



## CAUSAL FACTORS AND INTERVENTIONS TO PREVENT HYPERTENSION IN RURAL AREA: LITERATURE REVIEW

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### ABSTRACT

**Background:** Hypertension is a non-communicable disease known as The Silent disease. Prevalence of Hypertension in rural areas and in cities has a relatively small comparison number. The factors that cause hypertension in rural areas are different from the factors that cause hypertension in urban areas. The physical activity lifestyle of individuals with hypertension who live in rural areas has a higher life expectancy than individuals with hypertension in urban areas. Hypertension intervention is included in one of the SDGs programs. aims to provide an overview of the factors that cause hypertension and interventions carried out to treat hypertension in rural areas. **Methods:** scoping review is used with the PRISMA approach. Electronic databases were used such as PubMed, Google Scholar, and Science Direct. A literature review was conducted on international journals published in the last 5 years, available in full text and not the result of a review. **Result :** This study concludes that the causes of hypertension in rural areas include: alcohol use, occupation, smoking habits, age, zinc intake, sleep duration, exposure intensity to the use of biomass fuels, pesticides, and obesity. Interventions that can be given to people with hypertension who live in rural areas include: physical activity, family support, self-screening for routine blood pressure control, and improving sleep quality. **Conclusions:** In providing hypertension prevention interventions to people in rural areas, door-to-door visits are also needed to evaluate the success of the interventions that have been given, as well as seek information related to the causal factors that are obstacles to the success of the interventions that have been given

**Keywords:** Hypertension in Rural areas, Hypertension intervention

### INTRODUCTION

Hypertension is a non-communicable disease that has a high prevalence rate and tends to increase every year which is influenced by several factors such as age, gender, genetics, obesity, exercise, and sleep quality (Setyaningrum et al., 2017). Globally, the prevalence of hypertension is

estimated at 30% of the total population and is a cause of death of 1.7 million per year (Sartika et al., 2018). The prevalence of hypertension is predicted to increase by 29% by 2025. As many as 1 billion people in the world suffer from hypertension with systolic blood pressure > 14 mmHg and diastolic blood pressure > 90 mmHg, of



which 2/3 live in developing countries with low to moderate incomes (Sartika et al., 2018). In Indonesia, as much as 25.8% of the population suffers from hypertension. In 2016 the national health indicator survey increased to 32.4%, an increase of 7%. Hypertension in Indonesia is a degenerative and cardiovascular disease (Sartika et al., 2018).

Based on the results of Basic Health Research (2018) the prevalence of hypertension based on diagnoses by health workers and measurement results appears to increase with age. The prevalence of hypertension over the age of 18 years is 34.1%. This prevalence increased from 2013 with a percentage of 25.8%. Based on blood pressure measurements, hypertension affects more women (28.8%) than men (22.8%). The prevalence of hypertension over 18 years of age in East Java Province is 21.5% (Ministry of Health RI, 2018).

The incidence of hypertension in urban areas has a small difference from the incidence of hypertension in rural areas. The prevalence rate of hypertension in urban areas is 26.1% while in rural areas it is 25%, but this does not guarantee that the proportion of risk factors that cause hypertension in Indonesian society is higher in urban areas than in rural areas (Ministry of Health, 2013). Factors that cause hypertension in rural areas according to previous research include Age, gender, level of knowledge, exposure to pesticides, smoking habits, consuming alcohol, and physical activity (Indrapal et al., 2022) and (Rajkumar & Romate, 2020). Interventions that can be given to people with hypertension are not only with pharmacological therapy. Non-pharmacological interventions that can be given to people with hypertension include Physical activity (4-9 mmHg at least 30 minutes/day), Aerobic 8.3/5.2 mmHg 40-50 minutes/day) and Immersed Ergocycle (Static Bike) 5.1 /2.9 mmHg and foot reflexology exercises (8.4/3.4 mmHg for 30 minutes) (Kurdi, 2022). This therapy is

very easy to implement, but you need to be consistent in carrying it out to get optimal results (Iqbal & Handayani, 2022).

