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ANALYSIS OF RISK FACTORS FOR HYPERTENSION AMONG THE PRODUCTIVE AGE POPULATION

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ABSTRACT
Hypertension is a growing public health issue, particularly affecting individuals in productive age groups. The high incidence of hypertension in the North Sangatta Health Centre area highlights the need to identify contributing risk factors. This study aims to analyse determinants associated with hypertension among productive-age residents within the working area of the North Sangatta Health Centre. The method used in this study was an analytical observational approach with a case–control design. Data were collected using demographic questionnaires and blood pressure observation sheets. The research instruments were not subjected to validity and reliability testing because a digital sphygmomanometer that had been calibrated by the hospital and was used in accordance with standard operating procedures was utilized. The variables examined included demographic factors (age, sex, education, occupation), smoking habits, and medical history (familial hypertension and diabetes). The sampling technique used was non-random sampling, specifically purposive sampling, with a total of 136 respondents (68 cases and 68 controls). Data were analyzed using chi-square tests and logistic regression tests. Result: The findings indicated significant associations between hypertension and age ($P < 0.000$), diabetes ($P < 0.001$), and family history of hypertension ($P = 0.009$). No significant associations were found for gender ($P = 0.859$), occupation ($P = 0.360$), education ($P = 0.069$), or smoking habits ($P = 0.170$). Conclusion: It is concluded that age and specific medical and occupational factors play important roles in hypertension incidence in this population.

Keywords: age; diabetes; hereditary risk; hypertension; lifestyle; occupation

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INTRODUCTION

Hypertension (high blood pressure) was defined as blood pressure measuring 140/90 mmHg or higher. It was common but could become serious if left untreated (Wijayanti et al., 2022). Individuals with high blood pressure often did not experience symptoms. Hypertension was a leading cause of premature death worldwide. One of the global targets for non-communicable diseases was to reduce the prevalence of hypertension by 33% between 2010 and 2030 (WHO, 2023). WHO data stated that around 1.28 billion adults aged 30–79 years worldwide suffered from hypertension, most of whom lived in low- and middle-income countries (Ayu et al., 2022). It was estimated that 46% of adults with hypertension were unaware of their condition, and fewer than half (42%) had been diagnosed and treated (WHO, 2023).

The prevalence of hypertension based on the 2018 Basic Health Research (Riskesdas) in Indonesia was 34.1%. This prevalence increased from 25.8% in the 2013 Riskesdas. It was estimated that only one-third of hypertension cases in Indonesia were diagnosed, while the rest remained undiagnosed (Kemenkes RI, 2021). According to the East Kalimantan Provincial Health Office, the most common non-communicable disease (NCD) in the region was hypertension. In 2021, the number of people with hypertension in East Kalimantan reached 195,817, and in 2022 the number rose to more than 213,769. In East Kutai Regency, there were 119,827 people with hypertension in 2023, distributed across 18 districts: South Sangatta (8,268), North Sangatta (33,588), Bengalon (11,664), Rantau Pulung (3,912), Kaliorang (4,608), Sangkulirang (6,684), Sandaran (3,372), Muara Wahau

(8,727), Kongbeng (8,256), Telen (3,144), Muara Bengkal (4,020), Muara Ancalong (4,224), Busang (2,028), Teluk Pandan (4,116), Kaubun (4,524), Karangan (3,744), Long Mesangat (2,344), and Batu Ampar (2,604).

The impact of hypertension contributed to about 9.4 million deaths worldwide each year. Hypertension also caused at least 45% of deaths due to heart disease and 51% of deaths due to stroke (WHO, 2023). Complications of hypertension could cause serious damage to the heart. Excessive pressure could harden the arteries, reducing blood and oxygen flow to the heart. Increased pressure and reduced blood flow could lead to chest pain, heart attacks, heart failure, and irregular heartbeats that could cause sudden death. Hypertension could also rupture or block arteries that supplied blood and oxygen to the brain, potentially leading to stroke (Yahya & Natalya, 2021). Hypertension was classified into two types: primary and secondary hypertension. Primary hypertension did not have a clearly known cause and was not associated with renovascular disease or other conditions. Secondary hypertension was caused by disorders of the renal blood vessels, thyroid abnormalities (hyperthyroidism), and other conditions. Maintaining a healthy lifestyle had been proven to reduce blood pressure and decrease cardiovascular risks. Body mass index (BMI), educational level, and exercise did not show significant effects on blood pressure. However, smoking and the consumption of high-salt and high-fat foods had significant effects on blood pressure (Ayu et al., 2022).

