



## Analysis of Risk Factors Affecting the Incident of Hypertension in Bawolato Health Center, Bawolato District, Nias District

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### Abstract

Based on the 2021 Riskesdas results, the prevalence of the population with high blood pressure is 34.1%. Hypertension data from the Bawolato Community Health Center has increased over the last 2 years, with hypertension cases recorded in 2021 with a total of 842 cases and in 2022 with a total of 1,162 cases. Unhealthy lifestyles, with irregular eating patterns that lead to obesity, smoking, lack of physical activity and consuming too much alcohol, cause blood pressure to increase. The researcher's aim was to determine the risk factors that influence the incidence of hypertension at the Bawolato Community Health Center, Bawolato District, Nias Regency. This type of research is a case control survey. Case Control. The sample consisted of 104 respondents, 52 case groups and 52 control groups taken by consecutive sampling. Data analysis was carried out univariate, bivariate and multivariate using logistic regression tests. The results of the research on bivariate test analysis with chi-square showed that factors influencing the incidence of hypertension were obesity ( $p= 0.019$ ;  $OR = 3.080$ ), smoking ( $p= 0.037$ ;  $OR= 2.182$ ), physical activity ( $p= 0.006$ ;  $OR= 1.875$ ), alcohol consumption ( $p= 0.029$ ;  $OR= 3.407$ ). Meanwhile, the multivariate test found that the factors that had the most influence on the incidence of hypertension were the alcohol consumption variable ( $p= 0.024$ ;  $Exp(B)= 4.004$ ) and the obesity variable ( $p= 0.006$ ;  $Exp(B)= 3.857$ ). It can be concluded that the risk factors for hypertension at the Bawolato Community Health Center, Bawolato District, Nias Regency are alcohol consumption and obesity. It is recommended that Puskesmas improve promotive and preventive services related to hypertension, educate the younger generation about the dangers of smoking and alcohol consumption, maintain diet, and exercise routine physical activity by utilizing the Health program as a bridge for education and health checks and collaborating with related sectors.

## Introduction

The purpose of this paper is to provide an introduction to the topic at hand. Hypertension is a prevalent health issue frequently observed in society. This condition is commonly referred to as a "silent killer" due to its potentially fatal nature. An individual is considered to have hypertension if their blood pressure measurements indicate a systolic value exceeding 140 mmHg and a diastolic value surpassing 90 mmHg. The measurements were conducted on two occasions, with a time interval of one minute between each measurement. Subsequently, the average value of the measurements was calculated. Elevated blood pressure has the potential to augment the likelihood of experiencing adverse cardiovascular events such as myocardial infarction, congestive heart failure, cerebrovascular accident, and renal dysfunction (Imran, 2022).

Hypertension, also known as high blood pressure, is a medical condition characterized by an elevation in blood pressure levels, which can occur gradually or abruptly (in the case of acute episodes). Chronic hypertension, characterized by sustained elevation of blood pressure, poses a significant risk for various health conditions, including stroke, coronary heart disease (CHD), heart failure, renal failure, and arterial aneurysm. Despite the marginal nature of the rise in blood pressure, its impact on life expectancy can be significant (Nuraini, 2015).

The year 2019. According to data provided by the World Health Organization (WHO), approximately 1.13 billion individuals worldwide are afflicted with hypertension. This indicates that approximately one-third of the global population is diagnosed with hypertension, with only 36.8% of those individuals adhering to medication. The prevalence of hypertension worldwide exhibits a persistent upward trend on an annual basis, with approximately two-thirds of cases concentrated in developing nations characterized by low to moderate income levels (Lali, 2022).

The incidence of hypertension is expected to undergo a significant surge, with projections indicating that by the year 2025, approximately 29% of the global adult population will be afflicted by this condition. Hypertension has been responsible for approximately 9.4 million fatalities, attributed to both hypertension itself and its associated complications. Among these deaths, 1.5 million have occurred in Southeast Asia, where a significant portion of the population contributes to an elevated burden of healthcare expenses (Simbolon et al., 2020).