## **METHODS**

### **Study design**

The scoping review design outlined by (Arksey, H., & O'Malley, 2005) consists of the following steps: (1) formulating research questions, (2) identifying relevant studies, (3) selecting studies, (4) mapping data, and (5) compiling, summarizing, and summarizing reporting results

### **Search Strategy**

A literature search was carried out using various electronic databases such as PubMed, Google Scholar, and Science Direct. The keywords used were "Hypertension in rural areas, interventions in hypertension". The criteria for selecting articles were based on inclusion criteria based on PICO analysis (population, intervention, comparison, outcomes), with the provisions P: Population is hypertension sufferers in rural areas; I: Intervention is an intervention to prevent hypertension; C: Comparison is an intervention given by hypertension sufferers in rural areas; and O: Outcomes are the results or effects of hypertension prevention interventions.

### **Inclusion and Exclusion Criteria**

Inclusion criteria in the literature search included articles reviewed which were research articles in international journals, published at least in the last 5 years, available in full text. The exclusion criteria were articles that were the result of a literature review. Appropriate literature was then selected based on topics related to hypertension in rural areas, and hypertension interventions. After filtering the literature using the PRISMA guidelines, the literature was then analyzed in many 17 articles.

### **Screening**

Each abstract was checked twice by the authors using inclusion criteria. The study was excluded if it was not relevant to the topic of hypertension in rural areas and interventions for hypertension in rural areas, both quantitatively and qualitatively.

### Data Analysis

The analysis of the research data includes reading the entire contents of each article systematically, labeling the meaningful pieces of a set of texts, analyzing and mapping each context, and grouping them into categories. Combining the findings of qualitative and quantitative studies (Q1) and (Qn) the authors analyzed the content of the qualitative and

quantitative findings of studies related to hypertension in rural areas and hypertension interventions in rural areas were analyzed again to support the findings.

### RESULTS

The selected scientific articles are summarized and presented in Table 1. Based on the results of a study conducted of 17 articles, 6 articles about the factors that cause hypertension in rural areas, and 11 articles about interventions for hypertension in rural areas. The results of the article review are shown in Table 1 in the attachment