Risk factors that influenced the occurrence of hypertension included age, race or ethnicity, sex, obesity, stress, high-salt diet, alcohol consumption, smoking, coffee consumption, and oral contraceptive use. In Indonesia, hypertension remained a major public health issue. This disease affected not only older adults but also individuals in productive age groups. The prevalence of hypertension among men and women was similar, but premenopausal women had lower rates than men of the same age. Premenopausal women were protected by oestrogen, which increased High-Density Lipoprotein (HDL) levels. High HDL cholesterol was a protective factor against atherosclerosis, which could lead to hypertension (Septiyawati et al., 2021).

The study by Septiyawati (2021), showed significant effects of genetic history ($p = 0.017$; OR = 11.769), smoking status ($p = 0.036$; OR = 4.889), on the incidence of hypertension. The research conducted by Akbar and Santoso (2020), contributing factors to hypertension among residents in West Passi District, Bolaang Mongondow Regency. Similarly, the study by Wijayanti et al., (2023) showed significant relationships between smoking habits ($p = 0.002$), and hypertension incidence. In the working area of the North Sangatta Health Centre, the number of hypertension cases was 1,344 people (9.6%) in 2021, 2,498 people (11.4%) in 2022, and 915 people (13.2%) in the period of January–May 2023 (North Sangatta Health Centre Medical Records, 2023). Ted at the North Sangatta Health Centre from 29–31 May 2023, 20 visiting patients were identified, several of whom experienced hypertension. They reported similar complaints such as dizziness and heavy sensations in the neck. These patients were repeat visitors, and it was found that seven reported smoking and consuming salty foods, nine did not smoke but consumed salty foods, and four were overweight. This study aimed to determine the risk factors for hypertension among the productive-age population in the working area of Sangatta Utara Public Health Center.

METHOD

This study was an analytical observational research employing a case–control design. The research compared risk factors between the case group consisting of productive-age individuals with hypertension and the control group consisting of productive-age individuals without hypertension in the working area of the North Sangatta Health Centre. The study was conducted from September 2023 to February 2024 in the North Sangatta Health Centre working area. The study population consisted of all productive-age individuals with hypertension recorded in 2023, totalling 13,681 people. Sampling was carried out using a non-random technique, specifically purposive sampling.

The inclusion criteria for the case group were productive-age hypertensive patients who sought treatment at the North Sangatta Health Centre and agreed to participate. The control group consisted of non-hypertensive productive-age patients who also sought treatment at the same health centre. The sample size was calculated using 68 individuals for the case group and 68 for the control group, with a 1:1 matching ratio, resulting in a total sample of 136 respondents.

The independent variables in this study included age, sex, education, occupation, history of diabetes mellitus, family history of hypertension, and smoking habits, while the dependent variable was hypertension. Data collection was carried out through several stages: obtaining ethical approval, securing written informed consent from participants, and administering questionnaires and blood pressure observation sheets. The research data consisted of primary data obtained from questionnaires and blood pressure measurements, as well as secondary data derived from records of productive-age hypertensive patients at the North Sangatta Health Centre. All data were analysed using statistical software, employing Chi-square tests and logistic regression. This study was approved by the Health Research Ethics Committee of the Faculty of Medicine, Mulawarman University (Ethical Clearance No. 121/KEPK-FK/VI/2024). The researcher ensured compliance with all biomedical research ethical principles, including obtaining informed consent, maintaining participant confidentiality, and respecting participants' rights to withdraw from the study at any time without consequences, in accordance with established ethical standards.

