RISK FACTORS FOR COASTAL COMMUNITY ON THE INCIDENCE OF HYPERTENSION

Putri Nur Riani[1], Wulan Pratiwi[1], Ratih Indah Sari[1], Putri Rifatus Syifa[1]
[1]Medical Laboratory Technology Study Program, Borneo Citra Medika Health Polytechnic

*Korespondensi: putririani83@gmail.com

ABSTRAK. **Pendahuluan**: Penyakit degeneratif adalah kondisi tidak menular yang berkembang seiring waktu dan memerlukan penanganan khusus. Salah satu contoh tipikal adalah hipertensi, yang memengaruhi semua kelompok populasi dan berkontribusi signifikan terhadap angka penyakit dan kematian, terutama di Asia Tenggara. Berbagai faktor risiko, termasuk gangguan pembuluh darah, genetika, dan gaya hidup tidak sehat, menyebabkan hipertensi. Di Indonesia, sebagian besar penduduk miskin (63,47%) tinggal di wilayah pesisir dan pedesaan. Komunitas ini cenderung memiliki status ekonomi rendah, pengetahuan kesehatan terbatas, serta kebiasaan pola makan dan gaya hidup yang buruk, sehingga meningkatkan kerentanan mereka terhadap hipertensi. **Metode penelitian**: Penelitian ini menggunakan metode tinjauan pustaka yang didukung oleh sumber data sekunder. **Hasil**: Lima belas artikel yang memenuhi kriteria inklusi dianalisis. Kesamaan ditemukan pada faktor risiko lingkungan dan perilaku yang terkait dengan tingginya insiden hipertensi. Perbedaan diamati pada variabel penelitian, lokasi, ukuran sampel, dan luaran spesifik. Temuan kunci bersama menunjukkan hubungan yang kuat antara faktor gaya hidup dan prevalensi hipertensi. **Kesimpulan**: Hipertensi dipengaruhi oleh beberapa faktor perilaku seperti pengetahuan, kepatuhan pengobatan, pola makan (termasuk asupan garam dan makanan berlemak), stres, merokok, dan konsumsi kopi. Faktor-faktor lain yang berkontribusi meliputi aktivitas fisik dan kondisi sosial ekonomi. Saran: Akademisi sebaiknya lebih lanjut mengeksplorasi faktor-faktor yang berkontribusi terhadap hipertensi. Institusi kesehatan didorong untuk meningkatkan kesadaran dan edukasi masyarakat tentang faktor risiko terkait hipertensi guna mendorong pencegahan dini dan gaya hidup yang lebih sehat.

Kata kunci: Hipertensi, Gaya Hidup, Kebiasaan Makan, Faktor Risiko, Masyarakat Pesisir

ABSTRACT. Introduction: Degenerative diseases are non-communicable conditions that progress over time and require special treatment. One typical example is hypertension, which affects all population groups and contributes significantly to illness and death rates, particularly in Southeast Asia. Various risk factors, including vascular disorders, genetics, and unhealthy lifestyles cause hypertension. In Indonesia, a significant portion of the poor population (63.47%) resides in coastal and rural areas. These communities tend to have low economic status, limited health knowledge, and poor dietary and lifestyle habits, increasing their vulnerability to hypertension. Research method: This study used a literature review method supported by secondary data sources. Results and discussion: Fifteen articles that met inclusion criteria were analyzed. Similarities were found in environmental and behavioral risk factors linked to the high incidence of hypertension. Differences were observed in study variables, locations, sample sizes, and specific outcomes. Key shared findings indicate a strong relationship between lifestyle factors and hypertension prevalence. Conclusion: Hypertension is influenced by several behavioral factors such as knowledge, medication adherence, diet (including salt and fatty food intake), stress, smoking, and coffee consumption. Other contributing factors include physical activity and socioeconomic conditions. Suggestion: Academics should further explore detailed factors contributing to hypertension. Health institutions are encouraged to increase public awareness and education about hypertension-related risk factors to promote early prevention and healthier lifestyles.

Keywords: Hypertension, Lifestyle, Dietary Habits, Risk Factors, Coastal Communities

INTRODUCTION

Non-communicable Diseases are one of the causes of national and global health problems.

The WHO states that about 36 million of the 57 million deaths are caused by non-communicable diseases, with 29% of deaths occurring at the age

of less than 60 years in countries with lower-middle economic levels. The South Kalimantan Provincial Health Office of Tanah Laut Regency in 2022 reported a hypertension incidence of 3020 people. Non-communicable diseases, or NCDs, are also known as chronic diseases that are not transmitted from person to person. The progression of non-communicable diseases is generally slow and requires a long duration.[1]

Based on the WHO profile on non-communicable diseases in Southeast Asia, there are five non-communicable diseases with high morbidity and mortality, namely cardiovascular disease, cancer, chronic respiratory diseases, diabetes mellitus, and injury. Of the five diseases, hypertension is one of the causes of death in Southeast Asia. Hypertension, or better known as hypertension, has received attention from all walks of life, considering the impact it has caused both in the short and long term, and requires comprehensive and integrated countermeasures.[2]

Hypertension, or high blood pressure, is a disorder in the blood vessels that results in the supply of oxygen and nutrients to the body tissues being blocked.[3] Hypertension causes high morbidity (pain) and mortality (death) rates. Hypertension is a disease that arises due to the interaction of various risk factors that a person has.[4]

Factors that can affect the occurrence of hypertension are divided into two large groups, namely inherent or irreversible factors, such as gender, age, genetics, and modifiable factors, such as diet, exercise habits, and others. The occurrence of hypertension needs to play the role of these risk factors together (*common underlying risk factors*), in other words, one risk factor alone is not enough to cause hypertension. [5]

Many factors can cause hypertension, one of which is food consumption patterns. Consumption patterns are the arrangement of the type and amount of food intake consumed at a given time. Each group of people has a different consumption pattern because there are factors that affect the consumption pattern of a society or a certain group. The three most important factors that affect eating habits are food availability.[6]