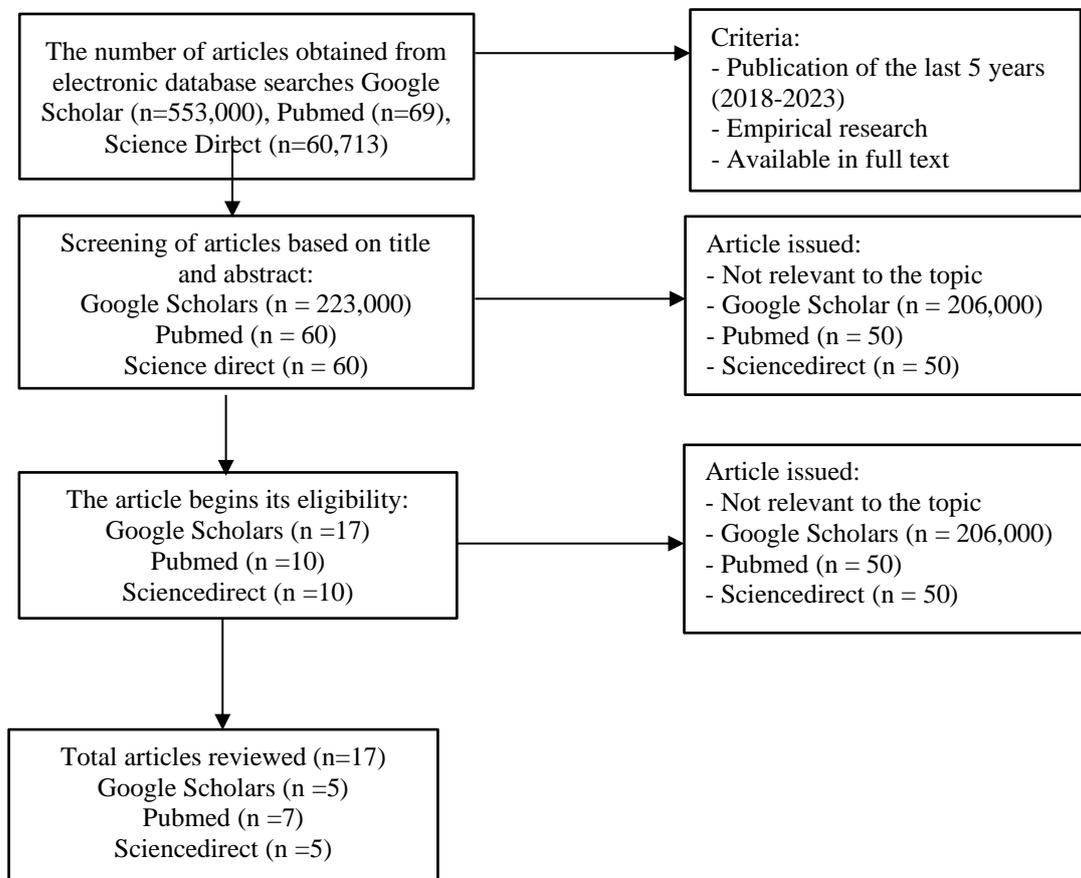


Figure 1. Prism Diagram

### DISCUSSION

Factors Causing Hypertension in Rural Areas According to previous studies



showed that in rural areas it is lower than in urban areas (Hasan et al., 2021). Factors causing hypertension in adults living in rural areas include tobacco use (smoking), alcohol use, occupation, age, zinc and carbohydrate intake, and overweight (Indrapal et al., 2022) and (Rajkumar & Romate, 2020). In another study, it was found that the cause of hypertension in rural areas was the use of biomass fuel, which could interact with multi-metal exposure, thereby increasing blood pressure (Pullabhotla & Souza, 2022). Research conducted by (Aristi et al., 2020) found that farmers who live in villages have food consumption factors (salted fish, milk, coffee, and food seasonings) associated with the incidence of systolic hypertension, while the habit of drinking tea is associated with the incidence of hypertension diastole. In research (Sugiarta et al., 2020) it was found that exposure to pesticides can increase blood pressure in farmers, which can also trigger hypertension. The lack of exposure to information related to the importance of carrying out independent screening of residents living in rural areas is also a factor causing increased blood pressure (Regea et al., 2022). Sleep duration in the elderly in rural areas is short and poor sleep quality is also associated with the prevalence of hypertension in the elderly (Wu et al., 2019). Sleep duration <6 hours and 6-<7 hours is significantly associated with the prevalence of hypertension in rural areas (Wu et al., 2019).

### **Hypertension Intervention in Rural Area**

Research conducted by (Islam et al., 2021) found that physical activity is proven to control and reduce blood pressure. In his research, it was stated that patients with hypertension who have higher education tend to comply with this exercise program, in contrast to hypertensive patients who have low education and tend not to care about the importance of doing physical activity to help lower blood pressure.

Attitudes and behavioral intentions of a person with hypertension are also predictors of physical activity (Hatefnia et al., 2019). Activities are needed to promote awareness interventions and motivation for physical activity, especially for people with low education (Islam et al., 2021). In a study conducted by (Muhammad Alfin et al., 2023) Physical is associated with an increase in blood pressure.

Another intervention that can be given to people with hypertension who live in rural areas according to research (Zeng et al., 2021) is establishing a cooperative relationship with caregivers with hypertension in the family because this can show benefits in improving the patient's quality of life, blood pressure control, family psychological well-being. The quality of life of adults with hypertension in urban areas is worse than hypertension sufferers who live in rural areas (Chantakeeree et al., 2022). Health education related to the importance of screening blood tests independently for people with hypertension is also one of the interventions that can control blood pressure for people with hypertension in rural areas (Gamage et al., 2020).

