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The Analysis of Factors Influencing Hypertension on Elderly: A Literature Study

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ABSTRACT

The prevalence of hypertension disease year after year continues to increase. The impact of hypertension and its risks in addition to two affecting human survival and reducing work productivity also adds to the burden of health service costs. Efforts to control this disease are not possible only by the health sector but must involve other sectors and active community involvement. The purpose of this study is to examine a journal of factors that influence the incidence in the elderly. This research method is descriptive analytics using a literature review design. The conclusion of this study is derived from ten research journals. The most dominant factors that influence the incidence of hypertension in terms of behavior include smoking, salt consumption, coffee consumption, and physical activity.

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Introduction

Health development in Indonesia is a health effort to achieve the ability to live a healthy life for every population in realizing an optimal degree of health. The government's success in national development has realized positive results in various fields, namely economic progress, environmental improvement, scientific and technological advances, especially in the medical

field so that it can improve the quality of health of the population and increase Life Expectancy. As a result, the number of elderly people tends to increase and increase faster. One of the results of health development in Indonesia is the increase in life expectancy. The increasing life expectancy population, causing the number of elderly residents to continue to increase from year to year. The increase in life expectancy from 45 years in the early 1950s to 65 years at this time. It means that the risk groups in our society are higher. The increasing elderly population is not only a phenomenon in Indonesia but also globally [2].

Blood pressure in the elderly will tend to be high so that the elderly are more at risk of developing hypertension. Increasing age results in increased blood pressure, because the arterial walls in elderly will experience thickening which results in the accumulation of collagen substances in the muscle layer, so that blood vessels will gradually narrow and become stiff [3]. Age is one of the factors that affect blood pressure. Age is related to hypertension. The older a person is, the greater the risk of developing hypertension.

Hypertension or better known as high blood pressure is a chronic disease due to excessive and almost not constant blood pressure on the arteries. Therefore, the government makes policies to manage hypertension, including other non-communicable diseases, the Ministry of Health makes policies, namely: Developing and strengthening active hypertension early detection activities, Increasing public access to early detection services through community based health center (Posbindu) activities, Increasing access to hypertension sufferers through revitalization of public health center (Puskesmas) for the control of NCDs through increasing professional health resources and competent in efforts to control NCDs, especially the management of NCDs in basic health service facilities such as Puskesmas..

In the elderly compared to the age of 55-59 years with the age of 60-64 years there was an increased risk of hypertesition by 2.18 times, aged 65-69 years 2.45 times and age >70 years 2.97 times. This happens because at that age the large arteries lose their flexibility and become stiff because of which the blood at each heart rate is forced through blood vessels that are narrower than usual and cause a rise in blood pressure [4].

One of the factors affecting blood pressure is gender [5]. Women tend to suffer from hypertension than men. In the study, 27.5% of women experienced hypertension, while for men it was only 5.8%. Women will experience an increased risk of high blood pressure (hypertension) after menopouse, which is over 45 years of age. Women who have not yet menopouse are protected by the hormone estrogen which plays a role in increasing high density lipoprotein (HDL) levels. Low HDL cholesterol levels and high LDL cholesterol (Low Density Lipoprotein) affect the occurrence of the atherosclerosis process and result in high blood pressure [3].

World Health Organization (WHO) data in 2015 showed that around 1.13 billion people in the world have hypertension, meaning that 1 in 3 people in the world are diagnosed with hypertension. The number of people with hypertension continues to increase every year, it is estimated that by 2025 there will be 1.5 billion people affected by hypertension, and it is estimated that every year 10.44 million people die from hypertension and its complications.