Another factor that causes hypertension in the elderly is lifestyle. Lifestyle is an important factor that affects people's lives. An unhealthy lifestyle can be the cause of hypertension, for example, physical inactivity and stress. A person whose parents have a history of hypertension in their children will be at risk of developing hypertension, especially in primary (*essential*) hypertension, which occurs due to the influence of genetics and the consumption of junk food, cigarettes, alcohol, and exercise. Junk food is high in calories, high in fat, low in fiber, and high in sodium or salt.[7] High fat and sodium or salt are one of the factors that cause hypertension. In cigarettes, there is a nicotine content that triggers the adrenal glands to release epinephrine or adrenaline, causing narrowing of blood vessels and making the heart pump harder due to higher pressure.[8]
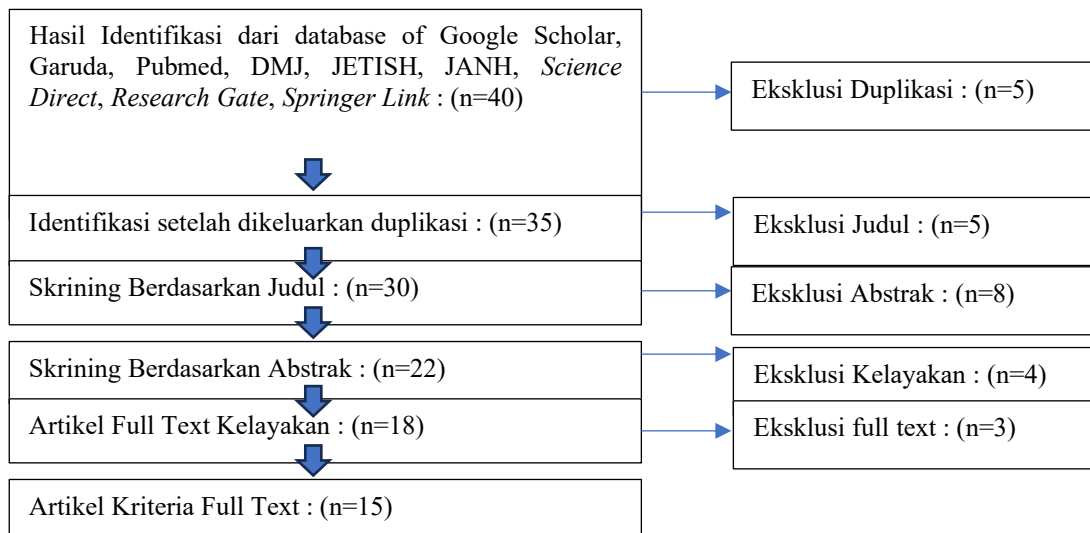
In Indonesia, the consumption of salt or the large amount of sodium content in food consumed by the community is one of the causes of hypertension. Sodium absorbed into blood vessels from high salt consumption results in water retention, resulting in increased blood volume. High sodium intake will lead to excessive production of natriuretic hormones, which will indirectly increase blood pressure.[9]

METHOD

The writing of this article uses the *literature review* method or commonly called literature study, secondary data as a complement to the research was obtained from the databases of Google Scholar, Garuda, Pubmed, DMJ, JETISH, JANH, *Science Direct*, *Research Gate*, *Springer Link,* with a vulnerable time of 2014-2024 (10 years).

The research articles taken were quantitative articles with open *access* to full text in Indonesian (35 articles) and English (5 articles). Article with the theme of discussing risk factors for the behavior of coastal communities towards the incidence of hypertension.

To be more specific, the following inclusion criteria are determined:

Hasil Identifikasi dari database of Google Scholar, Garuda, Pubmed, DMJ, JETISH, JANH, *Science Direct*, *Research Gate*, *Springer Link* : (n=40)	→	Eksklusi Duplikasi : (n=5)
⬇		
Identifikasi setelah dikeluarkan duplikasi : (n=35)	→	Eksklusi Judul : (n=5)
⬇		
Skrining Berdasarkan Judul : (n=30)	→	Eksklusi Abstrak : (n=8)
⬇		
Skrining Berdasarkan Abstrak : (n=22)	→	Eksklusi Kelayakan : (n=4)
⬇		
Artikel Full Text Kelayakan : (n=18)	→	Eksklusi full text : (n=3)
⬇		
Artikel Kriteria Full Text : (n=15)		

Based on the results of article screening and eligibility criteria, 15 articles that met the inclusion criteria for review were selected; the results of the study are presented in the article review table, as seen in Table 1.

Table 1. Study Articles Obtained

Writer	Study Design	Sample	Measurement Results	Customized factors	Conclusion
Cici Eirmawati, Wiratmo, Prihwanto Budi S	*case control*	44 case respondents and 88 control respondents	P = 0.000; OR = 6,429; P = 0.000; OR = 2,490; P = 0.000; OR = 3,519; P = 0.000; OR = 2,902	- The Relationship between Smoking Status and the Incidence of Hypertension in Men - The Relationship Between Smoking Habits and the Incidence of Hypertension - The Relationship between the Number of Cigarettes Smoked and the Incidence of Hypertension - The Relationship Between the Type of Cigarette Smoked and the Incidence of Hypertension	There is a relationship between smoking habits and incidence of hypertension in men aged 30-60 years in the heart disease department of RSD dr. Soebandi Jember.
Andry Setiawan, Yohannes Joko S., Maharso	*cross sectional*	The sample was 57 people	p-value = 0,002 (< α = 0,05 r= 0,407) p-value = 0,014 (< α = 0,05 r= 0,323)	- Length of work with the incidence of Hypertension in the production workforce - Noise intensity with the incidence of Hypertension in production workers	There is a significant relationship between noise intensity and length of work with the incidence of hypertension in the production workforce of PT. Japfa Comfeed Indonesia Tbk. in 2017

Writer	Study Design	Sample	Measurement Results	Customized factors	Conclusion
Achmad Rizal, And Jalpi	*Cross sectional*	*57 respondents*	p = 0.002 (< 0.05 r= 0.809) p = 0.000 (< 0.05)	- The relationship between coffee drinking habits and the incidence of hypertension - Long-term association of smoking with the incidence of hypertension	The incidence was mostly in the mild category (43.9%), the duration of smoking was mostly in the moderate category (52.6%), the habit of drinking coffee was mostly in the moderate category (47.4%), There was a relationship between the length of smoking and the incidence of hypertension
Pebrisiana, Lensi Natalia Tambunan, Eva Prilelli Baringbing	*Cross Sectional*	99 Respond	P = 0.000 (< 0.05) P = 0.000 (< 0.05) P = 0.000 (< 0.05) P = 0.000 (< 0.05) P = 0.000 (< 0.05)	- Age Characteristics with Hypertension Incidence - Educational Characteristics with the Incidence of Hypertension - Occupational Characteristics with Hypertension Incidence - Gender Characteristics with the incidence of hypertension - Characteristics of Hypertension History with Hypertension Incidence	There is a relationship between age, gender, education, occupation and history of hypertension with the incidence of hypertension at dr. Doris Sylvanus Hospital, Central Kalimantan Province in 2022.
Syriani Harahap, Nia Aprilla, Oktari Muliati	*Cross sectional*	70 orang	*p* = (0.014) (≤0.05)	- The relationship between hypertensive patients' knowledge about hypertension and adherence to taking antihypertensive drugs	There is a relationship between the knowledge of hypertensive patients and compliance with taking antihypertensive drugs in the working area of the Kampa Health Center.