Research conducted by (Susanto et al., 2023) states that the intervention that can be given in rural areas is the application of the Plant Based Diet Concept model as a solution for hypertension in meeting nutritional needs from vegetable protein and minimizing intake from animals and processed sources. Maximized nutrient intake in PBD involves a high intake of fiber, plant protein, vitamins, polyphenols, and unsaturated fatty acids, and a low intake of sodium. Processed food in a PBD can be adapted to the culture and habits of the local community to facilitate the consumption process and maintain consistency in the implementation of the process. A PBD is expected to provide considerable benefits for hypertension in farmers. Optimal nutrition and fiber in PBD will provide strong protection for organ



systems in the body and will help the systems work synergistically to reduce inflammation and oxidation in the body. Screening blood pressure checks routinely and periodically in high-risk individuals can prevent increased blood pressure and CVD (Ntaganda et al., 2022). The interventions also focused on proactive government home visits with trained health workers and adequate public health care infrastructure resulting in greater reductions in blood pressure than usual care of adults with hypertension (Jafar et al., 2020).

## CONCLUSION

This study concluded that the causes of hypertension in rural areas include: alcohol use, work habits, smoking, age, zinc intake, sleep duration, insensitivity to exposure to the use of biomass fuels and pesticides, and obesity. Interventions that can be given to people with hypertension who live in rural areas include physical activity, family support for patients, self-screening for routine blood pressure control, and improving sleep quality. Suggestions that can be given for further research are to examine more specifically interventions that are very effective to be given to people with hypertension in rural areas.

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**Table 1. results of literature review**

ID	Author	Title	Objective	Sample	Methods	Conclusion
C1	(Indrapal et al., 2022)	Sociodemographic factors, overweight/obesity and nutrients associated with hypertension among rural adults (>18 years): Findings from National Nutrition Monitoring Bureau survey	To determine the socio-demographic factors, overweight/obesity, and nutrition associated with hypertension in adults living in rural areas	120 villages from every state. The research sample is 2400 respondents from each state	Cross Sectional Study	Factors causing hypertension in adults living in rural areas include smoking, alcohol use, occupation, age, intake of zinc and carbohydrates, and being overweight.
C2	(Pullabhotla & Souza, 2022)	Air pollution from agricultural fires increases hypertension risk	To determine the effect of air pollution due to agricultural fires on increasing blood pressure	784,000 respondents living in agricultural areas across India	Cross Sectional Study	The incidence of hypertension increased by 1.8% for each standard deviation increase in the number of agricultural fires observed one day before blood pressure testing. This study found that the impact of air pollution caused by fires is stronger than the factors of male smokers, individuals who have undergone blood pressure medication, and individuals belonging to socially marginalized groups.
C3	(Zhong et al., 2022)	Interaction of biomass fuels use and metals exposure on hypertension: A prospective cohort study in rural areas along the Yangtze River, China	To determine the effect of using biomass fuel and exposure to metals on increasing blood pressure in rural areas	The research sample is 2283 respondents	<i>Cohort prospective</i>	The results showed that the use of biomass fuel can interact with multi-metal exposure and affect hypertension suffered by residents living along the Yangtze River, in China. Women are more sensitive to the interaction between biomass fuel and metal exposure. In addition, the association between metal exposure and hypertension may be lower among those who switch from biomass fuels to cleaner fuels and who use ventilation.
C4	(Regea et al., 2022)	Distribution of risks and prevalence of unscreened hypertension among adults living in rural Dano District, West Shewa, Oromia, Ethiopia, 2020: Community-based cross-sectional study	To determine the prevalence of unscreened hypertension in adults living in rural areas	The research sample is 605 respondents	Cross Sectional Study	The results showed that aged 19-33 years had a family history of hypertension, had low health-seeking behavior towards hypertension, and had low knowledge about the causes, risk factors, and prevention of hypertension.
C5	(Sugiarta et al., 2020)	Biomonitoring of Acetylcholinesterase (AChE) Inhibitor and the Association with Hypertension among Farmers in Bandung, Indonesia	To determine the effect of AChE on increasing blood pressure in farmers in Bandung	The research sample is 120 respondents	<i>Cross sectional</i>	The results of the study can be concluded that exposure to pesticides can increase AChE activity so that it affects blood pressure in farmers
C6	(Rajkumar & Romate, 2020)	Behavioural Risk Factors, Hypertension Knowledge, and Hypertension in Rural India	To determine risk factors for increased blood pressure	The research sample is 263 respondents	<i>Cross sectional</i>	The results of this study concluded that factors such as the use of smokeless tobacco, alcohol consumption, physical activity, gender, education, and employment were not related to hypertension.