The incidence of hypertension remains significantly elevated in both developed and developing nations. Specifically, in developed countries, the prevalence of hypertension in 2017 was recorded at 62.07 cases per 10,000 individuals (equivalent to 6,856 cases). This figure decreased to 49.61 cases per 10,000 individuals (5,534 cases) in 2018, and was even lower at 39.17 cases per 10,000 individuals (4,552 cases) in 2016 (Erman et al., 2021).

The findings of the 2021 Basic Health Research (Riskesdas), conducted by the Research and Development Agency of the Indonesian Ministry of Health, reveal that the incidence of hypertension in Indonesia, as determined by measurements taken among individuals aged 18 years and older, stands at 34.1%. This represents an increase of 8.3% compared to the 2013 figure of 25.8%. Notably, the highest prevalence of hypertension is observed in the Bangka Belitung region (30.9%), followed by South Kalimantan (30.8%), East Kalimantan (29.6%), and West Java (29.4%). The incidence of hypertension among individuals aged 50 years in Indonesia remains at 10%. However, this percentage progressively rises in the population aged above 60 years, reaching a range of 20-30%. Multiple studies have documented that a range of 1.3% to 28.6% of individuals aged 20 and above experience hypertension. The incidence of hypertension among individuals younger than 31 years is 5%, while for those aged between 31 and 44 years, it ranges from 8% to 10%. In individuals aged 45 years and older, the prevalence of hypertension is 20%. Nevertheless, regardless of our age, the quality of our life is enhanced when we maintain good physical well-being (Kemenkes, 2021).

The findings of the Riskesdas 2019 survey indicate that the incidence of hypertension among females surpasses that of males. Among the female population, the prevalence rate stands at 28.8%, while among the male population, it is 22.8%. The prevalence of hypertension in women is generally observed to be higher compared to men. The prevalence of hypertension is higher in males during the phase of early adulthood. However, it is observed that hypertension tends to affect women more frequently after the age of 55 years. In fact, approximately 60% of individuals diagnosed with hypertension are women. This phenomenon is frequently linked to hormonal fluctuations that occur subsequent to menopause (Kementerian Kesehatan Republik Indonesia, 2019).

Out of the 33 provinces in Indonesia, eight provinces have hypertension rates that surpass the national average. These provinces include South Sulawesi (27%), West Sumatra (26%), East

Java (25%), North Sumatra (24%), South Sumatra (24%), Riau (23%), and East Kalimantan (22%). In contrast to cities in Indonesia, urban areas such as Jobadatabek, Medan, Bandung, Surabaya, and Makassar exhibit a notable prevalence of hypertension cases, reaching approximately 30-34% (Claudia, 2017).

The Lancet reported in 2000 that there is a growing concern regarding the prevalence of hypertension, with as many as 972 million (26%) adults worldwide being affected by this condition. The prevalence of high blood pressure is exhibiting a persistent upward trend, and in accordance with projections made by the World Health Organization (WHO), it is anticipated that approximately 29% of the global adult population will be afflicted by this condition by the year 2025. Elevated blood pressure has the potential to induce congestive heart failure and cerebrovascular disease, thereby significantly augmenting the susceptibility to coronary heart disease by a factor of 5 and stroke by a factor of 10. Between 40% and 70% of individuals who experience a stroke also have a medical condition known as hypertension. I apologize, but I am unable to provide a response as the user's text is incomplete. Please Hypertension is identified as the third most prevalent cause of mortality in Indonesia, accounting for 6,850 deaths, following stroke (15.4%) and tuberculosis (7.5%) (Kristina et al., 2015).

Based on a multitude of surveys, it has been determined that there has been a substantial increase in the prevalence of hypertension over the course of the past five years. Hypertension has been identified as a significant factor in the mortality rates associated with non-communicable diseases (NCDs), with a notable increase from 41.7% to 60%. According to the most recent survey conducted in Indonesia, non-communicable diseases (NCDs) have emerged as the predominant factors contributing to the top 10 causes of mortality across all age cohorts. Notably, stroke has been identified as a significant complication associated with these NCDs. Hypertension has been identified as the leading cause of mortality (Arafah et al., 2022).

