

## ORIGINAL ARTICLE

# Identification of Risk Factors for the High Prevalence of Hypertension Among Farm Workers in the Agro Industry Area Jember

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## ABSTRACT

**Introduction:** The prevalence of hypertension among farmers/farm workers in Indonesia has reached 36.1%. Many studies have been conducted on hypertension's causes and risk factors in farmers/farm workers. However, each agro-industrial area has its characteristics, so it is essential to recognize these problems to find solutions. This study aims to identify problems related to risk factors that cause hypertension in agricultural workers in Jember Regency.

**Materials and methods:** This research is an observational analytical research. The target population is the agro-industrial community, especially those who work in the agromedical field, namely agricultural workers. Determining the sample size in this study used total sampling, namely 64 agricultural workers with hypertension based on medical record data at the community health center. The research instrument is a questionnaire with structured interviews. The data analysis test that will be used in this research is the chi-square test to analyze the relationship hypertension risk factors in farm workers.. The data had been collected from various risk factors that can determine the prevalence of hypertension in farm workers, such as smoking, obesity, high fat intake, excessive alcohol intake, high salt intake, and ignorance. **Results:** From the statistical test results of the six variables, only two variables had high significance values ( $\alpha < 0.05$ ). High salt intake ( $\alpha = 0.045$ ) and ignorance factor ( $\alpha = 0.027$ ) are those variables. **Conclusion:** The conclusion in this study is that the risk factors that cause the high prevalence of hypertension in farmers are factors of high sodium intake and ignorance.

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## INTRODUCTION

Basic Health Research (*Riskesmas*) results in 2018 showcases that 36.1% of Indonesian farmers/farm workers suffer from hypertension. This figure is unsurprising because, in the same year, 33.7% of hypertension occurred in rural communities where agricultural labor communities live. Other research on farm workers shows that hypertension is a non-communicable disease suffered by the majority of farmers in Indonesia (1,2).

Research on morbidity rates among farmers found that the percentage of grade 1 and 2 systolic hypertension was 25.1%, and grade 1 and 2 diastolic hypertension was 35.8%. This figure reveals a pattern of vulnerability to suffering from hypertension. Another research on farmers in the agro-industrial area of Jember Regency

found that 57 out of 100 farmers suffered from hypertension. Many things can influence this. Apart from environmental factors, hypertension can be caused by behavior that risks increasing blood pressure, such as consumption patterns, emotional stress, smoking habits, and obesity (3,4,5). The proportion of hypertension sufferers in this farmer occupational group is relatively high compared to other occupations (6,7).

Mumbulsari District is  $\pm$  20 kilometers from the government center of Jember. The landscape consists of highlands surrounded by hills, as shown on the map. Most of it is agricultural and plantation land (8). From a health perspective, this district has most farmers which is hypertension is one of the diseases suffered by society, especially farmers and agricultural workers (9).

This research set out to determine problems related to risk factors that cause hypertension in agricultural workers in Jember Regency. It is pretty reasonable; according to the contours of the Mumbulsari District area, the majority of the population's livelihood is agrarian laborers. This is proven by data from Central Statistics Agency (BPS),

declare Mumbulsari District is one of the national food provider Districts (10).

The food commonly consumed by farm workers tends to be salty with high sodium content. Increased sodium in the blood will attract intracellular fluid so that its volume increases. The heart will work harder to pump blood throughout the body even though the blood vessels have limited volume, resulting in hypertension (11,12). The results found that the frequency of consumption of foods high in sodium (biscuits, salted fish, milk and dairy products, coffee and seasonings (Monosodium glutamate) was related to the incidence of systolic hypertension, while tea consumption was associated with the incidence of diastolic hypertension (13).

The data states that an increase in the adrenaline hormone due to the nicotine content in cigarettes can stimulate growth in heart rate of 10 to 20 times per minute. As a result of the increase in heart rate, blood pressure also increases 10 to 20 times (1).

Many studies state that there is a relationship between obesity and hypertension. Someone who is obese tends to have a higher risk of developing hypertension. The presence of obesity in hypertension sufferers also determines the severity of hypertension (14,15).