RESULT

Univariate Analysis of Respondent Characteristics

The table below presents the univariate analysis of respondent characteristic. Characteristics in this study included age, sex, education, occupation, history of diabetes mellitus, family history, and smoking habits.

Table 1.
Univariate Analysis of Respondent Characteristics

Variable	Total (N=136)	f	%
Age	21 – 44 Year	74	54,4
	45 – 58 Year	62	45,6
Gender	Male	50	36,8
	Female	86	63,2
Education	Elementary School	15	11,0
	Junior – Senior High School	73	53,7
	College/University	48	35,3
Occupation	Employed	84	61,8
	Unemployed	52	38,2

Table 2.
Regarding health-related variables

Variable	Total (N=136)	f	%
History of Diabetes Mellitus	Yes	21	15,4
	No	115	84,6
Family History Of Hypertension	Yes	54	39,7
	No	82	60,3
Smoking Habits	Yes	23	16,9
	No	113	83,1

The univariate analysis of respondent characteristics showed that most participants were aged 21–44 years (54.4%), while 45–58 years accounted for 45.6%. The majority of respondents were female (63.2%), and males represented 36.8%. In terms of education level, more than half had completed junior to senior high school (53.7%), followed by college or university graduates (35.3%), and those with elementary-level education (11.0%). Most respondents were employed (61.8%), whereas 38.2% were unemployed. Table 2, Regarding health-related variables, 15.4% had a history of diabetes mellitus, while 84.6% reported no such history. Additionally, 39.7% had a

family history of hypertension, compared to 60.3% without. Smoking habits were reported by 16.9% of respondents, while the majority (83.1%) did not smoke.

Bivariate Analysis

The table below presents a bivariate analysis between independent and dependent variables based on the research results.

Table 3
Bivariate Analysis

Variable	Hypertension		Totaly	*P value*
	Yes	No		
Age				
21 – 44 Year	22 (29,7%)	52 (70,3%)	74 (100%)	0,000
45 – 58 Year	46 (72,4%)	16 (25,8%)	62 (100%)	
Gender				
Male	26 (52%)	24 (48%)	50 (100%)	0,859
Female	42 (48,8%)	44 (51,2%)	86 (100%)	
Education				
Elementary School	10 (66,7%)	5 (33,3%)	15 (100%)	
Junior – Senior High School	40 (54,8%)	33 (45,2%)	73 (100%)	0.069
College/University	18 (37,5%)	30 (62,5%)	48 (100%)	
Occupation				
Employed	34 (40,5%)	50 (59,5%)	84 (100%)	0,360
Unemployed	34 (65,4%)	18 (34,6%)	52 (100%)	
History of Diabetes Mellitus				
Yes	18 (85,7%)	3 (14,3%)	21 (100%)	0,001
No	50 (43,5%)	65 (56,5%)	115 (100%)	
Family History Of Hypertension				
Yes	35 (64,8%)	19 (35,2%)	54 (100%)	0,009
No	33 (40,2%)	49 (59,8%)	82 (100%)	
Smoking Habits				
Yes	15 (65,2%)	8 (34,8%)	23 (100%)	0,170
No	53 (46,9%)	60 (53,1%)	113 (100%)	

The bivariate analysis showed that age had a significant association with the incidence of hypertension (p=0.000), where respondents aged 45–58 years had a higher proportion of hypertension (72.4%) compared to those aged 21–44 years (29.7%). Gender was not significantly associated with hypertension (p=0.859), as the proportions of males (52%) and females (48.8%) with hypertension were relatively similar. Education level also showed no significant association (p=0.069), although hypertension was more common among respondents with elementary-level education (66.7%) compared to those with higher education levels. Occupation did not exhibit a significant relationship with hypertension (p=0.360), with relatively comparable proportions between employed (40.5%) and unemployed individuals (65.4%). A significant association was found between history of diabetes mellitus and hypertension (p=0.001), where respondents with diabetes history had a markedly higher prevalence of hypertension (85.7%). Family history of hypertension was also significantly associated with hypertension (p=0.009), with hypertension occurring more frequently among those with a positive family history (64.8%). Meanwhile, smoking habits were not significantly associated with hypertension (p=0.170), although individuals who smoked showed a higher proportion of hypertension (65.2%) compared to nonsmokers (46.9%).