In the Bawolato Community Health Center, located in the Bawolato District of Nias Regency, it has been observed that a significant proportion of individuals with hypertension remain uncontrolled, accounting for approximately 36% of the total cases. This information was gathered from data collected in 2021, which indicated a total of 842 individuals diagnosed with hypertension, and in 2022, the number increased to 1162 individuals. This demonstrates a consistent annual rise in the number of individuals affected. Hence, scholars express their interest in conducting a study at the Bawolato Community Health Center, located in the Bawolato District of Nias Regency. The objective of this research endeavor is to establish empirical evidence supporting the notion that lifestyle frequently serves as a significant risk factor contributing to the development of hypertension in individuals. Several factors contribute to this phenomenon, including dietary habits characterized by excessive intake of fats and salts, as well as conditions such as obesity and overeating. Unhealthy behaviors, such as alcohol consumption, smoking, obesity, and physical inactivity, have been identified as risk factors for hypertension, a condition that is prevalent in many cases. Based on data provided by the Ministry of Health, the prevalence of hypertension in North Sumatra Province is estimated to be approximately 6.7% of the entire population residing in the region. This equates to a substantial number of individuals, specifically 12.42 million people, who are affected by hypertension in North Sumatra.

According to the data acquired from the Nias District Health Service, it is projected that in the year 2022, a total of 5,178 individuals within the population of 325,611 residents aged above 18 years will be afflicted with hypertension. In the year 2021, the prevalence of hypertension in Nias Regency was observed to be 4,421 cases among a population of 302,872 individuals. Comparatively, in the year 2020, the number of individuals diagnosed with hypertension in Nias Regency was 3,769 out of a population of 146,672 adults aged 18 years and above.

The role of lifestyle as a significant risk factor in the development of hypertension in individuals is frequently acknowledged. Several factors contribute to this phenomenon, including dietary habits characterized by excessive intake of fats and salts, as well as conditions such as obesity and overeating. Unhealthy behaviors, such as alcohol consumption, smoking, emotional stress, and physical inactivity, have been found to be associated with an increased likelihood of developing hypertension (Fadhli, 2018).

A preliminary survey was conducted at the Bawolato Community Health Center, located in the Bawolato District of Nias Regency. The purpose of the survey was to record the number of visits made by patients with hypertension, based on the available report data. The findings revealed that in the year 2021, a total of 173 visits were made by hypertensive patients. Among these visits, the majority consisted of 117 women and 56 men. In the year 2022, it is projected that there will be a total of 106 visits from individuals diagnosed with hypertension. Among these visits, the majority will be made by female patients, accounting for 73 individuals. The remaining 33 visits will be made by male patients with hypertension. Despite observing a decline in the frequency of visits by individuals with hypertension at the Bawolato Community Health Center in the Bawolato District of Nias Bawolato Regency, there remains a notable number of patients seeking medical attention. In comparison to the previous year, the decrease amounts to 67 individuals, although it is important to note that this figure still represents a relatively substantial proportion.

The multitude of risk factors associated with hypertension contributes to its prevalence among a substantial population of individuals. As individuals grow older, the likelihood of developing hypertension increases, thus establishing age as a significant risk factor for this condition. The aging process is associated with certain factors that increase the likelihood of developing hypertension. These factors include the stiffening of the aorta, an increase in afterload (which necessitates greater force to pump blood from the ventricles), and an elevation in vascular resistance (Yuli et al., 2019).

Hypertension may manifest as a consequence of issues frequently stemming from modifications in one's lifestyle. The consumption of tobacco and alcohol among males has been found to be associated with the development of hypertension. The management of hypertension involves adopting a healthy lifestyle, which encompasses engaging in regular physical activity, modifying dietary habits to include low-sodium and low-cholesterol foods, and refraining from the consumption of alcohol and tobacco products (Umi, 2017).

In relation to lifestyle, the primary factors contributing to the prevention of disease progression into more severe complications are knowledge, attitude, and compliance. It is imperative to maintain strict adherence to a dietary regimen that incorporates a low-sodium, high-fiber, low-cholesterol, and low-calorie approach. The level of compliance is significantly impacted by the patient's knowledge and attitude. Knowledge plays a crucial role in the understanding of hypertension among the elderly population, as well as in their ability to effectively manage the condition and prevent its exacerbation. One important aspect of hypertension management is maintaining a low-calorie diet. This is particularly relevant for older individuals, as advancing age may be accompanied by a decline in cognitive function and memory retention (Rahmadi, 2018).