Hypertension and its complications can be prevented by a healthy lifestyle and controlling risk factors. Prevention of hypertension can be done by maintaining weight under normal conditions., regulating the diet by consuming low salt and low-fat foods, as well as increasing the consumption of vegetables and fruits, exercising regularly, exercising regularly, giving back and emotions, stopping smoking habits, avoiding alcoholic beverages, and conducting periodic blood pressure checks. From the description above, it can be concluded that hypertension occurs due to the influence of the interaction of two factors, namely genetic factors and environmental factors such as food and the influence of stress, therefore, researchers are interested in conducting research on hypertension with the aim of determining the factors causing hypertension in the elderly. Based on the background above, the formulation of the problem in this study is what affects the incidence of hypertension in the elderly. The purpose of this study isto determine the factors that influence the incidence of hypertehsi in the elderly byknowing the description of smoking habits, salt consumption, physical activity towards, coffee consumption, andonsumsi alkohol againsthypertension. Hypertension problem is a condition where blood pressure exceeds normal values, this is due to many factors. The dependent variable in this study is Hypertension, while the independent variable in this study is Age, Gender, Smoking Habits, Exercise Habits and Obesity . A person's health status is influenced by four factors, namely: Genetic factors, Health service factors, environmental factors, and behavioral factors.

Methods

A. Research Design

This research is a secondary study with a Literature Review design. Literature Review is an analysis in the form of criticism (building or dropping) of research that is being carried out on a specific topic or question on a part of science. Literature Review contains a description of theories, findings and other research materials obtained from reference materials to be used as a basis for research activities. A literature search is the first step to collecting information relevant to the research.

B. Research Phases and Techniques

The criteria for the journals reviewed are: Indonesian, published in 2015 - 2019 which can be accessed by FullTex in PDF format, Research topics on factors that affect the incidence of

hypertension. The Data analyzed is the original research data. The subjects in this study were the elderly.

Result

Table 1 shows the articles that meet the criteria.

Table 1. Article results

Author and Year	Purpose	Method
Azhari [6], 2017.	To know the factors associated with Hypertension	Descriptive analytics using a cross sectional study approach.
Sartik et al. [7], 2017.	To analyze the risk factors for hypertension	An analytical survey using a cross-sectional design.
Mayasari et al. [8], 2019.	The purpose of this study is to determine the factors related to the incidence of hypertension in the Bonegunu Health Center Work Area	A cross-sectional study analytical survey design.
Arifin et al. [9], 2016.	To determine the factors related to hypertension in the elderly in the work area of the UPT Puskesmas Petang I, Badung Regency in 2016.	A cross-sectional study design and uses a retrospective approach.
Sundari [10], 2015.	To determine the relationship between 6 factors that cause hypertension, namely gender, exercise, smoking, age, heredity, and obesity with the incidence of hypertension in Karang Anyar Village, Jati Agung District, South Lampung Regency.	Correlation using a cross-sectional approach.
Rahmayani [5], 2019.	To prove that gender, family history, stress, exercise habits, obesity status and smoking habits are risk factors for the incidence of primary hypertension.	Analytical research using survey methods and cross sectional approaches.
Ulfa & Wahyuni [11], 2016.	To determine the factors related to	A non-experimental study using a cut design

Discussion

A. Effect of Age on the Incidence of Hypertension in the Elderly

There were 2 researchers who discussed the influence of Age on the incidence of Hypertension. According to Ref. [7], most of the respondents were aged ≥ 40 years and those with hypertension were 82 (31.5%). Based on the results of statistical tests between the age

and incidence of hypertension, 31.5% of those aged ≥ 40 years were hypertensive and as many as 6.6% of respondents aged less than 40 years suffered from hypertension. From this it can be seen, that the proportion of hypertension at the age of more than 40 years is higher than the proportion of hypertension at the age of less than 40 years. This means that the older the age, the more at risk of suffering from hypertension. This is in accordance with the Ministry of Health of the Republic of Indonesia, namely the high level of hypertension in line with age, caused by changes in the structure of large blood vessels, so that the lumen becomes narrow and the walls of blood vessels become stiffer, as a result of which is an increase in systolic blood pressure. With the increase in age, an increase in diastole blood pressure is obtained on average, although not so noticeable, there is also an increase in the prevalence rate of hypertension every increase in the age group. According to Ref. [10], the study obtained data that from 141 respondents with essential hypertension (primary) 83 (53.6%) aged higher than 40 years, which means that the age factor of higher than 40 years is closely related to essential hypertension.

