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PHYSICAL ACTIVITIES OF WORKING COMMUNITIES DURING THE COVID-19 PANDEMIC WITH HYPERTENSION INCIDENCE IN INDRALAYA DISTRICT

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ABSTRACT

According to WHO, one in three people in the world suffers from hypertension. Riskesdas results showed that the prevalence of hypertension in Indonesia has increased to 34.1% in 2018. In Ogan Ilir Regency, there had been an increase in cases of hypertension during the COVID-19 pandemic. One important factor was physical activity. The purpose of this study aimed to determine the relationship between physical activity and the incidence of hypertension in workers. The design of this research was a quantitative study with a cross-sectional study design. The population was all workers aged over 25 years in Ogan Ilir district. The sample in this study were workers aged 25 years and lived in Indralaya, namely 100 respondents. The sampling technique was purposive sampling. Data analysis used the chi square test and multiple logistic regression risk factor models. The results of the bivariate analysis showed a relationship between physical activity variables, age, consumption of salty foods, consumption of fatty foods, central obesity, sleep quality, and stress variable with hypertension (p-value <0.05). The results of the multivariate analysis showed a significant relationship between physical activity and hypertension after controlling for the consumption of fatty foods, central obesity and sleep quality (PR 2 4.29; 95% CI: 4.68 – 125.98). Lack of physical activity was a risk factor for hypertension in workers. It was important to prevent hypertension by getting used to moderate-intensity physical activity for at least 30 minutes a day such as cleaning the house, walking, and exercising.

Keywords: worker, physical activity, hypertension

Introduction

Hypertension becomes the first cause of death in the world. It was estimated that the number of people with hypertension reached 1.5 billion people in 2025, and it was estimated that every year deaths due to complications of hypertension are 9.4 million people.[1] The prevalence of hypertension in Indonesia had increased, based on Riskesdas data, hypertension cases in Indonesia reached 25.8% in 2013, rising to 34.1% in 2018.[2]

Hypertension was a non-communicable disease, and it was most commonly experienced by the people of Ogan Ilir in 2020. Throughout 2020, hypertension cases in Ogan Ilir district reached 64,404 cases. This figure was much higher than other non-communicable diseases such as diabetes mellitus with 20,288 cases, and 829 cases of stress. The monthly trend of hypertension in Ogan Ilir Regency throughout 2020 showed that Indralaya District had a sharp increase in cases, starting from April 2020 to September 2020. The highest increase in the incidence of hypertension in Indralaya District, Ogan Ilir Regency occurred in September 2020, 1475 cases or 3 times the number of cases in August 2020.[3]

Research from Azhari showed that there was a relationship between work and the incidence of hypertension. As many as 44 (73.3%) people who worked had hypertension, and only 24 (46.2) people who did not work had hypertension.[4] Workers aged 25-29 years, they had been most affected by the COVID-19 pandemic. At least around 81.67% experienced of reduced working time, 79.76% were temporarily taking break, 68.08% were not in the labor force, and 63.07% were unemployed. This caused workers to lose or lack daily physical activity due to reduced time, holidays, or unemployment.[5]

According to previous research there was a significant relationship between physical activity with the incidence of hypertension.[6] while several studies had shown of reduced physical activity due to the COVID-19 pandemic. The COVID-19 pandemic caused a decrease in a person's level of physical activity.[7] In the research of Puccinelli et al. obtained a score of the level of physical activity carried out by a person during social distancing of 2.9 ± 1.1 or lower compared to the score of the level of physical activity before the pandemic, which was 3.5 ± 0.8. [8] People who did not work, experiencing a greater percentage of developing hypertension and people who had light physical activity that had a 1.25 times risk of developing hypertension compared to people who had moderate or heavy activity.[6] Previous research was still carried out on the population in general and was not specific to physical activity in working groups of people. This study aimed to determine the relationship between physical activity and the incidence of hypertension in people who worked during the COVID-19 pandemic in Indralaya sub-district.

Methods

This study used a cross sectional research design. The target population was all workers (formal or informal) in Indralaya District who were ≥ 25 years old. The research location was carried out in two villages that were randomly selected from 241 villages and sub-districts; Muara Penimbung Ulu and Indralaya Raya villages. Purposive sampling technique was used as a technique sampling. 100 respondents according to the inclusion criteria of respondents were workers, aged ≥ 25 years and domiciled in Indralaya District. The number of respondents in Muara Penimbung Ulu village was 49 people and in Indralaya Raya village was 51 people.