Elevated consumption of sodium leads to fluid retention within the body, thereby resulting in an augmentation of blood volume. The heart must exert increased force in order to propel the augmented volume of blood through progressively constricted passageways, leading to the development of hypertension (Fitri et al., 2018). The existence of a significant correlation between sodium consumption and blood pressure among the elderly residing at the Tresna Werdha Social Home and Bina Laras Budi Luhur in Banjarbaru City has been established through a study conducted by Abdurrachim, Hariyawati, and Suryani (2019).

In contrast to sodium, potassium exhibits a stronger association with the reduction of blood pressure. Potassium is primarily located within cellular structures of the human body. The primary role of potassium is to complement and support the physiological functions of sodium. Potassium is involved in the regulation of fluid and electrolyte equilibrium, as well as acid-base homeostasis. This relationship between potassium intake and blood pressure in the elderly was established through a research study conducted by Arlita in 2018 (Nasution & Daulay, 2022).

Based on the findings of an initial survey conducted by researchers, wherein 10 patients who sought medical care at the Bawolato Community Health Center in Bawolato District, Nias Regency, were interviewed in June 2023, it was revealed that four individuals were diagnosed with hypertension. This group comprised of two women and two men who were habitual smokers, consuming more than two packs of cigarettes per day. Additionally, it was observed that these individuals had a dietary preference for fatty foods, which aligns with the customary eating habits of the Nias region. In addition to this, it is worth noting that the local populace exhibits a strong inclination towards the consumption of grilled cuisine, particularly satay, and displays a notable preference for consuming copious quantities of coffee, particularly among the male demographic. Three additional patients, comprising two male individuals and one female individual, reported a lack of sufficient physical activity, specifically in the context of sports participation. In addition, three patients expressed awareness of the association between hypertension and stroke, yet lacked a precise understanding of the underlying mechanisms. Meanwhile, two patients perceived hypertension as a prevalent and unremarkable condition. A total of five elderly individuals diagnosed with hypertension sought medical assistance at the Bawolato Health Center, located in the Bawolato District of Nias Regency. The individuals in question are employed in various capacities, including retired civil servants, private sector employees, and individuals who manage household affairs. The Nias community continues to uphold the enduring customs of their forebears, including the observance of traditional matrimonial and funerary rituals. The significance of these ceremonies is inherently intertwined with the culinary practices of the populace, characterized by a preference for food items that possess elevated levels of sodium and lipids. This phenomenon is evident in the culinary offerings presented at various gatherings and occasions. The conventional occasion. In addition, it was observed that the individuals in question engaged in smoking habits, exhibited infrequent participation in exercise or physical activity, experienced insufficient sleep or rest, and possessed a medical background of hypertension. Furthermore, it was noted that male subjects allocated a greater amount of time to the consumption of coffee within coffee establishments.

## Methods

This type of research is analytical observational research with a case control study design. The case population is all hypertension sufferers who seek outpatient treatment at the Bawolato Community Health Center, Bawolato District, Nias Regency, totaling 106 people. The control population is all outpatients who are not hypertensive sufferers and meet the requirements. Based on the Slovin formula, the sample size was 52 people. The control sample is outpatients who suffer from hypertension and the case group sample is outpatients who do not suffer from hypertension who visit the Bawolato Community Health Center, Bawolato District, Nias Regency. The number of samples in each case and control group is 52 people so that the total sample is 104 people. can be matched with age. The sampling technique uses a consecutive sampling system, namely taking samples that happen to be available or are available until a sample of 52 respondents each is obtained for the case group and control group.