B. The Effect of Gender on the Incidence of Hypertension in the Elderly

There were 2 researchers who discussed the influence of Sex on the incidence of Hypertension. According to Ref. [6], based on the results of bivariate analysis, it was obtained p value = 0.026 with an alpha value = 0.05 (H0 rejected) means that it shows that there is a relationship between sex and the incidence of hypertension with an Odds ratio (OR) value = 2.708, this means that respondents who are female have a 2.7 times chance of developing hypertension compared to respondents who are male with a confidence level (95% CI) = 1.197- 6.126. The results of this study are also in line with the research of Ref. [12] which states that there is a relationship between sex and the incidence of hypertension (p value = 0.018 with or value = 3.417). Based on the results of existing studies and theories, researchers concluded that there is a relationship between the sexes and the incidence of hypertension, most of the hypertension occurs in men compared to women.

The prevalence of hypertension seems to be the same for women and white men, however in American-African women Primary Hypertension is higher than for women. In this study, men suffered more from Primary Hypertension, which was 71.9% compared to women who experienced Primary Hypertension, which was only 37.9%. This is in accordance with the theory that men have a greater chance of developing hypertension earlier than women, this is because men have a lifestyle that tends to increase blood pressure, such as smoking. Whereas in women protected from cardiovascular disease before menopause because women who have not experienced menopause are protected by the hormone estrogen [5].

C. Effect of Smoking on the Incidence of Hypertension in the Elderly

There were 4 researchers who discussed the effect of Smoking on the incidence of Hypertension. According to the research of Ref. [5], respondents who had a habit of smoking proposed the incidence of primary hypertension as much as 74.2%, in respondents who had smoked the proportion of primary hypertension incidence was 66.7% and in respondents who did not smoke the proportion of primary hypertension incidence was 16.7%. The results of statistical tests with Chi-Square obtained a p value less than 0.001 which is smaller than the α value of 0.05 which means that smoking habits are a risk factor for the incidence of primary hypertension as evidenced by POR values: 14,375 Confidence Interval (CI = 95%: 3,280-63,008) which means that the risk of developing primary hypertension for respondents who have a habit of smoking is 14,375 times greater than those who do not smoke.

Based on the theory, smoking affects the incidence of hypertension. Toxic chemicals such as nicotine and carbon monoxide smoked through cigarettes that enter the bloodstream can damage the endothelial lining of arterial blood vessels, resulting in a process of atherosclerosis and high blood pressure. In the autopsy study, it was proven that it was closely related to smoking and the presence of atherosclerosis in all blood vessels. Smoking in people with high blood pressure further increases the risk of damage to arterial blood vessels [5].

Nicotine in smokers will instantly increase blood pressure even in addicts. Smoking higher than 20 cigarettes per day is closely related to increased blood pressure and left ventricular hypertrophy. Respondents who smoked for more than 30 years had a 2.98 times risk compared to those who smoked less than 10 years. The risk of people who quit smoking to experience Primary Hypertension will be smaller than that of people who smoke. The advantages of quitting smoking are seen after 5 years of quitting and the risk returns to the way of not smoking after 20 years of quitting smoking [13].

The results of this study in accordance with the results of Rayhani's research found that 80% of people with hypertension had a history of smoking. This result is also supported by the results of Julianty P's study, which stated that respondents with unhealthy behavior (smoking, drinking liquor and lack of exercise) had a 1.53 times risk of suffering from hypertension compared to respondents with healthy behavior. According to Ref. [7], smoking behaviour is an act that does not have a positive value in all respects, especially on health. Smoking is a prelude that brings about various types of deadly degenerative diseases, such as cancer and heart disease. Nicotine in tobacco is the cause of increased blood pressure immediately after the first suction. Like other chemicals in cigarette smoke, nicotine is absorbed by very small blood vessels in the lungs and circulated into the bloodstream. In just a few seconds the nicotine had already reached the brain. The brain reacts to nicotine by signaling 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. Smoking a cigarette will have a big influence on rising blood pressure. This is because cigarette smoke contains approximately 4000 chemicals, of which 200 are toxic and 43 other types can cause cancer for the body.