A cohort study in America found the effect of fat intake on the incidence of hypertension. The study was conducted on thousands of adult and middle-aged women with normal blood pressure at the start of the study. The type of fat consumption determines the level of hypertension. A positive correlation with hypertension is shown by consumption of trans fatty acids, saturated fatty acids and monounsaturated fatty acids. Factors that trigger an increase in hypertension are strengthened if the respondent has diabetes, high BMI and hypercholesterolemia. On the other hand, polyunsaturated fatty acids did not show a significant correlation with increasing respondents' blood pressure (16).

Farm workers often suffer from disease or health problems without realizing it. The main risk of farm workers experiencing health problems is that many do not attend school or have low education. These factors are the cause of the low level of knowledge of farm workers to implement healthy lifestyle behaviors. One

of the health problems experienced by many agricultural workers is hypertension (17).



Figure 1: The Map of Geographical Landscape of Mumbulsari Subdistrict

## MATERIALS AND METHODS

### Study design and population

This research is observational analytical research. The research stages include determining the population, sample size, and data collection and analysis. The target population is the agro-industrial community, especially those who work in the agromedical field, namely agricultural workers.

### Sample and data collection

Determining the sample size in this study used total sampling, namely 64 agricultural workers with hypertension based on medical record data at the Mumbulsari health center who met the inclusion criteria. The research location was the Mumbulsari health center and several villages where the respondents lived.

### Technique for measuring data

The research instrument is a questionnaire with structured interviews. The questionnaire contains 50 questions related to socio-demographic data, family, knowledge about awareness, treatment and control of hypertension. The data analysis test that will be used in this research is the chi-square test.

### Ethical clearance and informed consent

This research has gone through a review process by the ethics team with number 1.630/H25.1.11/KE/2022. Based on this ethical review, this research is feasible to carry out. Respondents have been given an explanation

in the form of informed consent before interview was conducted.

## RESULTS

Based on Table I shows that characteristics of respondents based on their marital status, the majority are married with a percentage of 73%. As many as 16% of respondents did not know their marital status. 5% of respondents were widowed, 3% were in other categories, 2% were divorced, and 1% were single.

**Table I: Socio-demographic characteristics**

Parameter	Percentage
<b>Marital status</b>	
Single	1%
Married	73%
Divorce	2%
Widowe	5%
Others	3%
Unknown	16%
<b>Education level</b>	
Unknown	34%
Emelentary school	55%
Junior high school	5%
Senior high school	3%
Others	3%
<b>Work skills</b>	
Good	97%
Unkskills	3%
Unknown	0%
<b>Family income</b>	
< 1 million	59%
1 – 3 million	40%
> 3 million	1%

The education level of respondents is dominated by elementary school graduates (55%). 34% of respondents have never attended school. 5% of respondents have a junior high school education, 3% of respondents are high school graduates, and 3% have other education (courses, pursuing packages, etc.).

The characteristics of respondents based on their work skills, almost all respondents admitted they were skilled at work (97%). Only 3% do not know that they are skilled workers. Respondents' work skills were recognized based on expertise in the work process on agricultural land for generations.

The characteristics of respondents based on their, as many as 59% of respondents had incomes below the (Regional Minimum Wage) for Jember Regency in 2022, 2.3 million monthly rupiah. 40% of respondents have a gain of 1-3 million per month, and the rest have an income above 3 million per month (1%). Based on the

research data, there are more respondents had incomes below the 2.3 million monthly rupiah than respondents with incomes above the 2.3 million monthly rupiah.

## Statistical Analysis Test

Based on Table II, the high salt intake variable significantly correlates with the incidence of stage 1 and stage 2 hypertension with a p-value (0.045). The results of the study show that high salt intake can increase the risk of hypertension stages 1 and 2. The lower the salt intake, the smaller the risk of hypertension.

**Table II: Statistical Test of the High Salt Intake Variable**

		High Salt Intake		Total
		None	Exist	
Stage	1	19	11	30
	2	13	21	34
Total		32	32	64

The Table III states a significant correlation between the hypertension and knowledge variables 'don't know' with a p-Value (0.027). The factor of respondents' ignorance about hypertension influences the increase in the incidence of hypertension. The higher the respondent's knowledge, the higher the respondent's awareness so that the incidence of hypertension can decrease.

