluarga Dengan Kejadian Hipertensi Di Wilayah Kerja Puskesmas Nguter - UMS ETD-db,” 2016. <http://eprints.ums.ac.id/46230/> (accessed Apr. 15, 2022).
12. Sri Tanti Rahmayani, “Faktor-Faktor Risiko Kejadian Hipertensi Primer Pada Usia 20–55 Tahun Di Poliklinik Penyakit Dalam Rsud 45 Kuningan | Syntax Idea,” 2019. <https://jurnal.syntax-idea.co.id/index.php/syntax-idea/article/view/37> (accessed Apr. 15, 2022).
13. J. R. Patricia N. Adriaansz, “Hubungan Konsumsi Makanan Dengan Kejadian Hipertensi Pada Lansia Di Puskesmasranomuut Kota Manado,” *Jurnal Keperawatan UNSRAT*, 2016. .
14. M. Ramadhani Firmansyah, P. Studi NERS, and S. Siti Khadijah Palembang, “Hubungan Merokok dan Konsumsi Kopi dengan Tekanan Darah pada Pasien Hipertensi,” *J. Kesehat.*, vol. 8, no. 2, pp. 263–268, 2017, <https://doi.org/10.26630/JK.V8I2.495>.
15. D. Sulastri, E. Elmatris, and R. Ramadhani, “Hubungan Obesitas Dengan Kejadian Hipertensi Pada Masyarakat Etnik Minangkabau Di Kota Padang,” *Maj. Kedokt. Andalas*, vol. 36, no. 2, pp. 188–201, 2012, <https://doi.org/10.22338/MKA.V36.I2.P188-201.2012>.
16. A. S. Fatimah Kautsar, “Obesitas, Asupan Natrium Dan Kalium Terhadap Tekanan Darah | Media Kesehatan Masyarakat Indonesia,” 2014. <https://journal.unhas.ac.id/index.php/mkmi/article/view/491> (accessed Apr. 15, 2022).
17. K. F. Agus Hendra Al-Rahmad, “Faktor Resiko Peningkatan Kolesterol pada Usia Diatas 30 Tahun di Kota Banda Aceh,” *J. Nutr.*, vol. 18, no. 2, pp. 109–114, 2016, <https://doi.org/10.29238/JNUTRI.V18I2.62>.
18. M. R. S. A.A Sagung Ika Nuriska, “Hubungan Kadar Kolesterol Total Dengan Hipertensi Sistolik Pada Pasien Diabetes Melitus Tipe 2 Di Poliklinik Endokrin Rumah Sakit Umum Sanglah Periode Januari – Desember 2011 | E-Jurnal Medika Udayana,” 2015. <https://ojs.unud.ac.id/index.php/eum/article/view/12638> (accessed Apr. 15, 2022).

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