ID	Author	Title	Objective	Sample	Methods	Conclusion
C7	(Islam et al., 2021)	Effectiveness of a scalable group-based education and monitoring program, delivered by health workers, to improve control of hypertension in rural India: A cluster randomised controlled trial	To examine the Effectiveness of a scalable, group-based monitoring and education program, delivered by health workers, to improve hypertension control in rural India	14,500 research respondents	Casecontrol Study	Based on the combined score of knowledge and attitude items, 46% of people support physical activity programs; the proportion is higher in men than in women (53% vs 41%). After adjusting for covariates, men (odds ratio, 95% confidence interval (CI) 3.50, 1.72–7.11) were compared with women and those with the lowest schooling level (OR 3.06, 95% CI, 1 .27–7.38) compared to those without education are more likely to organize or take part in CL programs. Respondents had positive attitudes toward CL but did not feel obligated to participate in the CL program
C8	Wu et al., 2019)	Sleep quality, sleep duration, and their association with hypertension prevalence among low-income oldest-old in a rural area of China: A population-based study	To determine the relationship between sleep quality and the prevalence of increased blood pressure in rural areas	1066 research respondents	Cross-sectional	Short sleep duration and poor sleep quality are associated with the prevalence of hypertension in the elderly. Prevention of hypertension in older adults should be investigated from a sleep improvement perspective
C9	(Hatefnia et al., 2019)	Applying the theory of planned behavior to determine factors associated with physical activity by women with hypertension in rural areas of Iran	To find out the determinants of the factors that cause hypertension by using the TPB theory	215 research respondents	Cross-sectional	We recommend designing an intervention program based on these two factors for women with hypertension living in rural areas of Iran. This study shows that perception has a control for self-care behavior in patients with hypertension. This can be considered as an important barrier to planning aimed at increasing intention towards self-management. This is more important in susceptible patients, such as the elderly and women
C10	(Jafar et al., 2020)	A Community-Based Intervention for Managing Hypertension in Rural South Asia	To determine the effect of implementing Community Based Interventions in Managing Hypertension in Rural South Asia	2645 research respondents	Case control	In rural communities in Bangladesh, Pakistan, and Sri Lanka, interventions focused on home visits by government-trained public health workers and with existing public health care infrastructure led to greater reductions in blood pressure than usual care among adults with hypertension
C11	(Zeng et al., 2021)	Effects of a family dyadic partnership program for people with hypertension in a rural community: A pilot randomised controlled trial	To find out the effect of the family partnership program on hypertension sufferers in the community	44 research respondents	Case-control	The findings of this study are that there is a relationship between the cooperation of patient caregivers in families showing benefits in improving the quality of life of patients on blood pressure control, the relationship between patients and families and the psychological well-being of partner families in rural areas.