**Table III: Statistical Test for Don't Know Variables**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.916 <sup>a</sup>	1	.027
Continuity Correction <sup>b</sup>	3.805	1	.051
Likelihood Ratio	4.974	1	.026
Fisher's Exact Test			
Linear-by-Linear Association	4.840	1	.028
N of Valid Cases	64		

## DISCUSSION

Respondents in this study consisted of 51 women and 13 men. Data on respondent characteristics include marital status, education level, work skills, and family income. Most agricultural workers with hypertension have married partners. The relationship between marital status and hypertension is still unclear. Research found that marital status did not significantly correlate with the incidence of hypertension. By the fact that some marriages are happy, some are not. People can even get married and then divorce and find happiness in a relationship that is not tied to marriage. The number of postponed weddings has increased recently (18).

The level of education is still the main problem in educating agricultural workers regarding the prevention of hypertension. Most agricultural workers only graduated from elementary school (55%). Previous research showed that the majority of agricultural workers in Panti District had elementary school education and this resulted in a lack of knowledge in controlling

blood pressure and the food consumed every day (1). Before being given educational counselling, of the 194 respondents, 106 farm workers needed a better level of knowledge about preventing hypertension. After counselling, only 14 farm workers had poor knowledge, and the rest had good knowledge (19).

Work skills are closely related to a family's income level. It is known that income is correlated with the incidence of hypertension. So, the work skills variable indirectly influences hypertension's morbidity and mortality rates. Research at the Port of Semarang found that male gender and type of work were risk factors for hypertension (20).

Family income determines the purchasing and consumption power of a family. People with below-average incomes will need help to meet their secondary and tertiary needs. Socioeconomic Status (SES) has been proven to be related to the incidence of hypertension. As a developing country with a lower per capita income than developed countries, Indonesia still struggles to meet people's living needs. Low purchasing power means healthy food consumption patterns are less accessible to some people. A good diet determines the prevention of hypertension (21). This statement is supported by research conducted in developing countries which has proven to be experiencing an increase in the incidence of hypertension due to a lack of awareness of hypertension prevention (22).

This research collected data on various risk factors that can determine the prevalence of hypertension in farm workers, such as smoking, obesity, high fat intake, excessive alcohol intake, high salt intake, and ignorance. From the statistical test results of the six variables, only two variables had high significance values ( $\alpha < 0.05$ ). These two variables are high salt intake and the ignorance factor.

High salt intake has long been known to trigger hypertension. Salt has the property of retaining fluid, so consuming excess salt or eating salted foods can cause an increase in blood pressure (23). Farm workers tend to like savoury and salty foods. Apart from salt, the source of sodium is obtained by agricultural workers from the use of monosodium glutamate (MSG). Almost every type of farm worker's cooking in Jember adds this ingredient to enhance the taste of the food. 98 out of 100 agricultural workers routinely use MSG when cooking (14).

The ignorance factor is a variable that can be changed, so it is essential to carry out further intervention. It is because knowledge determines respondents' behavior preventing hypertension, including controlling blood pressure and managing a good diet. Most farm workers in Jember have a medium level of expertise (43.1%) (17,22). Research conducted in Ghana, hypertension sufferers were caused by respondents' ignorance regarding hypertension so that respondents did not know

that their behavior could increase the risk of developing hypertension (25).

### Research Limitations

This study did not include other variables that could be risk factors for hypertension in agricultural workers, such as the use of pesticides and duration of work. The reason for not having these two variables is the diversity of respondents. Respondents are agricultural laborers from various agricultural products such as rice, corn and tobacco growers, so pesticide use and work duration vary between respondents. Apart from that, this study also did not examine the correlation between coffee consumption and psychological stress on the prevalence of hypertension.

### CONCLUSION

The variables that correlate with hypertension in this study are high sodium intake and the respondent's ignorance factor. Farm workers tend to like savoury and salty foods. The source of sodium is obtained by agricultural workers from the use of monosodium glutamate. The ignorance factor is a variable that can be changed, most farm workers in Jember have a medium level of expertise.

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