Multivariate Analysis

Based on the results of the multiple logistic regression analysis, it was concluded that the variable of history of diabetes mellitus had the most significant association among the six variables examined. The chi-square analysis showed a p-value of <0.001 ($p < 0.05$), indicating a strong relationship between a history of diabetes mellitus and hypertension. The Nagelkerke R Square value of 0.394 indicated that the predictor variables included in the model were able to explain

39.4% of the variance, while the remaining 60.6% was explained by other variables not included in the model.

DISCUSSION

The Relationship Between Age and Hypertension

Based on the results of the chi-square test, the data showed a p-value of 0.000 ($p < 0.05$), indicating a significant relationship between age and hypertension. This finding supported the concept that age was an independent risk factor for the development of hypertension. From a practical perspective, these results highlighted the importance of more accurate blood pressure monitoring among older adults. Public health interventions focusing on the prevention and management of hypertension in the elderly population were essential to reducing the burden of disease and its associated complications (Chobanian et al., 2023). Maulia et al. (2021) stated that at ages above 45 years, the arterial walls experienced thickening due to the accumulation of collagen in the muscle layers, causing the blood vessels to gradually narrow and become stiff. The age-related narrowing of blood vessels affected blood circulation, which in turn led to an increase in blood pressure.

The findings of this study were consistent with various epidemiological studies showing that the prevalence of hypertension increased with advancing age. One study by Franklin et al. (2021), demonstrated an association between age and hypertension, with an Odds Ratio of 3.410, indicating that older adults were three times more likely to develop hypertension due to physiological changes such as arteriosclerosis and decreased kidney function. Age is one the most common predictor and non-modifiable risk factor of hypertension. Hypertension is more common among older adults than adults of 40-59 years of age. On average, systolic blood pressure increases with age whereas diastolic blood pressure increases then declines at latter ages. Aging affects the structure, vasculature and function of human heart causing arterial stiffness leading to reduced arterial buffering capacity thereby causing hypertension (Hussainy, 2024).

The Relationship Between Gender and Hypertension

Based on the results of the chi-square analysis, a p-value of 0.859 was obtained, indicating that there was no relationship between sex and the incidence of hypertension among individuals in the productive-age group. Similar findings were reported in studies conducted by Wardhani (2024) and Wahyuni (2022), Indriana (2024), which showed that there was no significant relationship between sex and the incidence of hypertension, with p-values of 0.377 ; 0.108 ; 0,145 ($p > 0.05$). This condition could have been caused by several factors. In the productive-age group, the hormonal differences between men and women that generally influenced blood pressure were not yet evident in a dominant way. Men tended to have a higher risk of hypertension from a younger age, while women still received natural protection from estrogen until they approached menopause. However, when both groups were analyzed together within a wide productive-age range, these differences could have balanced each other out, resulting in no statistically significant association (Hernita, 2024).

In addition, the influence of other risk factors such as high-salt diets, obesity, physical inactivity, smoking habits, alcohol consumption, and work-related stress was often stronger than the effect of sex. The dominance of these factors could have masked the risk differences based on gender. The unequal proportion of male and female samples in the study might also have caused the association to appear insignificant. Moreover, the lifestyles of men and women in the productive-age population had become increasingly similar, particularly regarding work patterns, physical activity, and stress levels, which might have reduced the differences in hypertension risk between them. Therefore, the absence of an association between sex and the incidence of hypertension in the productive-age group could be understood as the result of a combination of biological factors, lifestyle similarities, and the characteristics of the study sample (Hernita, 2024).