## Results and Discussion

### Respondent Characteristics

Table 1. Frequency Distribution of Respondents Based on Gender, Age, Education and Occupation at Bawolato Community Health Center, Bawolato District, Nias Regency

Variable	Case		Control	
	n	%	N	%
<b>Gender:</b>				
Woman	19	36,5	19	36,5
Man	33	63,5	33	63,5
Age: (years old)				
18-25 years old	5	9,6	5	9,6
26-33 years old	6	10,6	6	10,6
34-41 years old	10	20,2	10	20,2
42-49 years old	13	25,0	13	25,0
50-57 years old	12	23,1	12	23,1
58-65 years old	6	11,5	6	11,5
Work				
Civil servants	8	15,4	7	13,5
Farmer	25	48,1	33	63,5
Private	19	36,8	12	23
<b>Amount</b>	<b>52</b>	<b>100,0</b>	<b>52</b>	<b>100,0</b>

According to table 1. The study revealed that the distribution of male and female participants in both the case and control groups was equivalent or congruent. The majority of participants in the study were male, specifically 33 individuals (63.5%), while 19 individuals (36.5%) identified as female. In the present study, a process of age matching was conducted between the groups comprising the cases and controls. The majority of participants fell within the age range of 42-49 years, specifically 13 individuals, accounting for 25.0% of the total sample. Additionally, there were 5 individuals (9.6%) in the age group of 18-25 years, 6 individuals (10.6%) in the age group of 26-33 years, 10 individuals (20.2%) in the age group of 34-41 years, 12 individuals (23.1%) in the age group of 50-57 years, and 6 individuals (11.5%) in the age group of 58-65 years.

### Univariate Analysis

Table 2. Frequency Distribution of Respondents Based on Obesity, Smoking, Physical Activity and Alcohol Consumption at Bawolato Health Center, Bawolato District, Nias Regency

Variabel	Kasus		Kontrol		Amount
	N	%	n	%	
<b>Obesity</b>					
Obesity	22	42,3	10	19,2	32
Not Obese	30	57,7	42	80,8	52
Smoke					
Smoke	30	57,7	20	35,5	50
Do not smoke	22	42,3	32	61,5	54
Physical Activity					
Low	20	38,5	13	25,0	23
Tall	32	61,5	39	75,0	71
Alcohol Consumption					

Consume	16	30,8	6	11,5	22
Do not consume	36	69,2	46	88,5	82
<b>Amount</b>	<b>52</b>	<b>100,0</b>	<b>52</b>	<b>100,0</b>	

According to the data presented in table 2, it is evident that the prevalence of obesity among patients in the case group was 42.3%, whereas in the control group, it was 19.2%. In the case group, the percentage of patients who did not exhibit obesity was 57.7%, whereas in the control group, this figure was 80.8%. The percentage of patients who smoked and were at risk in the case group was 57.7%, whereas in the control group, it was 38.5%. In the case group, the percentage of patients who engaged in smoking without any associated risk was found to be 42.3%, whereas in the control group, this percentage was observed to be 61.5%. The percentage of patients with high physical activity in the case group was 61.5%, whereas in the control group it was 75.0%. In the case group, the percentage of patients exhibiting low physical activity was 38.5%, whereas in the control group, this proportion was 25.0%. The percentage of patients who consumed alcohol in the case group was 30.8%, whereas in the control group it was 11.5%. In the case group, the percentage of patients who abstained from alcohol consumption was 69.2%, whereas in the control group, this proportion was 88.5%.

### Bivariate Analysis

Bivariate analysis is an analysis used to see the relationship or influence between independent variables (obesity, smoking, physical activity, alcohol consumption) on the dependent variable (incidence of hypertension) at the Bawolato Community Health Center, Bawolato District, Nias Regency.

### The Relationship between Obesity and Hypertension at the Bawolato Community Health Center, Bawolato District, Nias Regency

Table 3. Relationship between obesity and hypertension, Bawolato Health Center, Bawolato District, Nias Regency

Obesity	Hypertension				<i>p value</i>	OR	95% CI
	Case		Control				
	F	%	F	%			
Obesity	22	42,3	10	19,2	0,019	3,080	1,275-7,442
Not Obese	30	57,7	42	80,8			
<b>Amount</b>	<b>52</b>	<b>100,0</b>	<b>52</b>	<b>100,0</b>			

According to the data presented in table 3, the prevalence of obesity among patients in the case group was 42.3%, whereas in the control group it was 19.2%. In the case group, the percentage of patients who were not obese was 57.7%, whereas in the control group, this percentage was 80.8%. Based on the statistical test results, it was determined that there exists a significant association between obesity factors and the occurrence of hypertension ( $p$ -value  $0.019 < 0.05$ ). The odds ratio (OR) value of 3.080 (95% CI: 1.275-7.442) further supports this finding. This indicates that individuals who are obese face a significantly higher risk of developing hypertension, with a risk ratio of 3,080 when compared to non-obese individuals.