Writer	Study Design	Sample	Measurement Results	Customized factors	Conclusion
Alfian Yusuf, Fathurrahman, Magdalena	*Cross Sectional*	60 0rank	P = 0,328 (> 0,005) P = 0,620 (> 0,005)	- The Relationship between Salt Consumption and Hypertension - The Relationship between Caffeine Consumption and Hypertension	There is no association between salt consumption and hypertension, There is no association between caffeine consumption and hypertension
Rini Kresti Sundari, Latifah, Rian Tasalim	*Cross Sectional*	20 elderly people with hypertension	P=0,000 (< 0,05)	- Relationship of medication adherence to blood pressure reduction	There is a strong correlation between adherence to taking antihypertensive medication and changes in blood pressure.
Trinanda Agustina sapta ningrum, Mahalul Azam, Fitri Indrawati	*Cross sectional study*	165 orang	P= 0,012 (>0,05) P=0,004 (< 0,05) P=0,001 (< 0,05) P= 0,000 (< 0.05)	- BMI with Hypertension Incidence - Waist circumference with the incidence of Hypertension - Pelvic Hip Circumference Ratio - Body Fat Percentage	That there was a relationship between the ratio of pelvic waist circumference and body fat percentage and the incidence of hypertension in the Posbindu in the working area of the Karangjambu Health Center.
Alexandra Maria Pires, Maximiano Oqui, Virgilio Soares, Benito Oliveira F. Xavier, Tata Mahyuvi	*Cross - Sectional*	*Sampling Result is defined as 91*	*P = 0.016 (< 0.05)*	*Relationship between stress level and recurrence of the hypertensive disease*	*Stress level is the main risk of recurrence of hypertension. When stress to the patient's recurrence of hypertension. When stress to the patient's recurrence of Hypertension will occur another complication, hypertension is also a kind of disease that is very dangerous to distribute and cause mortality. Hypertension sometimes, other people call silence killer.*

Writer	Study Design	Sample	Measurement Results	Customized factors	Conclusion
Herlina Dewi Lestari, Netty, Ari Widyarni	*cross sectional*	89 Respond	*p-Value = 1,000 > α (0,05)* *p-Value = 0,015 < α (0,05)*	- The Relationship Between Smoking Habit and the Incidence of Hypertension in the Elderly - The Relationship Between Coffee Drinking Habits and the Incidence of Hypertension in the Elderly	There is a relationship between coffee drinking habits and the incidence of hypertension in the elderly in the Tanjung Island Health Center area, Tanah Bumbu Regency
Nakmaus Solikha, Wasisto Utomo Nurhannifah Rizky Tampubolon	*cross sectional*	*79 respondents*	*P = 0,020 (< 0,05)* *P = 0,540 (> 0,05)* *P = 0,000 (< 0.05)* *P = 0,000 (< 0,05)* *P = 0,056 (> 0,05)*	- *Correlation Between Perceptions Of Disease Consequences With Dieting Behavior In Patients With Hypertension* - *Relationship Between Perceptions Of Disease Duration Aspects Of The Disease With Diet Behavior In Patients With Hypertension* - *Relationship Between Personal Control Aspects of Disease Perceptions and Diet Behavior in Hypertension Sufferers* - *Correlation Between Perceptions Of Disease Control Aspects Of Treatment With Diet Behavior In Patients With Hypertension* - *Relationship Between Perceptions Of Illness Aspects Of Identity, Symptoms And Dieting Behavior In Patients With Hypertension*	*There is a relationship between perceptions of disease in terms of consequences, personal control, treatment control, and anxiety with dietary behavior in hypertensive patients and there is no relationship between perceptions of disease in terms of disease duration, identity/symptoms, understanding of disease, and emotions with dietary behavior in hypertension.*

Writer	Study Design	Sample	Measurement Results	Customized factors	Conclusion
Witti Karvitil Sholeha R, Nasrajuhdi, Uni Sri L, Nurhayati Asarori	*Cross Sectional*	140 Responses	P = 0,006, 0,000, 0,001, 0,005 (P < 0,05) P = 0,451, 0,135, 0,504, 0,422 (P > 0,05)	- Average Difference in Blood Chemical Profile Levels in Productive Age Group Based on Blood Pressure Variable - Difference in Average Blood Chemical Profile Levels in Productive Age Groups based on body mass index (BMI) variables	There was a significant difference between the mean levels (blood sugar, cholesterol, creatinine, urea and SGOT) in the productive age group and blood pressure. As for uric acid levels, there was no significant difference because of the p>0.05 value. And there was no significant difference between the average Blood Chemical Profile level and the body mass index (BMI) in the productive age group.
Marlinda Putri Hartanti, Mifbakhuddin	*cross sectional.*	35orang	P = 0,000 (P < 0,05) P = 0,015 (P > 0,05) P = 0,709 (P > 0,05) P = 0,262 (P > 0,05) P = 0,218 (P > 0,05)	- Relationship between age and the incidence of hypertension - The relationship between coffee drinking habits and the incidence of hypertension, - The relationship between smoking habits and the incidence of hypertension - Relationship between Exercise Habits and the Incidence of Hypertension - The Relationship between Sodium Intake and the Incidence of Hypertension.	There is a relationship between age and Coffee Drinking Habits with the Incidence of Hypertension, While Smoking Habits, Smoking Habits Exercise and sodium intake were not associated with the incidence of hypertension.
Julianingsih	*Cross Sectional*	36 Respond	P = 0.001 (P <0.05)	- The Effect of NCD Counseling on Blood Pressure Control	There is an effect of hypertension NCD counseling on medication adherence and blood pressure control in hypertensive patients at the Sempur Bogor Health Center in 2023.