It was suggested that although gender differences were found in the prevalence of hypertension in Indonesia, current hypertension guidelines and management rarely focused on these differences. Therefore, future hypertension control policies needed to adopt a gender-based approach in health education and monitoring, supported by stronger and more proactive cross-sector collaboration.

The Relationship Between Education and Hypertension

Based on the results of the chi-square analysis, a p-value of 0.069 was obtained, indicating that there was no relationship between education level and the incidence of hypertension among individuals in the productive-age group. Similar findings were reported by Sulistiani (2022); Yunandar (2024) ; Cahyaningrum et al (2022), who obtained a p-value of 0.907; 0,3379 ; 0,205. A high level of knowledge among respondents was not a parameter that prevented them from being exposed to hypertension, nor did low knowledge necessarily result in a significant impact on the occurrence of hypertension. This was due to the possibility that individuals with lower education were still active in seeking information about hypertension its causes, symptoms, and preventive measures so that they could avoid developing the condition. Conversely, individuals with higher education who were not concerned about health issues could still experience hypertension. Thus, a person's level of knowledge could not be used as a definitive parameter for determining their risk of developing hypertension, as other factors such as unhealthy lifestyles and related behaviors also contributed to the occurrence of the disease.

Education was a factor that indicated a person’s ability to absorb and understand health information. The researcher assumed that there was no relationship between education and blood pressure levels among older adults because they were aware of the need to maintain a healthy lifestyle. Several elderly individuals who were surveyed consistently monitored their health at healthcare facilities and engaged in physical activities, either in groups or regularly in their own homes. They also paid attention to the types of food they consumed.

The Relationship Between Occupation and Hypertension

Based on the results of the chi square analysis, a p value of 0.360 was obtained, indicating that there was no relationship between occupation and the incidence of hypertension among individuals in the productive-age group. The findings of this study were consistent with those of Sulistiani (2022), who reported a p-value of 0.167, indicating that there was no relationship between occupation and the incidence of hypertension.

Hypertension was partly caused by modern lifestyle factors. People today were busy prioritizing work in order to achieve success. Their busyness, hard work, and demanding goals led to feelings of stress and created high pressure. These feelings of pressure caused blood pressure to rise. In addition, busy individuals often did not have time to exercise. As a result, body fat increased and accumulated, which could obstruct blood flow. Blood vessels that were compressed by fat deposits caused blood pressure to become elevated. This was one of the causes of hypertension The absence of a significant relationship between occupation and the incidence of hypertension could be explained by several factors. The occupational categories used in this study may not have reflected the actual differences in workload, stress levels, or physical activity experienced by the respondents. Many types of jobs that were reported did not clearly indicate whether individuals were experiencing high work-related stress or sedentary working conditions, making it difficult to identify meaningful variations in hypertension risk (Setiandari, 2022).

In addition, occupation did not always determine a person’s level of stress, as each individual had different coping mechanisms. Some respondents with highly demanding jobs were able to manage stress well, while others with lighter workloads became stressed more easily. As a result, occupation was not a consistent predictor of hypertension in this population. Other risk factors such as diet, smoking habits, alcohol consumption, obesity, and family history appeared to have a stronger

influence on blood pressure. The dominance of these factors may have overshadowed the contribution of occupational status. Moreover, many respondents, regardless of their type of occupation, maintained healthy lifestyles by regularly monitoring their health, exercising, and paying attention to their diet. This reduced the differences that might have emerged due to occupational factors. Therefore, the lack of an association between occupation and hypertension was likely caused by a combination of lifestyle behaviors, individual stress-management abilities, and other contributing factors.