ID	Author	Title	Objective	Sample	Methods	Conclusion
						Further studies are advised to test long-term effects in a large population size is recommended.
C12	(Aristi et al., 2020)	The relationship between consumption of food high sodium and incidence of hypertension in farming workers in the working area of puskesmas panti, jember district	To determine the relationship of high sodium food consumption to the incidence of hypertension in farmers	The research sample is 11,901 respondents	Cross-sectional study	In this study, it can be concluded that the frequency of food consumption (salted fish, milk, coffee, and food seasonings) is associated with the incidence of systolic hypertension, while the habit of drinking tea is associated with the incidence of diastolic hypertension. Therefore, it is necessary to monitor blood pressure regularly and regulate the consumption of food for farm workers through non-communicable diseases (PTM) Posyandu activities every month.
C13	(Chanta keeree et al., 2022)	Factors Affecting Quality of Life among Older Adults with Hypertension in Urban and Rural Areas in Thailand: A Cross-Sectional Study	To determine the effect of QOL on the incidence of hypertension in rural areas	The research sample is 420 respondents	Cross-sectional study	According to our findings, the quality of life of older adults with hypertension in urban areas is better than in rural locations in Thailand. HPB was a predictor of QoL among older adults in both areas. Older urban adults may need extra support with health education and supervised control of some chronic diseases to improve self-care and improve their quality of life. In rural areas with less incidence of hypertension may require more knowledge about hypertension and frequent monitoring to improve self-management. It can help older adults reduce emotional distress, increase self-confidence. Confident in taking good care of their health, and having a good quality of life. Because of this, this study provides a reasonable basis that older adults with hypertension still need more health care advice and monitoring by health care providers.
C14	(Ntaganda et al., 2022)	High rates of undiagnosed and uncontrolled hypertension upon a screening campaign in rural Rwanda: a cross-sectional study	To determine the prevalence of hypertension that is not screened	The research sample is 910 respondents	Cross-sectional study	High blood pressure levels identified through a health screening campaign in this Rwanda district are surprising given the district's rural characteristics and the relatively low age of the population. These data highlight the need to implement an adequate strategy for prevention, diagnosis and control of HTN covering rural areas of



ID	Author	Title	Objective	Sample	Methods	Conclusion
						Rwanda as part of a multi-component strategy for CVD prevention
C15	(Hasan et al., 2021)	Prevalence and associated factors of hypertension in selected urban and rural areas of Dhaka, Bangladesh: findings from SHASTO baseline survey	To find out the factors that cause hypertension in urban and rural areas	4856 research respondents	Cross-sectional study	The prevalence of hypertension is higher in urban areas than in rural areas. Factors that influence include: age, level of education, physical activity
C16	(Susantol et al., 2023)	Management of Hypertension Using a Plant-Based Diet Among Farmers: Protocol for a Mixed Methods Study	To find out the development of hypertension management using a plant-based diet among farmers	263 respondents	Mix metode	The concept of Plant-Based Diet as a solution for hypertension is based on meeting nutritional needs from vegetable protein and minimizing intake from animals and processed sources. Maximized nutrient intake in PBD involves a high intake of fiber, plant protein, vitamins, polyphenols, and unsaturated fatty acids, and a low intake of sodium. Processed food in a PBD can be adapted to the culture and habits of the local community to facilitate the consumption process and maintain consistency in the implementation of the process. A PBD is expected to provide considerable benefits to overcome hypertension in farmers. Optimal nutrition and fiber in PBD will provide strong protection for organ systems in the body and will help the systems work synergistically to reduce inflammation and oxidation in the body
C17	(Muhammad et al, 2023)	Relationship of Physical Activity and Blood Pressure: Data Analysis of the Integrated Non-Communicable Diseases Development Post (Posbindu PTM) Jenggawah Public Health Center in Jember Regency at 2020	To determine the relationship between physical activity and increased blood pressure	116 respondents	Case control	This study concludes the relationship between physical activity and blood pressure in PTM Posbindu participants in the working area of the Jenggawah Health Center. With this research, it is hoped that later local health workers or cadres will be able to provide educational information, health promotion, and antihypertensive training programs that can improve the physical activity of respondents under PTM Posbindu.