Writer	Study Design	Sample	Measurement Results	Customized factors	Conclusion
Nofi Susanti , Putra Apriadi Siregar, Reinpal Falefi	*cross-sectional*	90 people	P = 0.009 CI 3,780 (1,479-9,664) (p<0.05) P = 0.001 CI 5,350 (1,992-14,368) (p<0.05) P = 1,000 0,986 (0,403-2,413) (p>0.05) P = 0.000 9,000 (3.136-26,830) (p<0.05)	- Consumption of fruits, vegetables and fish, educational status and employment status to the incidence of hypertension in the coastal area of Percut Village - Educational status on the incidence of hypertension in the coastal area of Percu Village - Employment status against the incident hypertension in the coastal area of Percu Village - Age to the incidence of hypertension in the region Percu Village Coastal	There is a significant relationship between food consumption patterns, education status and age to the incidence of hypertension in the coastal area of Percut Village, Percut Sei Tuan District, Deli Serdang Regency, North Sumatra

Discussion of Research Results

After 15 articles were reviewed, it was found that the similarities between the articles used, on average, the research design used by the researchers were *cross-sectional and case-control study designs*. From the results of this study, there are several similarities in environmental risk factors that are closely related to the high incidence of hypertension in the community. For the differences from the 15 articles studied, the differences include variables, research location, number of research samples, and research results.

Smoking Status Factors

The risk of hypertension differentiated into irreversible factors and modifiable factors, one of the risk factors for hypertension that can be changed is smoking habits. Smoking is one of the habits that can affect blood pressure. Smoking a cigarette will have a significant effect on increasing blood pressure or hypertension. Toxic chemicals, such as nicotine and carbon monoxide inhaled through cigarettes, enter the bloodstream and damage the endothelial lining of arteries, resulting in atherosclerosis and hypertension.

The CO gas produced by cigarette smoke can cause blood vessels to "cramp" so that blood pressure rises. The nicotine in cigarettes, after entering the body, will signal the adrenal glands to release epinephrine (adrenaline). This powerful hormone will constrict blood vessels and force the heart to work harder due to higher pressure. A person who smokes is 6,429 times more likely to develop hypertension than someone who does not smoke.[10]

These results are following research that concludes that there is a statistically significant relationship between smoking habits and the incidence of hypertension. Cigarette smoked can increase blood pressure. Cigarettes will result in vasoconstriction of peripheral blood vessels and vessels in the kidneys, leading to an increase in blood pressure. Smoking a cigarette every day increases systolic pressure by 10-25 mmHg and increases heart rate by 5-20 times per minute.[11]

A person who smokes a total of >20 cigarettes per day tends to have a 2,490 times higher risk of hypertension than someone who smokes <10 cigarettes per day. This result is in

accordance with the opinion that if a cigarette is consumed in ten puffs of cigarette smoke, then within a year for smokers of 20 cigarettes per day will experience 70,000 puffs of cigarette smoke. Some of the chemicals in cigarettes that are harmful to health are cumulative, and one day the dose of the poison will reach a toxic point and will start to cause symptoms.[12]

Non-filter smoking tends to have a 3.518 times higher risk of hypertension compared to the habit of smoking filter cigarettes. With a greater nicotine and tar content and not accompanied by a filter at the base of the cigarette stick, the potential for nicotine and tar to enter the lungs from non-filtered cigarettes will be greater than that of filter cigarettes, which has a bad impact on the wearer, one of which will be at risk of hypertension.[13]

A person who has smoked for more than 10 years is 2,902 times more likely to develop hypertension than someone who has smoked for less than 10 years. The long-term impact of smoking on the incidence of hypertension is very significant because the earlier a person smokes, the more difficult it is to quit smoking. Cigarettes also have a *dose-response effect, which is a big influence because they will accumulate more toxins after the age of* 40 years.[14] However, there are also studies that state that there is no relationship between smoking habits and the incidence of hypertension with a result value *of p Value* = 0.571 > α (0.05) because hypertension is not only caused by smoking habits. However, other factors can cause hypertension.[15]

Coffee Consumption Factors

The increase *in the prevalence* of hypertension in general is due to lifestyle changes, so that there is a shift in disease patterns from infectious diseases to chronic *degenerative diseases.* One of the *chronic degenerative* diseases is high blood pressure. One cup of coffee contains 75 – 200 mg of caffeine, which can increase blood pressure by 5 – 10 mmHg.[16]

Most respondents who consume coffee in the light category said 2 cups per day is enough. Coffee consumption typically occurs in the morning while having breakfast, in the afternoon, or in the evening when gathering with friends or just going to a coffee shop. At night, many people say to keep your body warm if you feel cold. They also say that consuming coffee helps break down drowsiness, and it has become a habit to drink coffee when gathering with friends, to refresh the body, eliminate fatigue, and reduce stress by smelling the aroma of coffee.

Many also say that coffee is a friend of smoking. Environmental or cultural factors can also influence coffee consumption. The culture of the community usually involves consuming coffee when relaxing together with family members or friends. Coffee is given to relatives or family members who are guests, especially to male peers. On the other hand, most of the residents work as laborers and the private sector. Workers have more free time to stay at home and often chat with peers, which has become a common thing accompanied by coffee and cigarettes. However, they did not realize that the habit of drinking coffee also had an impact on health, especially hypertension.

The mechanism of action of caffeine is to inhibit the action of adenosine receptors, then inhibit the enzyme phosphodiesterase, and induce it. Adenosine is a neurotransmitter in the brain that plays a role in reducing cell activity, especially nerve cells (*neuro-deresan*). Caffeine also increases the hormone adrenaline in the blood, which causes increased activity of the heart muscle in pumping blood and increases blood pressure, so that blood flow to various organs of the body increases.[17,18]

The caffeine content in black ground coffee is less than 5 mg/g. The caffeine content in one consumption/sachet of black ground coffee (31 g/sachet) and instant white ground coffee (20 g/sachet) is also less than 5 mg/g. Caffeine levels that are still within reasonable limits or do not exceed the usual dose, which is 300-600 mg if consumed no more than 3 sachets a day.[19]

According to the research of Herlina et al., the results of the statistical test with *Chi-Square* obtained *a value of p-value* = 0.015 < α 0.05, meaning that there is a significant relationship between coffee drinking habits and the incidence of hypertension in the elderly in the Tanjung Island Health Center area, Tanah Bumbu Regency. The results of this study are in line with Rita's research, which states that there is a relationship between

coffee drinking habits and hypertension levels, with the results obtained a significant value, p-value = 0.000 < α (0.05).[20´21]