The Relationship Between History of Diabetes Mellitus and Hypertension

Based on the results of the chi-square analysis, a p-value of 0.001 was obtained, indicating that there was a relationship between a history of diabetes mellitus and the incidence of hypertension among individuals in the productive-age group.The findings of this study were consistent with those of Nuemi (2022), who reported a p-value of 0.003, indicating that there was a relationship between diabetes mellitus and the incidence of hypertension. Furthermore, another study in Gaborone, Botswana, identified hypertension in 61.2 percent of diabetic patients. Hypertension was observed in 64.4 percent of female DM patients and 53.1 percent of male DM patients. Female sex was associated with a higher risk of hypertension (P=0.0001). Hypertension was also associated with older age (P=0.00). Among those over 50 years old, the proportion of hypertensive individuals in the DM population increased to 70.9 percent (Tapela et al., 2020).

In several studies, patients with diabetes mellitus were found to be at risk of developing hypertension (Kholifah, 2020). Kholifah (2020), stated that individuals with a history of diabetes mellitus could develop hypertension because diabetic patients experienced insulin resistance and hyperinsulinemia, which increased peripheral resistance and enhanced vascular smooth muscle contraction in response to norepinephrine and angiotensin II. The majority of individuals with type 2 diabetes mellitus had a high risk of developing hypertension. This was caused by increased peripheral resistance due to vascular remodeling and increased vascular volume associated with hyperinsulinemia and hyperglycemia resulting from insulin resistance. Diabetes could trigger the formation of plaques in large blood vessels (atherosclerosis), which led to the narrowing of blood flow, thereby requiring higher pressure for blood circulation, a condition known as hypertension.

The Relationship Between Family History of Hypertension and Hypertension

Based on the results of the chi-square analysis, a p-value of 0.009 was obtained, indicating that there was a relationship between a family history of hypertension and the incidence of hypertension among individuals in the productive-age group. The findings of this study were consistent with those of Setiandari (2022); Indriana (2021); Nuemi (2022), who reported a p-value of 0.005; 0,00; 0,001, indicating that there was a relationship between family history and the incidence of hypertension.

Hypertension was one of the complex hereditary disorders. Essential hypertension was usually associated with genes and genetic factors, in which many genes played a role in the development of hypertensive conditions. Genetic factors contributed about 30% to variations in blood pressure among different populations. Heredity or genetic predisposition to disease was the main risk factor, as a family history of hypertension was more commonly found in monozygotic (identical) twins than in heterozygotic (fraternal) twins when one of them suffered from hypertension. An individual was considered to have a primary genetic predisposition to hypertension when, if left naturally without therapeutic intervention, the interaction with environmental factors allowed the hypertension to develop, and within 30–50 years symptoms would eventually appear (Setiandari, 2022). The findings of this study were in accordance with hereditary theory, as increased genetic susceptibility could lead to hypertension, and the gene involved was neurogenic, which genetically acted as a trigger for the onset of hypertension. This condition occurred when an individual was born to two healthy carriers of the defective gene, but it could also occur when the defective gene

was dominant.

The Relationship Between Smoking Habits and Hypertension

Based on the results of the chi-square analysis, a p-value of 0.107 was obtained, indicating that there was no relationship between smoking habits and the incidence of hypertension among individuals in the productive-age group. The findings of this study were consistent with those of Sulistiani (2022) ; Bokaba (2021), who reported a p-value of 1.000 ; 0,158, indicating that there was no relationship between smoking habits and the incidence of hypertension.

The findings of this study showed no relationship between smoking habits and the incidence of hypertension because respondents were classified only as smokers and non-smokers, without describing the frequency, the number of cigarettes smoked per day, the duration of smoking, or the type of cigarettes used. In fact, these factors strongly influenced the impact of smoking on blood pressure. When the smoking variable was not measured in detail, the actual relationship might not have appeared significantly in the statistical analysis. In addition, the effects of smoking were more acute than chronic. Nicotine could cause a rapid increase in blood pressure through the stimulation of the sympathetic nervous system; however, this increase was usually temporary. As a result, smoking did not always emerge as a strong risk factor for chronic hypertension, especially when examined in this study, which used a cross-sectional design.