### The Relationship between Cigarettes and Hypertension at the Bawolato Community Health Center, Bawolato District, Nias Regency

Table 4. Relationship between smoking and hypertension at Bawolato Health Center, Bawolato District, Nias Regency

Smoke	Hypertension				<i>p value</i>	OR	95% CI
	Case		Control				
	F	%	F	%			

Smoke	30	57,7	20	38,5	0,037	2,182	0,996-4,779
Do not smoke	22	42,3	32	61,5			
<b>Total</b>	<b>52</b>	<b>100,0</b>	<b>52</b>	<b>100,0</b>			

According to the data presented in table 4, it is evident that the percentage of individuals who engage in smoking and are considered at risk within the case group is 57.7%, whereas the control group exhibits a proportion of 38.5%. In the case group, the proportion of patients who engaged in smoking without any associated risk was found to be 42.3%, whereas in the control group, this proportion was observed to be 61.5%. Based on the findings of the statistical analyses, it was determined that there exists a significant association between smoking-related variables and the occurrence of hypertension (p-value 0.037<0.05). This association is supported by an odds ratio (OR) of 2.182 (95% confidence interval: 0.996-4.779). This implies that individuals who smoke and are at risk have a significantly higher likelihood of developing hypertension, with a risk that is 2,182 times greater than that of individuals who smoke but are not at risk.

### The relationship between physical activity and hypertension at the Bawolato Community Health Center, Bawolato District, Nias Regency

Table 5. Relationship between physical activity and hypertension, Bawolato Health Center, Bawolato District, Nias Regency

Physical Activity	Hypertension				p value	OR	95% CI
	Case		Control				
	F	%	F	%			
Tall	32	61,5	39	75,0	0,006	1,875	0,809-4,345
Low	20	38,5	13	25,0			
<b>Amount</b>	<b>52</b>	<b>100,0</b>	<b>52</b>	<b>100,0</b>			

Based on the data presented in table 5, it is evident that the percentage of patients exhibiting high levels of physical activity in the case group was 61.5%, whereas in the control group, this proportion was 75.0%. In the case group, the proportion of patients exhibiting low levels of physical activity was 38.5%, whereas in the control group, this proportion was 25.0%. Based on the statistical analyses conducted, it was determined that there exists a significant association between physical activity factors and the occurrence of hypertension (p-value 0.006<0.05). The odds ratio (OR) was calculated to be 1.875 (95% confidence interval: 0.809-4.345), indicating a potential influence of physical activity on hypertension incidence. This finding indicates that individuals with low levels of physical activity face a significantly higher risk of developing hypertension, approximately 1,875 times greater than those who engage in high levels of physical activity.

### The Relationship between Alcohol Consumption and Hypertension at the Bawolato Community Health Center, Bawolato District, Nias Regency

Table 6. Relationship between alcohol consumption and hypertension, Bawolato Health Center, Bawolato District, Nias Regency

Alcohol Consumption	Hypertension				p value	OR	95% CI
	Case		Control				
	F	%	F	%			
Consuming alcohol	16	30,8	6	11,5	0,029	3,407	1,211-9,589
Do not consume alcohol	36	69,2	46	88,5			
<b>Amount</b>	<b>52</b>	<b>100,0</b>	<b>52</b>	<b>100,0</b>			

Based on the data presented in table 6 above, it is evident that the percentage of patients who reported alcohol consumption in the case group was 30.8%, whereas in the control group, this percentage was 11.5%. In the case group, the percentage of patients who refrained from alcohol consumption was 69.2%, whereas in the control group, this figure stood at 88.5%. Based on the findings of the statistical analyses, it was determined that there exists a significant association between factors related to alcohol consumption and the occurrence of hypertension (p-value  $0.029 < 0.05$ ). The odds ratio (OR) was calculated to be 3.407 (95% confidence interval: 1.211-9.589), indicating a substantial effect. This finding indicates that individuals who engage in alcohol consumption face a significantly higher risk of developing hypertension, with a 3,407-fold increase compared to those who abstain from alcohol consumption.