Stress Factors

Factors that influence the increase in blood pressure are standard of living such as smocks, high salt intake, obesity, physical activity and stress, genetic factors, age, imbalance between vasoconstriction and vasodilation modulators, and the renin, angiotensin and aldosterone systems.[22] Stress is defined as a predisposing factor especially for Hypertension, stress arises when the altered individual adapts to a series of social factors. That is why they cannot improve adaptation to the environment to damage health and do not automatically respond to stressor estimates.[23] There are many factors that can affect stress levels for patients with hypertension, namely economic and service problems, family problems, dietary problems, smoking habits, physical and psychological disorders that accompany high blood pressure, and overthinking hypertension.[24]

Recurrence of hypertension progressively affects stress through sympathetic nerve activity which can increase arterial pressure. Stress can increase sympathetic nerve activity with its mechanisms that regulate nerve and hormonal function. Therefore, the body can increase salt and water retention. When stressed, aldosterone production increases the secretion of catecholamines into renin-angiotensin. Blood pressure increases when the impact of increased hormone secretion refers. Prolonged stress may lead to an increase in blood pressure.[25] Concluded by Chi-Square results, there is a relationship between stress levels and recurrence of hypertension in patients aged 40-60 years, with significant values of 0.016 < 0.05. Other research suggests that people who experience stress are at risk of hypertension recurrence, which means that continuous increases in stress levels may influence the recurrence of hypertension.[26]

The level of stress, such as the respondent's content with nonspecific characteristics, is about how the content can respond to those involved in more challenging services. Stress, such as tension conditions, is influenced by the emotional thinking and physics of the human condition. Stress can appear as a cause of identical precision and tension, which stems from inconsistencies between a person and this environment. Stress therefore has the same reaction, which adapts to the characteristic individual until one can perceive the various stresses that affect through the level of maturity of thinking, the adaptation of habilitation for each human being and each environment. When someone suffering from stress can attend to stress, refer to a means without interfering with the functioning of the part of the body that is not preoccupied with stress.[27]

Physiologically, stress can increase blood pressure, respiration, and arrhythmias. In addition to the physiological response to the hormone, adrenaline is one of the factors that cause severe stress and can lead to increased blood pressure and blood clotting that can even result in a heart attack. Adrenaline can also speed up the heart rate and narrow the coronary arteries. People's psychological conditions vary, so this condition can also affect blood pressure. In addition, uncontrolled emotions and negative thoughts can cause high blood pressure but do not cause physical symptoms. This research is supported by a method that states that high emotional conditions and the possibility of continuous stress from time to time can cause somatic reactions that directly affect the circulatory system, which can affect the heart rate and circulatory system.[28]

Consumption Pattern Factors

Diet plays an important role in the incidence of metabolic syndrome, namely high blood fat levels, high blood pressure, and obesity. The wrong diet with excessive calorie consumption or less than the recommended nutritional requirement (AKG). Urban lifestyles follow the era of globalization, and hypertension cases continue to increase. The lifestyle of fast food that is rich in fat, salty, and lazy to exercise, plays a role in increasing the number of hypertension patients. Modern lifestyles in stressful situations are the most common and include a lack of exercise, and trying to cope with stress by smoking, drinking alcohol, and coffee, all of which are included in the list of causes that increase the risk of hypertension.[29´30]

Major diets such as eating fatty ≥ 3 times a day can cause Hypertension. Fatty foods are obtained from the consumption of meat, coconut milk foods, and fast food (fried). The body indeed needs fat as a protective and building substance. However, if consumed excessively, it will increase the occurrence of plaque in the blood vessels, which will further cause hypertension. The wrong diet can lead to an increase in blood pressure, such as consuming fatty foods, especially saturated fat and cholesterol.[31]

Consumption of fatty meat foods can cause hypertension. The meat group that contains a lot of fat is pork, beef, and chicken. Long-term intake of meat and poultry is associated with an increased risk of hypertension. Data shows that people who consume more meat have a greater tendency to experience hypertension compared to people who consume more sea fish. The results of the study showed that the risk of reducing hypertension was associated with increased seafood consumption.[32]

Another study stated that in people who eat a lot of marine fish with high levels of unsaturated fatty acids, the omega-3 content in marine fish is directly related to the incidence of hypertension. Other studies have also shown that the content of omega-3 fatty acids prevents the occurrence of degenerative diseases. This applies to types of marine fish that are in a fresh state or have not been preserved by the drying and salting process. Salted fish contains a lot of sodium, which will increase the incidence of hypertension. Fish oil is helpful for rapidly converting omega-3 to omega-6, which helps lower blood pressure and reduce the risk of myocardial infarction.

In Indonesia, the consumption of salt or the large amount of sodium content in food consumed by the public is one of the causes of hypertension. Sodium absorbed into blood vessels from high salt consumption results in water retention, resulting in increased blood volume. High sodium intake will cause excessive production of natriuretic hormones, which will indirectly increase blood pressure. People's reactions to salt intake, which contains sodium, vary. In some people, even if they consume sodium indefinitely, the effect on blood pressure is little or none. But in another group, too much sodium causes an increase in blood which also triggers hypertension.

Salt causes the buildup of 18 fluids in the body, as it draws fluid outside the cells to prevent it from escaping, thus increasing blood volume and pressure. In humans who consume 3 grams of salt or less, the average blood pressure is low. In contrast, those with a higher salt intake, about 7-8 grams, have higher average blood pressure. The recommended salt consumption is no more than 6 grams/day, which is equivalent to 110 mmol of sodium or 2400 mg/day. Sodium intake will increase, causing the body to retain fluids that increase blood pressure.[35]

Salt consumption or the high sodium content in food consumed by the community is one of the causes of hypertension. Sodium absorbed into the blood vessels from high salt consumption results in water retention, resulting in increased blood volume. This results in an increase in blood pressure. High sodium intake will lead to excessive production of natriuretic hormones, which will indirectly increase blood pressure.[36]

Another researcher stated that the pattern of salt consumption for respondents had a significant influence on the occurrence of hypertension. The more salt in the body, the more plasma volume, cardiac output, and blood pressure will increase. In addition, high salt consumption can shrink the diameter of the arteries, so the heart must pump harder to push the increased blood volume through the narrowed arteries, which can lead to hypertension.