Other more dominant risk factors might also have overshadowed the influence of smoking on blood pressure, such as high-salt diets, obesity, lack of physical activity, alcohol consumption, diabetes, and family history. When these factors were more prevalent among respondents, the role of smoking became less apparent in influencing the occurrence of hypertension. Furthermore, some respondents who smoked might not have reported their smoking habits honestly (underreporting), causing the data to become biased and masking the true relationship.Thus, the absence of an association between smoking habits and hypertension in this study was likely caused by a combination of insufficiently detailed variable measurement, the acute nature of smoking's effects, the dominance of other risk factors, reporting bias, and the diverse characteristics of the respondents.

CONCLUSION

There was a significant relationship between age, a history of diabetes mellitus, and a family history of hypertension (genetic). This was demonstrated by the significance values of $p < 0.05$ for age (0.000), a history of diabetes mellitus (0.001), and a family history of hypertension (0.009). The factors that were not found to be associated with the incidence of hypertension were gender (0.859), education (0.069), occupation (0.360), and smoking habits (0.170).

REFERENCES

Akbar dan Santoso. (2020). Analisis Faktor Penyebab Terjadinya Hipertensi Pada Masyarakat (Studi Kasus Di Kecamatan Passi Barat Kabupaten Bolaang Mongondow). Media Publikasi Promosi Kesehatan Indonesia. 3 (1) p. 12-19.
https://jurnal.unismuhpalu.ac.id/index.php/MPPKI/article/view/1013/743

Ayu dkk. (2022). Faktor - Faktor Yang Menyebabkan Hipertensi Di Kelurahan Medan Tenggara. Jurnal Kesehatan Masyarakat (e-journal), 10 (2) p. 136-147. https://ejournal3.undip.ac.id/index.php/jkm/article/download/32252/26652

Bokaba.M, (2021) . Undiagnosed Hypertension in a Workplace: The Case of a Logistics Company in Gauteng, South Africa. Healthcare (Basel). 30; 9 (8): 964. Doi: 10.3390/healthcare9080964

Cahyaningrum, E., Putri, N. R. I. T., & Dewi, P. (2022). Hubungan usia dan tingkat pendidikan dengan peningkatan tekanan darah lansia. Seminar Nasional Penelitian dan Pengabdian kepada Masyarakat (SNPPKM). 1 (1) p. 325–331.

https://repository.horizon.ac.id/items/show/584

Chobanian, et al. (2014). The seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure: The JNC 7 Report

Franklin, S. S., Larson, M. G., Khan, S. A., Wong, N. D., Leip, E. P., Kannel, W. B., & Levy, D. (2021). Does the relation of blood pressure to coronary heart disease risk change with aging? The Framingham Heart Study. Circulation, 103(9), 1245-1249.

Hernita, H.D. (2024). Analisis Faktor-faktor yang Berhubungan dengan Kejadian Hipertensi di Wilayah Kerja Puskesmas Tumbang Talaken Kabupaten Gunung Mas. 2 (2).p. 57-79. The Journal General Health and Pharmaceutical Sciences Research.
DOI: https://doi.org/10.57213/tjghpsr.v2i2.423

Hussainy S.A. (2024). Blood Pressure in Relation to Age and Gender. Journal of Drug Delivery and Therapeutics. 14 (3). p. 39-43. https://jddtonline.info/index.php/jddt/article/view/6456/5922

Indriana.Q.A (2024). Relationship Of Sedentary Lifestyle With Hypertension Incidence In Productive Ages (20-59 Years) Among Educators And Educational Staff In Jember, Indonesia. JIKM.15 (2).p. 246- 257 DOI: https://doi.org/10.26553/jikm.2024.15.2.246- 257.