The dependent variable in this study was hypertension. The hypertension variable was measured from the respondent's blood pressure using a digital tensimeter. Blood pressure measurements were taken 2 times on the right arm and left arm with an interval of 10 minutes. The measurement results were then averaged. Respondents were categorized as hypertension if the measurement results obtained systolic blood pressure ≥ 140 mmHg and/or diastolic ≥ 90 mmHg and respondents were categorized as not hypertension if the measurement results obtained < 140/90 mmHg). Blood pressure measurements were carried out by medical personnel, namely nurses who already had a registration certificate (*STR*).

The main independent variable in this research was physical activity. Measurement of physical activity was carried out using the International Physical Activity Questionnaire (IPAQ). The physical activity variable was measured from daily activities including work, sports, and daily activities containing physical activity in the last 7 days. Respondents were categorized as having insufficient physical activity if they obtained an IPAQ score < 3000 MET-minutes/week and were categorized as having sufficient activity if they obtained an IPAQ score ≥ 3000 MET-minutes/week). Confounding variables in this study were age, gender, smoking, consumption of salty foods, consumption of fatty foods, central obesity, sleep quality and stress. Measurement of confounding variables were age, gender, smoking, consumption of salty foods, consumption of fatty foods, was carried out using a questionnaire whose validity and reliability had been tested in communities with the same characteristics as the respondent inclusion criteria, in South Indralaya sub-district. The central obesity variable was measured using a tool in the form of a metlin tape by measuring the respondent's abdominal circumference. Sleep quality variables used the Pittsburgh Sleep Quality Index (PSQI) questionnaire and stress was measured using the Dass-21 questionnaire.

The data analysis used was univariate analysis, bivariate analysis using the chi square test, and multivariate analysis was used in the terms of multiple logistic regression models of risk factors with the help of statistical software. This research was approved by the Health Research Ethics Commission, Faculty of Public Health, Sriwijaya University, within Number: 035/UN9.FKM/TU.KKE/2022.

Results

The frequency distribution of the study variables consisted of hypertension, physical activity, age, gender, smoking, consumption of salty foods, consumption of fatty foods, central obesity, sleep quality, and stress. The results of the univariate analysis of each variable were as follows:

Table 1. The Frequency Distribution of Respondents Based on Independent and Dependent Variables

Variable Dependent Variable	Frequency (n=100)	Percentage (%)
Hypertension events		
Yes	30	30
No	70	70
Independent Variable		
Physical Activity		
Not enough	38	38
Enough	62	62
Age		
Age group > 54 years	26	26
Age group 25 – 54 years	74	74
Type of work		
Farmers / Breeders	12	12
Trader	30	30
Laborer	6	6
Driver	4	4
PNS/BUMN/BUMD	15	15
Private sector employee	18	18
Songket craftsmen	15	15
Gender		
Man	40	40
Woman	60	60
Smoke		
Smoker	24	24
Ex-Smoker	16	16
Not a smoker	60	60
Consumption of Salty Foods		
≥ 1 time/day	15	15
< 1 time/day	85	85
Consuming Fatty Foods		
≥ 1 time/day	22	22
< 1 time/day	78	78
Central Obesity		
Yes	60	60
No	40	40
Sleep Quality		
Bad	46	46
Good	54	54
Stress		
Stress	7	7
Normal	93	93

Table 1 showed that the proportion of people suffering from hypertension was high, 30 (30%) people. As many as 62 (62%) people did enough physical activity. Most of the respondents were of working age (25 – 54) years as many as 74 (74%) people. Gender of women as much as 60 (60%) people. Most of the respondents were non-smokers as many as 60 (60%) people. A total of

85 and 87 (85% and 87%) people consumed salty and fatty foods < 1 time/day. As many as 60 (60%) people had central obesity. As many as 46 (46%) people experienced poor sleep quality, and as many as 7 (7%) people experienced stress.