An increase in alcohol consumption over a long period will influence increasing cortisol levels in the blood, so that the activity *of the rennin-angiotensin aldosterone system* (RAAS) will increase, which is a hormonal system that regulates the balance of blood pressure and fluids in the body. In addition, if a person consumes alcohol, then the volume of red blood cells in their body will increase. This will increase blood viscosity, which can increase blood pressure. Risk factors that can cause hypertension are nutritional status, family history, smoking, stress, and alcohol consumption.[38]

The types of alcoholic beverages that are most consumed by the public are broadly divided

into *beer*, *wine*, and *spirits* (*brandy*, *whiskey,* and *vodka*). In addition, traditional alcoholic beverages consumed by respondents in this study are tuak and liquor. The results of blood pressure measurements showed that most of the respondents who drank beer and wine had normal blood pressure. However, respondents who drank spirits and other beverages (liquor and liquor), most had blood pressure at risk (prehypertension).[39]

Some types of alcohol that are often consumed in various countries include *beer*, *wine*, and *spirits*. *Beer* and *wine* are one of the various alcoholic beverages that have an alcohol content of 4.5% and 12.9%. The raw material of *beer* comes from wheat, while the raw material of *wine* comes from grapes. In addition to *beer* and *wine*, there are types of alcoholic beverages with higher alcohol content, namely *spirits, which are commonly known as brandy, whiskey, and vodka,* with an alcohol content of 41.1%. The classification of alcohol consumption is divided into 3 groups, namely light (0.29-6 ml per day), medium (6.30-29 ml per day), and heavy (>29 ml per day).[40]

Other research also shows that one of the risk factors for hypertension in fishermen is alcohol consumption. The results of the study stated that excessive alcohol consumption, namely with a minimum of 1 drink or more per day, had a risk of 7,917 times of hypertension compared to respondents who consumed less than one drink per day.[41]

Factors of Knowledge and Compliance in Taking Hypertension Medication

Few people know about high blood pressure as a serious disease (*silent killer)* because people with high blood pressure feel healthy and have no serious complaints; therefore, they consider the disease mild. High blood pressure is often found during routine examinations when patients come in and have other complaints. The dangerous effect of hypertension is when complications occur; therefore, it is only known if it causes organ disorders such as kidney function disease, coronary heart disease, cognitive impairment, or stroke. Generally, high blood pressure reduces the life expectancy of those affected.[42]

This disease is one of the many degenerative diseases that can lead to death. In addition to the high mortality rate, high blood pressure not only affects the cost of medicine and care that sufferers must bear but also has a negative impact on spending on medical treatment. It is important to remember that high blood pressure is also related to a decrease in quality of life, if a person suffers from high blood pressure and does not undergo regular treatment and regular control, this condition can cause serious complications and even lead to death. Continuously high blood pressure will make the heart work harder, and eventually damage the blood vessels in the brain, kidneys, heart, and eyes.[43]

In coastal areas, the head of the family usually works as a fisherman to catch fish in the sea, while women serve as housewives. Economic conditions of coastal communities tend to be low, with the majority (63.47%) of Indonesia's poor living in coastal areas and rural. The diet of coastal communities is classified as a bad habit and can affect the occurrence of hypertension. Not only that, but coastal communities also have poor behavior, knowledge, and lifestyle, which can cause the incidence of hypertension. Lack of knowledge can be caused by a lack of grasp of information, low education, lack of awareness, and a less supportive environment from both health workers and health promotion media related to hypertension. Learning is not only focused on increasing knowledge, but also on increasing family awareness and concern on matters related to hypertension.[44]

Good patient knowledge about hypertension affects patient compliance in hypertension treatment, resulting in a lower incidence of hypertension. However, if knowledge is poor, the management and treatment of hypertension will also not be carried out properly. Hypertensive patients who are well-informed about hypertension will obey treatment. Knowledge from all aspects together will affect the level of treatment compliance. If the respondent's knowledge of the disease and its control is improved, along with knowledge of the antihypertensive drug, the adherence to taking antihypertensive medication will increase.[45]

The results of the study stated that the coverage of treatment only reached 28%. This occurs due to low adherence to treatment in patients with essential hypertension. Adherence is difficult to achieve in patients due to a lack of understanding, the emergence of side effects of drug use, less affordable drug prices for patients, the use of complementary drugs, and access to health services. According to other studies, every month, patients with hypertension at the Health Center tend to only take medication at the Health Center but do not control their blood pressure. This is because the patient feels healthy (31.8%), does not feel symptoms of pain such as dizziness, heaviness in the nape of the head, difficulty sleeping, among others. So that blood pressure control is not a serious effort at that time to be made. The decision to obey or not rests entirely with the patient.[46]

The surrounding environment, such as health workers, family, and access to positive health services, only encourages behavior. The changing condition in this patient reflects the patient's lack of personal awareness to carry out medical recommendations. There are times when the patient feels sick with symptoms, making him feel vulnerable, but at a certain time, the patient does not feel vulnerable. In other circumstances, for example, the patient feels vulnerable. Still, he does not feel that the condition of his disease must be taken seriously, when it is hindered by daily busyness.[47]

When feeling dizzy and blood pressure rises, the patient will take antihypertensive drugs. To form a firm intention to follow medication compliance behavior in patients, knowledge and skills are needed. Knowledge and attitude changes are also influenced by the way the information is presented. Building open and trusting communication between patients and healthcare workers is the first step in creating a receptive environment where information is considered reliable and worthy of consideration. All successful communication and interactions usually require a good understanding of the other person's point of view.[48]

CONCLUSION

Previous research has shown that the severity of hypertension cases in the community is related to and influenced by many factors. Behavioral factors are the most influential factors in the incidence of hypertension in the community, including knowledge and adherence to hypertension medication, consumption patterns (salt, fatty foods, alcohol consumption), stress, cigarette consumption, and coffee consumption. However, it cannot be denied that other factors also influence hypertension, such as diet, exercise, family economic factors, and heredity.