According to Ref. [12], the increase in blood pressure in smokers is caused by the respondent's smoking habit which has become a daily necessity, there are even respondents who can spend more than 20 cigarettes per day, so it will cause a buildup of harmful substances in the blood and can cause various diseases, one of which is cardiovascular disease because nicotine substances that enter the bloodstream can damage the lining of the walls of arterial blood vessels and result in the process of atherosclerosis and Hypertension. This increase occurs due to nicotine narrowing blood vessels, forcing the heart to work hard and causing blood pressure to rise. Cigarettes contain thousands of chemicals harmful to the health of the body, including tar, nicotine, and carbon monoxide. These chemicals that enter the bloodstream can damage the endothelial layer of arterial blood vessels and result in the process of atherosclerosis and hypertension [14].

Based on the results obtained, out of 141 respondents with essential hypertension (primary) 61 (39.4%) respondents smoked and all of them were male respondents. Based on the results of interviews conducted on 94 respondents with hypertension of the female sex, both those with essential (primary) and secondary hypertension, all of them said that they do not smoke, but they have husbands who smoke, so it is likely that people with hypertension who are female are often exposed to cigarette smoke containing *carbon monoxide* which can affect the binding of oxygen in the blood. In accordance with the opinion of Ref. [15] who states that carbon monoxide in cigarette smoke will also replace oxygen bonds in the blood, resulting in increased blood pressure because the heart is forced to pump to put enough oxygen into other organs and tissues of the body.

According to Ref. [9], smoking is the habit/behavior of smoking cigarettes and has smoked in the respondent's life. The data are categorized into two, namely smoking if currently respondents have a habit/ behavior of resent and or have had previous smoking habits/ behaviors, be it light smokers, moderate smokers, or heavy smokers. And not smoking if the respondent states that he has no habit/ behavior and or has never had a smoking habit/ behavior before. Toxic chemicals such as nicotine and carbon monoxide smoked through cigarettes that enter the bloodstream can damage the endothelial lining of arterial blood vessels, and result in artereosclerosis, and high blood pressure. In the autopsy study, it was proven that it was closely related to smoking and the presence of artereosclerosis in all blood vessels. Smoking also increases heart rate and the need for oxygen to be supplied to the heart muscle. Smoking in people with high blood pressure further increases the risk of damage to arterial blood vessels.

D. Effect of Salt Consumption on the Incidence of Hypertension in the Elderly

There was 1 researcher who discussed the effect of smoking on the incidence of Hypertension. According to Ref. [13], based on the results of the chi square test between sodium intake and the incidence of hypertension, there was no significant relationship between sodium intake and the incidence of hypertension (p = 0.001). The results of this study are in accordance with the statement of Ref. [17], excessive consumption of sodium will increase extracellular and ways to normalize the intracellular fluid are drawn out so that the volume of extracellular fluid increases and as a result of the increase in the volume of extracellular fluid causes an increase in blood volume which has an impact on the onset of hypertension. This study is in line with related studies conducted by Ref. [18], the results show that there is a meaningful relationship between sodium intake and the incidence of hypertension. Research conducted by Ref. [19] which found a meaningful relationship between the consumption of salty foods, containing sodium glutamate (vetsin, soy sauce and sauce) with the incidence of hypertension.

E. Effect of Physical Activity on the Incidence of Hypertension in the Elderly

There were 4 researchers who discussed the effect of smoking on the incidence of Hypertension. In Ref. [5] respondents with irregular exercise habits the incidence of primary hypertension was 73% while in respondents with regular exercise habits the proportion of primary hypertension incidence was 29.2%. The results of statistical tests with Chi-Square obtained a p value = 0.002 which is smaller than the value of α 0.05 meaning that irregular exercise habits are a risk factor for the incidence of primary hypertension which is also proven by the POR value: 6.557 Confidence Interval (CI = 95%: 2.096-20.517) which means that the risk of experiencing primary hypertension for respondents who have irregular exercise habits is 6.557 times greater than that of those who have irregular exercise habits 6.557 times greater than those who have regular exercise habits.