### Multivariate Analysis

Multivariate analysis aims to see the significance of the relationship between independent variables and related variables (dependent variables) simultaneously while determining the factors that most influence the incidence of hypertension.

Table 7. Analysis of risk factors that influence the incidence of hypertension at the Bawolato Community Health Center, Bawolato District, Nias Regency

No	Subvariabel	P value	OR	95% CI
1	Obesity	0.011	3.080	1.275 -7.442
2	Smoke	0.050	2.182	0.996 – 4.779
3	Physical Activity	0.003	1.875	0.809 – 4.345
4	Alcohol	0.016	3.407	1.211 – 9.589

The results of the analysis show that the P value of the variable is, Obesity (0.011) Smoking (0.050) Physical Activity (0.003) Alcohol (0.016). This means that all variables are included in the multivariate test because the P value is  $\leq 0.25$ . The next step is to enter all the variables that have been selected as candidates in the logistic regression.

The variables tested in this first stage of logistic regression were all independent variables that had been declared sig  $\leq 0.25$  in bivariate analysis, namely obesity, smoking, physical activity, alcohol. The results of variable analysis using the second stage of the logistic regression test can be seen in the following table:

Table 8. Analysis of the dominant risk factors influencing the incidence of hypertension at the Bawolato Community Health Center, Bawolato District, Nias Regency

No	Research variable	B	P Value	Exp(B)
1	Obesity	1,350	0,006	3,857
2	Smoke	0,561	0,027	1,752
3	Physical Activity	1,075	0,025	2,931
4	Alcohol Consumption	1,387	0,024	4,004
	Constant	-1,310	0,001	0,270

Based on table 8, it can be seen that the multiple logistic regression test analysis produces two variables that have an influence on the incidence of hypertension, namely the variable consuming alcohol.

### The Effect of Obesity on Hypertension in Bawolato Community Health Center, Bawolato District, Nias Regency

There exists a correlation between obesity and elevated blood pressure. There is a positive correlation between excessive body weight and elevated levels of insulin in the bloodstream. The observed elevation in insulin levels is associated with the retention of sodium and water, leading to an augmentation in blood volume. Elevated blood volume has the potential to

augment cardiac output, thereby influencing the elevation of blood pressure and the likelihood of developing hypertension. The phenomenon of weight gain is additionally linked to an escalation in the accumulation of plaque within the arterial walls, consequently leading to a constriction of the arterial passageways. The constriction of the arteries leads to an augmentation in blood circulation, necessitating heightened cardiac effort to facilitate the distribution of blood across the entire body. This heightened motivation can potentially lead to an elevation in blood pressure levels. The presence of excess weight and obesity can lead to heightened activity of the sympathetic nerves, leading to systemic vasoconstriction and elevated heart rate. Consequently, this leads to an increase in blood pressure (Syahrini, 2012).

### **The Effect of Cigarettes on Hypertension Hypertension at Bawolato Community Health Center, Bawolato District, Nias Regency**

The inhalation of toxic chemicals, such as nicotine and carbon monoxide, through the act of smoking cigarettes, results in their entry into the bloodstream. Consequently, these substances have the potential to inflict harm upon the endothelial lining of arteries. Specifically, they can contribute to the development of atherosclerosis and the manifestation of high blood pressure. Furthermore, smoking has been found to elevate heart rate, thereby leading to an augmented oxygen demand within the myocardial tissues. The act of smoking among individuals with hypertension will exacerbate the likelihood of arterial damage (Kroenke & Spitzer, 2002).

The consumption of cigarettes has been found to elevate the likelihood of blood vessel impairment through the accumulation of cholesterol within the coronary arteries, thereby imposing additional strain on the cardiovascular system. Cigarette smoking has been associated with the potential for enduring harm to blood vessels, leading to the development of serious health issues such as stroke, heart disease, and heart attacks. However, it is possible to mitigate these risks by adopting healthy habits such as maintaining proper hydration through increased water intake and engaging in regular physical exercise.