REFERENCE

1. Sudayasa, I. P., Alifariki, L. O., Rahmawati, R., Hafizah, I., Jamaludin, J., Milasari, N., Nisda, N., & Usman, A. N. (2020). Determinant Juvenile Blood Pressure Factors in Coastal Areas of Sampara District in Southeast Sulawesi. Enfermeria Clinica, 30(Supplement 2), 585-588. doi: 10.1016/j.enfcli.2019.07.167. https://doi.org/10.1016/j.enfcli.2019.07.167

2. Ministry of Health of the Republic of Indonesia. 2018. Results of Basic Health Research (Riskesdas) 2018. Jakarta: Health Research and Development Agency of the Ministry of the Republic of Indonesia.

3. Cahyani, Retno, Saraswati, Lintang Dian, & Ginandjar, Praba. (2019). The Relationship between Seafood Consumption and the Incidence of Hypertension in Coastal Communities in the Working Area of the Mangkang Health Center, Semarang City. *Journal of Public Health (Undip), 7*(4), 743748. Google Scholar.

4. Oktaviarini, E., Hadisaputro, S., Chasani, S., Suwondo, A, & Setyawan, H. 2019. Risk factors for hypertension in employees in the Port Perimeter area (Study at the Semarang Class II Port Health Office).

5. Arif D. 2013. Factors related to the incidence of hypertension in the elderly in the Klumpit Village Center. UPT Gribig Health Center, Kudus Regency.

6. Fadhilah FH., Widjanarko B, Shaluhiyah Z. (2018. Factors related to eating behavior in children who are more nourished in Junior High School in the working area of the Poncol Semarang Health Center. Journal of Public Health. 6(1): 734±744.

7. Ridwan, E. S., & Nurwanti, E. (2013). Lifestyle and Hypertension in the Elderly in Kasihan District, Bantul, Yogyakarta | Ridwan

| Indonesian Journal of Nurses and Midwifery. https://ejournal.almaata.ac.id/index.php/JNKI/article/view/28/27

8. Andrea, G.Y. 2013. Correlation of hypertension degree with the stage of chronic kidney disease at dr. Kariadi Semarang Hospital for the period 2008-2012. http://eprints.undip.ac.id. Retrieved September 26, 2021

9. Mifta Hulzana Y, Sunarto K, Nur Ayini S.L. The Relationship between Salt Consumption Patterns and the Incidence of Hypertension in the Elderly at the Central City Health Center. *Journal Health & Science : Gorontalo Journal Health and Science Community. P-ISSN (2614-8676).* *https://ejurnal.ung.ac.id/index.php/gojhes/index*

10. Cici Eirmawati, Wiratmo, Prihwanto Budi. The Relationship Between Smoking Habits and the Incidence of Hypertension at dr. Soebandi Jember Hospital. *e-Jurnal Pustaka Kesehatan, vol. 2 (no. 2), May 2014*

11. Mariza Elvira, Novi Anggraini. FACTORS ASSOCIATED WITH THE INCIDENCE OF HYPERTENSION. Journal of Academic Baiturrahim *e ISSN 2654-2552 Vol.8. No 1*, March 2019

12. Irene Megawati Umbas, Josef Tuda, Muhamad Numansyah. The Relationship Between Smoking and Hypertension at the Kawangkoan Health Center. e-Journal of Nursing (e-Kp) Volume 7 Number 1, May 2019

13. Uguy, J.M. 2019. Smoking Habits and Hypertension Incidence in the Keja Area of the Molompar Belang Health Center, Southeast Minahasa Regency District. *Journal of KESMAS.* 8(1). 44-48. From https://ejournal.unsrat.ac.id/index.php/kesms/articleviewFile/23951

14. Budianto, A. 2017. The relationship between smoking and coffee drinking behavior with blood pressure in adult males in Kertosuko Village, Krucil District, Probolinggo Regency. *Nursing New: a scientific journal of nursing. Volume 2, Number 2.* From https://publikasi.unitri.ac.id/index.php/fikes/article/view/443

15. Susanti, N., Qodariah, Harnani, Y., & Rasyid, Z. 2017. The effectiveness of leflet on knowledge and regulating the diet of the elderly with hypertension at the Serasan Health Center in Natuna Regency. *Photon: journal of science and health 7 (02),* 33-38. From

http://www.ejurnal.umri.ac.id/index.php/photon/article/view/500

16. Nur Patria Tjahjani, Afra Chairunnisa, Hana Handayani. Analysis of the difference in caffeine in black ground coffee and instant white ground coffee by UV – Vis. Scholar Journal of Pharmacy STIKES Scholar Utama Kudus. P-ISSN 2559 – 2163 E-ISSN 2599 – 2155. Vol.5, No.1, May 2021. http://cjp.jurnal.stikescendekiautamakudus.ac.id

17. Herlina Dewi Lestari, Netty, Ari Widyarni. The Relationship between Smoking and Coffee Drinking Habits and the Incidence of Hypertension in the Elderly at the Tanjung Island Health Center, Tanah Bumbu Regency in 2020.

18. Rita, Dian. (2016). The Relationship of Coffee Drinking Habits to the Level of Hypertension. journal.unigres.ac.id/index.php/jnc/article/view/266. Retrieved 10 January 2019.

19. Nita, Y. (2018). The Relationship between Family Support and Dietary Compliance of Hypertension Patients at the Payung Sekaki Health Center in Pekanbaru in 2017. Journal of Health Sciences.

20. Achmadi, U. F. 2013. Public Health: Theory and Applications. Jakarta: Graha Grafindo.

21. Anggraieni, W. N., & Subandi, S. (2014). The effect of dhikr relaxation therapy to reduce stress in essential hypertension sufferers. *JIP* (Journal of Psychological Intervention), 6 (1), 81 – 102.

22. Ninin Wulan Sari, Amriati Mutmainna, Irmayani. The Relationship between Stress and the Incidence of Hypertension in Patients in the Working Area of the Tamangapa Health Center, Makassar City.JIMPK: Scientific Journal of Student & Nursing Research Volume 4 Number 2, 2024

23. Alexandra Maria Pires, Maximiano Oqui, Virgilio Soares, Benito Oliveira F. Xavier, Tata Mahyuvi. *Relations Between Stress Level With Recurrence Of Hypertension Disease To Patients Aged 40-60 Years Old In Community Health Center Level II Municipality Lospalos, Timor Leste.Journal of Applied Nursing and Health*, Vol. 4, No. 2, December 2022.

24. Pujiastuti, C., Hindriyastuti, S., & Winarsih, B. D. (2022). The relationship between stress levels and the incidence of hypertension in inpatients at Mardi Rahayu Kudus Hospital. *The Shine of World Light D-III Nursing*, 7(01).