Kemenkes RI (2021). Profil Kesehatan Indonesia 2021
file:///C:/Users/MyBook%20Pro%20K7V/Downloads/Profil-Kesehatan-Indonesia-2021.pdf

Kholifah, S. H. (2020). Sosioekonomi, Obesitas, dan Riwayat Diabetes Melitus (DM) dengan Kejadian Hipertensi. Jurnal Penelitian dan Pengembangan Kesehatan Masyarakat Indonesia, 1 (2), 157-165.https://journal.unnes.ac.id/sju/jppkmi/article/view/40323/18498

Maulia, M., Hengky, H. K., & Muin, H. (2021). Analisis kejadian penyakit hipertensi di Kabupaten Pinrang. Jurnal Ilmiah Manusia Dan Kesehatan, 4(3), 324–331. http://jurnal.umpar.ac.id/index.php/makes/article/view/614

Nuemi,H.M (2022). Hypertension among people with diabetes mellitus: Prospective study. Prospective study. International Journal of Health Sciences, 6(S5), 7470²7484. https://doi.org/10.53730/ijhs.v6nS5.10783.

Septiyawati dkk. (2021). Incidence of Hypertension of 30-50 Years Old in the Salatiga City Health Center. Publik Health Perspectives Journal, 6, (1), 53-62.
https://journal.unnes.ac.id/nju/index.php/phpj/article/view/25978/11097

Setiandari L.O. (2022). Hubungan Pengetahuan, Pekerjaan dan Genetik (riwayat hipertensi dalam keluarga) Terhadap Perilaku Pencegahan Penyakit Hipertensi: Knowledge, Work and Genetic Relationship (family history of hypertension) to Hypertensive Disease Prevention Behavior . Media Publikasi Promosi Kesehatan Indonesia (MPPKI), 5(4), 457-462. https://doi.org/10.56338/mppki.v5i4.2386

Sulistiani (2022). Faktor-Faktor yang Berhubungan dengan Kejadian Hipertensi pada Pegawai di Pusdiklat Pajak Kemanggisan Jakarta Barat Tahun 2021. Jurnal Kesehatan. 15 (2). p. 100-109. DOI : https://doi.org/10.32763/juke .v15i2.426.

Tapela, N. M., Clifton, L., Tshisimogo, G., Gaborone, M., Madidimalo (2020). Prevalence and determinants of hypertension awareness, treatment, and control in Botswana: a nationally representative population-based survey. Hindawi. International Journal of Hypertension. 2020, Article ID 8082341, 12 pages https://doi.org/10.1155/2020/8082341

Wahyuni S, Ibrahim, Agustina. Faktor-Faktor Yang Berhubungan Dengan Hipertensi Pada Lansia Di Desa Alue Bili Geulumpang Kecamatan Baktiya Kabupaten Aceh Utara Tahun 2022. Journal Health Medical Science. 2022;1(2):1-8

Wardhani.J.R (2024). Hubungan Usia Dan Jenis Kelamin Dengan Kejadian Hipertensi Pada Pasien Rawat Jalan di Poliklinik Penyakit Dalam RSUD Meuraxa Banda Aceh. The Journal of Multidisciplinary Research on Scientific and Advanced. 2 (4). p. 903-911
DOI :https://doi.org/10.61579/future.v2i4.337

WHO. (2023). Hypertension. Article. https://www.who.int/news-room/fact-sheets/detail/hypertension

Wijayanti, dkk. (2022). Faktor- Faktor Yang Memengaruhi Kejadian Hipertensi Di Desa Sungai Itik Kecamatan Sungai Kakap. Jurnal Mahasiswa dan Peneliti Kesehatan, 9, (1). p.36-47.

https://openjurnal.unmuhpnk.ac.id/index.php/JJUM/article/view/4537/2183

Yahya dan Natalya. (2021). Gambaran Pengetahuan Lansia Tentang Hipertensi: Literatur Review. Prosiding Seminar Nasional Kesehatan Lembaga Penelitian dan Pengabdian Masyarakat Universitas Muhammadiyah Pekajangan Pekalongan, 1205-1216. https://jurnal.umpp.ac.id/index.php/prosiding/article/view/815/572

Yunandar .R (2024). Hubungan Usia, Pendidikan, dan Tingkat Pengetahuan dengan Kejadian Hipertensi Berpendekatan Cross Sectional. Jurnal Keilmuan Dan Keislaman, 4(2).p.179–188. https://doi.org/10.23917/jkk.v4i2.399