The results of Ref. [20] stated that respondents who had unhealthy behavior (smoking, drinking liquor and lack of exercise) had a 1.53 times risk of suffering from hypertension compared to respondents with healthy behavior. According to Ref. [15], nowadays there are many activities that can be done in an appropriate and practical way, so that making everyone lazy to move automatically makes the body rarely move. The lack of public awareness of the importance of exercising is also a factor in people being lazy to exercise, even though it is done once or twice a week. There is an extraordinary busyness, people also feel that they no longer have time to exercise. People prefer to sleep if they have a rest period after work or on holidays. This condition triggers high cholesterol and also the presence of blood pressure that continues to strengthen, giving rise to hypertension [10].

According to Ref. [8], lack of physical activity can increase the risk of suffering from hypertension because it increases the risk of being overweight. Inactive people also tend to have a higher heart rate frequency so that the heart muscle has to work harder on each contraction. The harder and more often the heart muscle has to pump, the greater the pressure imposed on the arteries. Blood pressure is affected by physical activity. Blood pressure will be higher at the time of physical activity and lower when resting. Physical activity is the movement that the muscles of the body and its supporting systems perform. During physical activity, muscles need energy outside of metabolism to move, while the heart and lungs need additional energy to deliver nutrients and oxygen throughout the body and to produce remnants from the body [21].

People who diligently do sports such as cycling, jogging and aerobics regularly can facilitate blood circulation so that it can lower blood pressure. People who are less active in sports are generally likely to be overweight. Exercise can also reduce or prevent obesity as well as reduce salt intake in the body. Salt will come out of the body with sweat. Through regular exercise (aerobic physical activity for 30-45 minutes/ day) can reduce peripheral resistance that will prevent hypertension [18].

According to this study, it was found that the elderly in the work area of the Puskesmas Petang I, Badung Regency tended to do more activities or sports activities regularly. However, the results were obtained that the absolute number of elderly people who did not regularly exercise who suffered from hypertension was slightly higher than the elderly who did not regularly exercise who suffered from hypertension. In terms of proportion, the proportion of the elderly who do not exercise who suffer from hypertension is 74.5%. This proportion is greater than the proportion of the elderly who exercise who suffer from hypertension, which is 52.3%. This means that the risk of hypertension will be higher in someone who does not exercise than in those who do sports. Various studies state that exercising regularly is the first intervention to control various degenerative (non-communicable) diseases.

The results are regularly proven to be beneficial for lowering blood pressure, reducing the risk of stroke, heart attack, and others. The effect of exercise in the long term of about four to six months can lower blood pressure by 7.4/5.8 mmHg without the help of hypertension drugs. This effect of blood pressure drop can last up to about 20 hours after exercise. Exercise is a daily physical exercise activity that a person does regularly in order to provide physical fitness in a week of at least 30 minutes, at least 3-4 times a week.

F. Effect of Coffee Consumption on the Incidence of Hypertension in the Elderly

There was 1 researcher who discussed the effect of smoking on the incidence of Hypertension. According to Ref. [12], the results of a study of coffee consumption variables in hypertensive patients obtained a p-value of 0.020<α (0.05), this shows that there is a

relationship between smoking habits and blood pressure in hypertensive patients at the Palembang Pembina Health Center in 2016. Or value=3.467, this indicates that patients who consume coffee are at 3.467 times risk of uncontrolled blood pressure compared to patients who do not consume coffee. Coffee can affect blood pressure because it contains polyphenols, Niacin, and Caffeine. Caffeine has the effect of stimulating the central condition system (CNS), Excitation in the CNS gives rise to feelings of not drowsiness, not so tired, as well as faster and clearer thinking power, but in contrast muscle coordination ability, punctuality and counting accuracy are reduced. Caffeine can stimulate the vasomotor center and direct excitation of the myocardium causes a rise in blood pressure. People who do not consume coffee have lower blood pressure than people who consume 1-3 cups per day, and people who consume coffee 3-6 cups per day have high blood pressure.

G. Effect of Stress on the Incidence of Hypertension in the Elderly

There were 2 researchers who discussed the effect of Smoking on the incidence of Hypertension. The results of the analysis showed that most respondents, namely as many as 70.7% of respondents who were stressed, experienced primary hypertension, while only 25% of respondents experienced the incidence of primary hypertension. The results of statistical tests with *Chi-Square* obtained a p value = 0.002 which is smaller than the value of α 0.05 meaning that stress is a risk factor for the incidence of primary hypertension which is also proven by the POR value: 7.25 Confidence Interval (CI = 95%: 2,150- 24.442) which means that the risk of experiencing primary hypertension for respondents who are stressed is 7.25 times greater than those who do not experience stress.