25. Haryanto, E. (2017). Overview of Stress Levels of Emergency Installation Nurses at

Soreang Regional General Hospital, Bandung Regency. Journal of Aeromedical Health, 3(1), 51-56.

26. Ardian, I. 2018. Significance of Stress Levels with Blood Pressure in Hypertensive Patients. Journal of Nursing, Sultan Agung Islamic University, 978-602-1145- 69–2, 152–156.

27. Yoo, Sunmi, Theresa, N, Tom B, Issa, F.2, Su – Jau, Y, Sathanur, RS, Gerald, S.B, 2004. Comparison of Dietary Intakes Associated With Metabolic Syndroma Risle Factors In Young Adults : The Bogalusa Heart Study, The America Journal of Clinical Nutritional, Volume 80, No. 4 , p 841 – 848

28. Risha P. Rokot, Linda W. A. Rotty, Emma Sy. Moeis.Differences in Marine Fish and Meat Consumption Patterns on the Incidence of Hypertension in the Community. *Journal of e-Clinic (eCl), Volume 7, Number 1, January-June 2019*

29. Sunarto Kadir. Diet and Incidence of Hypertension. *Jambura Health and Sport Journal* Vol. 1, No. 2, August 2019.

30. Windyasari. (2016). *The Relationship Between Food Consumption and the Incidence of Hypertension in the Pre-Elderly in the Working Area of UPTD Puskesmas Kampung Bangka, Southeast Pontianak District*. Publication Manuscript. Tanjungpura University, Pontianak

31. Manawan A. The relationship between food consumption and the incidence of hypertension in Tandari Satu Village, Eris District, Minahasa Regency. Pharmacon. 2016; 5(1).

32. Borgi L, Curhan GC, Willett WC, Hu FB, Satija A, Forman JP. Long-term intake of animal flesh and risk of developing hypertension in three prospective cohort studies. J Hypertens. 2015; 33(11):2231-8.

33. . Sulastri D. Relationship between Plasma Omega 3 Intake and Levels and the Incidence of Hypertension in Minangkabau Ethnic Groups in Padang City. Andalas Medical Magazine. 2010; 34(2).

34. Janu Purwono, Rita Sari, Ati Ratnasari, Apri Budianto. Salt Consumption Patterns with the Incidence of Hypertension in the Elderly. Journal of Health Discourse. Volume 5, Number 1, July 2020. e-ISSN 2544-6251

35. Patricia N. Ardiaansz, Julia Rottie, Jill Lolong. The Relationship between Food Consumption and the Incidence of Hypertension in the Elderly at the Ranomuut Health Center, Manado City. Nursing ejournal (e-Kp) Volume 4 Number 1, May 2016

36. Elvivin, Lestari, H., and Ibrahim, K. Analysis of risk factors of salt, alcohol, smoking and coffee drinking habits on the incidence of hypertension in bajo fishermen on Tasipi Island, West Muna Regency in 2015. Public Health Student Scientific. 2016; 1(3):1-12.

37. I Gusti Ayu Ninik Jayanti, Ni Ketut Wiradnyani, I Gede Ariyasa. The relationship between alcohol consumption patterns and the incidence of hypertension in tourism workers in Legian Village. *The Indonesian Journal of Nutrition, 6 (1), 2017 e-ISSN: 2338-3119, p-ISSN: 1858-4942*

38. Ainun, AS., Sidik, AS., and Rismayanti. The relationship between lifestyle and the incidence of hypertension in students in the health environment of Hasanuddin University. Thesis. Hasanuddin University; 2014.

39. Astaria Ginting, Taufik Ashar, Jemadi. Risk factors for hypertension at the age of 18-40 years in the working area of the Siamlingkar Medan Health Center in 2017. Excellent Midwifery Journal. Volume 1 No. 1, April 2018. P.ISSN : 2620-8237 E.ISSN : 26209829

40. Wade, C. (2021). Overcoming hypertension. Bandung: Nuansa Cendikia.

41. Sakina T.A Harahap, Anggi Febrian, Angga Dwi Prasetyo, Ahmad Nur Hidayat, Nurly Fadila, Risky Andreansyah, Faiza Dia Amanda Br Harahap, Riris Aditya Sari, Keysha Danty, Romiza Arika. An overview of the behavior of coastal communities towards the incidence of hypertension in Kuala Lama Village. Vol.4 No.3 of 2023, p. 5781- 5787

42. Donna NP Butarbutar, Lelo Sintani, & Luluk Tri Harinie. (2020). Improving the Economic Welfare of Coastal Communities through Women's Empowerment. Journal of Environment and Management, 1(1), 31–39. https://doi.org/10.37304/jem.v1i1.1203

43. Deni Kurniati, Tri Adi Nugroho, Rizki Yeni Wulandari, Moh.Heri Kurniawan, Asril HS. The Relationship between Knowledge and the Role of Nurses in Handling Hypertension Patients at the Ngambur Health Center UPTD, West Coast Regency. JREMIK, Vol. 1, No. 1, February 2023

44. Rejo and Nurhayati Isnani. 2020. The Relationship Between Family Knowledge Level About Hypertension and Hypertension Classification. Journal of PROFESI (Islamic Professionals). Vol 18. No 2.

45. Barreto S, Marcon SS. Knowledge about hypertension and factors associated with the

non adherence to drug therapy. 2014; 22(3):495.

46. Gelirli A, Hipertansiyon T, EtkisiU. Impact of patients"knowledge, attitude andpractices on hypertension on compliance with antihypertensive drugs in a resource poor setting." 2010; 9(2):87–92.

47. THE RELATIONSHIP BETWEEN KNOWLEDGE FACTORS AND THE LEVEL OF ADHERENCE TO TAKING ANTIHYPERTENSIVE DRUGS (A STUDY ON ESSENTIAL HYPERTENSION PATIENTS IN THE WORKING AREA OF THE BANDARHARJO HEALTH CENTER, SEMARANG CITY). JOURNAL OF PUBLIC HEALTH (e-Journal) Volume 8, Number 1, January 2020 ISSN: 2715-5617 / e-ISSN: 2356-3346
http://ejournal3.undip.ac.id/index.php/jkm

48. Wiley J. Health behavior and health education. Glanz, Karen Rimer, Barbara. K V, editor. Jossey Bass; 2008. 100 p.