Table 2. The Relationship Between Independent Variables and the Incidence of Hypertension in Workers in Indralaya District

Variable	Hypertension				Total		*P- Value*	PR (95% CI)
	Yes		No					
	n	%	n	%	n	%		
Physical Activity								
Not enough	25	65,8	13	34,2	38	100	<0,0001	8,15(3,41-19,49)
Enough	5	8,1	57	91,9	62	100		
Age								
Retirement age	14	53,8	12	46,2	26	100	0,005	2,49 (1,42-4,36)
Working Age	16	21,6	58	78,4	74	100		
Gender								
Man	14	35	26	65	40	100	0,504	1,31 (0,72-2,38)
Woman	16	26,7	44	73,3	60	100		
Smoke								
Smoker	6	25	18	75	24	6	0,647	0,77 (0,26-2,28)
Ex-Smoker	6	37,5	10	62,5	16	6	0,567	1,4 (0,44 – 4,43)
Not a smoker	18	30	42	70	60	18	-	Referensi
Consumption of Salty Foods								
≥ 1 time/day	13	86,7	2	13,3	15	100	<0,0001	4,33 (2,71-6,92)
< 1 time/day	17	20	68	80	85	100		
Consuming Fatty Foods								
≥ 1 time/day								
< 1 time/day	18	81,8	4	18,2	22	100	<0,0001	5,31 (3,04-9,27)
	12	15,4	66	85,6	78	100		
Central Obesity								
Yes	26	43,3	34	56,7	60	100	0,001	4,33(1,63-11,47)
No	4	10	36	90	40	100		
Sleep Quality								
Bad	22	47,8	24	52,2	46	100	0,001	3,22 (1,59-6,54)
Good	8	14,8	46	85,2	54	100		
Stress								
Stress	6	85,7	1	14,3	7	100	0,003	3,32 (2,10-5,25)
Normal	24	25,8	69	74,2	93	100		

Based on table 2, it was known that the results of bivariate analysis show that there was a relationship between physical activity (PR: 8.15; 95% CI: 3.41-19.49), age (PR: 2.49; 95% CI: 1.42-4, 36), consumption of salty foods (PR: 4.33; 95% CI: 2.71-6.92), consumption of fatty foods (PR: 5.31; 95% CI: 3.04-9.27), obesity central nervous system (PR: 4.33; 95% CI: 1.63-11.47), sleep quality (PR: 3.22; 95% CI: 1.59-6.54), and stress (PR: 3, 32; 95% CI: 2.10-5.25) on hypertension, while the variables gender and smoking were not related to the incidence of hypertension in workers.

In table 3, it was known that the results of the multivariate risk factor model analysis showed a significant relationship between physical activity variables and hypertension (p-value = <0.0001). While the consumption of fatty foods, central obesity, and sleep quality were confounding variables. Workers who had less physical activity, were at risk of developing

hypertension 24.3 times greater than workers who had sufficient physical activity after being controlled by the variables consumption of fatty foods, central obesity and sleep quality. In this study, it was believed that 95% of the general population, lack of physical activity is a risk factor for hypertension with a CI range between 4.683 – 125.986.

Table 3. Multivariate Analysis of Determinants of Compliance with Taking Antihypertensive Medications in the Work Area of Indralaya Health Center

Variable	*P- Value*	PR *Adjusteds*	95% CI	
			Lower	*Upper*
Physical Activity	<0,0001	24,289	4,683	125,986
Consuming Fatty Foods	<0,0001	27,261	4,255	174,646
Central Obesity	0,044	6,851	1,056	44,430
Sleep Quality	0,142	2,936	0,698	12,344

Discussion

The results of this study showed that one third of the respondents had high blood pressure. The results of this research supported data from the Ogan Ilir District Health Service which showed the number of hypertension cases increased during the COVID-19 pandemic. At the beginning of 2020, before COVID-19 entered Indralaya, hypertension cases in Indralaya District were 500 cases as of January 2020. However, after COVID-19 entered Indralaya District since May 2020, hypertension cases in Indralaya experienced an increase to 1500 cases as of September 2020.

There is a significant relationship between physical activity and the incidence of hypertension. Workers who were not physically active are 8 times more likely to experience hypertension than workers who were physically active or have sufficient physical activity. This was in line with previous research which stated that there was a significant relationship between physical activity and hypertension.[6,9,10,11,12] Further multivariate analysis obtained the same results. There was a relationship between physical activity and the incidence of hypertension after being controlled by the variables consumption of fatty foods, central obesity and sleep quality (p-value = 0.000). Workers with less physical activity are 24.3 times were more likely to experience hypertension than workers with sufficient physical activity after being controlled by the variables of fatty food consumption, central obesity and sleep quality (workers with low physical activity) 95% CI: 4.683-125.986). This was in line with the results of previous research which stated that people who did not do physical activity were 1.98 times more likely to experience hypertension.[6]