The results of this study are in accordance with the literature that there is a relationship between stress factors and the incidence of hypertension, suspected through the activation of sympathetic nerves. Increased sympathetic nerve activity can gradually increase blood pressure. Stress can trigger an increase in the hormone adrenaline, also often making people have poor eating habits, and smoking. These conditions, if not addressed, have the potential to become a risk factor for hypertension. Stress control has a great impact on reducing blood pressure. This is also in accordance with Ref. [22], stress is proven to be related to the prevalence of hypertension.

According to Ref. [8] regarding the relationship between stress and the incidence of hypertension in the Bonegunu Health Center Work Area, results were obtained with a P-value value of 0.000 less than 0.05, which means that there is a significant relationship between stress and the incidence of hypertension in the Bonegunu Health Center Work Area.

High blood pressure or hypertension can be caused by stress which is suffered by an individual, because the reaction that arises to stress impulses is that his blood pressure

increases. In addition, generally individuals who experience stress have difficulty sleeping, so it will have an impact on their blood pressure which tends to be high [23]. Non-compliance in treatment and prolonged stress can add to severe hypertension.

In this study based on the results of interviews with respondents, researchers assumed that stress factors do not directly cause hypertension, but stress causes a re-increase in blood pressure, which can eventually lead to hypertension. Factors that affect blood pressure through stress, including stress due to daily life, work pressures, ethnic differences, social environment, and emotional distress. If one of the risk factors is combined with the stress factors above, there will be a two-fold increase in blood pressure [8].

According to Ref. [11], among 43 respondents who experienced stress, there were 37 respondents (86%) who suffered from hypertension. Meanwhile, among the 48 respondents who did not experience stress, there were 25 respondents (52.1%) who suffered from hypertension. From the results of statistical tests obtained a p-value of 0.001 meaning that there is a meaningful relationship between stress and the incidence of hypertension in the elderly.

The mechanism of stress hormones to increase blood pressure in cardiovascular is that when norepinephrine is produced, there is an increase in the hormone in the heart which can increase heart output, so that epinephrine levels will also increase. The increase caused by the hormone can increase blood pressure by as much as 5 mmHg. To avoid hypertension, the incidence of stress needs to be controlled.

H. Effect of Alcohol consumption with the incidence of Hypertension

There were 2 researchers who discussed the effect of Smoking on the incidence of Hypertension. Based on the results of research conducted by researchers regarding the relationship between alcohol consumption and the incidence of hypertension in the Bonegunu Puskesmas Work Area, results were obtained with a P-value of 0.000 less than 0.05, which means that there is a significant relationship between alcohol consumption and the incidence of hypertension in the Bonegunu Health Center Work Area [8]. This is in line with a study conducted by Ref. [13] regarding factors related to blood pressure at the Telaga Murni Cikarang Barat Health Center in 2012 where based on the results of research on 75 samples showed that consuming alcohol has a meaningful relationship with hypertension.

Alcohol is one of the factors causing hypertension because alcohol has the same effect as carbon dioxide which can increase blood acidity, so that the blood becomes thick and the heart is forced to pump blood, besides that excessive alcohol consumption in the long term will have an effect on increasing cortisol levels in the blood so that the activity of Renin-Angiotensin Aldosterone System (RAAS) increases and results in increased blood pressure.

Conclusion

Of the 10 studies, the most dominant factors affect the incidence of hypertension in terms of behavior include: Smoking, Salt Consumption, Coffee Consumption, Physical Activity. To provide counseling related to hypertension cases to the community, it is necessary to cooperate with puskesmas and posyandu or PTM Posbindu, providing the necessary facilities and infrastructure. Puskesmas needs to work with posyandu and Posbindu to provide information related to the importance of preventing hypertension cases and improving the quality of services for people with hypertension.

Conflict of Interest

Authors declare that there is no conflict of interest.

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