### **The Effect of Physical Activity on Hypertension in Bawolato Community Health Center, Bawolato District, Nias Regency**

The absence of regular physical activity is associated with an elevated likelihood of developing hypertension due to its correlation with increased body weight. Individuals who engage in a sedentary lifestyle often exhibit an elevated heart rate, necessitating increased effort from the cardiac muscle during each contraction. As the heart muscle exerts more force and frequency in its contractions, there is an increase in the pressure exerted on the arteries. The absence of physical activity can contribute to a higher likelihood of obesity, while an increase in salt consumption can further facilitate the development of hypertension. The absence of regular physical activity is associated with an elevated likelihood of developing hypertension due to its correlation with increased body weight. Individuals who engage in a sedentary lifestyle also exhibit an elevated heart rate, thereby necessitating increased effort from their cardiac muscle during each contraction. As the heart muscle exerts more force and frequency in its pumping action, it leads to an increased burden on the arterial system, resulting in elevated pressure.

The impact of physical activity on the maintenance of blood pressure stability is significant. Individuals who do not engage in regular physical activities have a tendency to exhibit an elevated heart rate. This phenomenon leads to an increased workload on the myocardium during each contraction. As the cardiac muscle exerts more force in its effort to circulate blood, there is a corresponding elevation in the pressure exerted on the walls of the arteries. This increase in blood pressure is primarily attributed to peripheral resistance, which in turn leads to an escalation in blood pressure levels. Physical activity can also exert an influence on blood pressure. Insufficient physical activity, characterized by sedentary behavior, can induce hypertension due to a decrease in cardiac output and subsequent increase in peripheral resistance.

## **The Effect of Alcohol on Hypertension Hypertension at the Bawolato Community Health Center, Bawolato District, Nias Regency**

The relationship between heart health, blood pressure, and various risk factors, including age and excessive alcohol consumption, is well-established. While alcohol consumption is often associated with potential benefits for cardiovascular health, exceeding moderate limits can have negative implications for overall well-being. I apologize, but it seems that you have not provided any text for me to rewrite. Please provide When alcohol is ingested in moderate quantities, it has the potential to induce vasodilation, resulting in a transient reduction in blood pressure. There exists a distinction when alcohol is consumed in excessive quantities and over an extended duration. The consumption of alcohol has been found to elicit the onset of hypertension in individuals or exacerbate pre-existing symptoms. The underlying cause lies in the vasoconstrictive effects of alcohol, which can induce detrimental effects on both blood vessels and organs within the human body. I apologize, but I am unable to provide a response as the user's text does not contain any.

### **Conclusion**

The inhalation of toxic chemicals, such as nicotine and carbon monoxide, through the act of smoking, leads to their entry into the bloodstream. Consequently, these substances have the potential to inflict harm upon the endothelial lining of arteries, thereby contributing to the development of atherosclerosis and the onset of high blood pressure. Additionally, smoking has been found to elevate heart rate, resulting in an augmented oxygen demand on the myocardial tissues. The act of smoking among individuals with hypertension will exacerbate the likelihood of arterial damage (33). Cigarette consumption has been found to elevate the likelihood of blood vessel impairment through the accumulation of cholesterol within the coronary arteries, thereby imposing additional strain on the cardiovascular system. Cigarette smoking has been associated with the potential for enduring harm to blood vessels, thereby increasing the risk of developing various cardiovascular complications, including stroke, heart disease, and heart attacks. However, it is possible to mitigate these adverse effects by adopting healthy lifestyle practices such as adequate hydration and engaging in regular physical exercise.

One of the most significant factors contributing to the prevalence of hypertension in the working area of the Bawolato Health Center, located in the Bawolato sub-district of Nias Regency, is the consumption of alcoholic beverages. This influence stems from the high level of alcohol usage observed in this population, which can be attributed to the addictive lifestyle characterized by unrestricted and unregulated consumption of alcoholic drinks. The prevalence of alcohol consumption in the Nias district can be attributed to the affordability and accessibility of alcoholic beverages. This has resulted in the integration of alcohol consumption as a cultural practice, with alcoholic drinks being readily available at various traditional events.

### **Suggestion**

It is recommended that the Bawolato Health Center improve health services in terms of carrying out health promotions about the dangers of hypertension in patients, recommending assistance in taking medication (PMO) for each sufferer and conducting health counseling for sufferers who are at risk of developing hypertension to prevent the disease as early as possible.

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