More than a third of respondents had less physical activity. During the COVID-19 pandemic, there were many restrictions on community activities which were the result of the large-scale social restriction (PSBB) policy in accelerating the handling of COVID-19.[11] The level of physical activity carried out during social distancing (2.9 ± 1.1) was lower than before the pandemic (3,5 ± 0,8, p <0,001).[8] The COVID-19 pandemic caused a decrease in a person's level of physical activity.[7] According to previous research, a sedentary lifestyle increased high blood pressure (p =

0.032; OR = 4.9; 95% CI 1.29-18.26).[12] Groups of people with less physical activity experienced the highest risk of blood pressure (p = 0.035; OR = 4.7; 95% CI 1.12-1967).[9] A study on hypertensive patients showed that physical activity could help lower blood pressure. Physical activity such as aerobics with moderate to high intensity could lower the patient's blood pressure by an average of 11/5 mmHg.[13] Although the forms of physical exercise performed vary, studies had shown that there was a sufficient effect in helping to lower the blood pressure of a hypertensive patient.[14]

According to further analysis on multivariate, it was found that central obesity was a confounding relationship between physical activity and hypertension in workers. Workers with central obesity had 6.882 times the risk of developing hypertension compared to workers who were not centrally obese (95% CI: 2.174 – 21.786). This research was in line with previous research which stated the relationship between central obesity and hypertension.[6,15,16,17,18] One of the factors that causes obesity was the consumption of high-fat foods. Individuals who consumed foods high in fat were at risk of increasing body mass index and waist circumference, as well as waist-to-hip ratio.[19]

Fatty foods triggerred excess cholesterol in the blood which increased blood volume and caused high blood pressure. Based on bivariate analysis, there was a relationship between fatty food intake and workers' high blood pressure (p-value = 0.000). Workers who ate fatty foods once a day were 24.7 times more likely to develop hypertension than workers who ate fatty foods less than once a day (95% CI: 7.121 –86.027). According to the Indonesian Ministry of Health's guidelines, consumption of fatty foods should be between 20 – 25% of total daily energy or the equivalent of 5 tablespoons of oil (67 gr)/person/day.[20]

Based on the bivariate analysis conducted, there was a significant relationship between sleep quality and the development of hypertension in workers (p-value = 0.001). Workers with poor sleep quality had a 5.3 times risk of suffering from hypertension compared to workers with poor sleep quality (95% CI: 2.043 – 13.599). Sleep quality was related to the incidence of hypertension (p-value = 0.000), C = 0.674.[21] This research was also in line with previous research, the result showed that there was a significant relationship between the quality of sleep patterns and hypertension (p-value = 0.000) with OR (95% CI) = 12.46 (2.52 – 61.48).[22] This was because poor sleep quality can increase sympathetic nervous system activity, physical stress and psychosocial stress. As a result, heart rate increased, salt was retained, and getting high blood pressure. People had low quality sleep and lack of sleep, could affect the body's circadian rhythm, causing blood pressure rise.[23]

Sleep quality was one of the factors that influenced the relationship between physical activity and hypertension. According to previous research, people who had sleep disorders and short sleep times had twice the risk of developing hypertension compared to people who had enough sleep and

did not experience sleep disorders.[24] In addition, people had low sleep quality and sleep deprivation affected the body's circadian rhythm, thereby increasing blood pressure.[23] In the working group, it was known that high work tension and low levels of physical activity were related to poor sleep quality. There was a fairly large difference in sleep quality between workers with upper and lower status.[25]

Conclusion

Based on the research result that has been carried out, it was concluded that there was a relationship between physical activity, age, consumption of salty foods, consumption of fatty foods, central obesity, sleep quality and stress on hypertension. Workers who had less physical activity were at risk of developing hypertension 24.3 times greater than workers who had sufficient physical activity after being controlled by the variables consumption of fatty foods, central obesity and sleep quality. Workers and the public further increased productivity through moderate intensity physical activity such as gymnastics, getting used to walk when traveling near home. Moderate intensity physical activity of at least 150 minutes for 5 days/week to prevent non-communicable diseases. People with central obesity should spend time during the week for physical activity in the form of jogging, planks, sit ups, skipping or cycling. For companies or agencies where working, people should make exercise mandatory every week. As well as holding heavy intensity physical activities such as volleyball, badminton, basketball, futsal or cycling in the work environment. For the elderly, suitable physical activity was light and moderate physical activity. Light physical activity such as walking, cleaning the house and driving. Meanwhile, moderate physical activity such as gymnastics, cycling and gardening.

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Conflict of Interest

There was no conflict of interest in this research.

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