

## The effect of worker behavior and physical workload on work productivity through blood pressure of workers at PT Maruki International Indonesia

 Feiby Bidiastuti<sup>1\*</sup>,  Atjo Wahyu<sup>2</sup>, Syamsiar S. Russeng<sup>3</sup>,  Yahya Thamrin<sup>4</sup>, Ummu Salmah<sup>5</sup>

<sup>1,2,3,4</sup>Department of Occupational Health and Safety, Faculty of Public Health, Hasanuddin University, Makassar, Indonesia; feibybidiastuti902@gmail.com (F.B.).

<sup>5</sup>Department of Biostatistics/KKB, Faculty of Public Health, Hasanuddin University, Makassar, Indonesia.

**Abstract:** This study examines how physical workload, smoking, and coffee intake affect blood pressure and employee productivity. A quantitative research approach was employed, with data obtained from 147 respondents using questionnaires and blood pressure assessments. The results of the analysis showed that physical workload had a significant positive effect on systolic blood pressure ( $p=0.001$ ;  $\beta=0.264$ ) and a significant negative effect on work productivity ( $p=0.003$ ;  $\beta=-0.166$ ), but not significantly on diastolic blood pressure ( $p=0.082$ ). Smoking behavior had a significant positive effect on systolic blood pressure ( $p=0.020$ ;  $\beta=0.191$ ) and diastolic blood pressure ( $p=0.001$ ;  $\beta=0.249$ ), but not significantly on work productivity ( $p=0.092$ ). Coffee drinking behavior showed a significant positive effect on systolic blood pressure ( $p=0.037$ ;  $\beta=0.186$ ) and diastolic blood pressure ( $p=0.014$ ;  $\beta=0.239$ ), and through blood pressure had a significant effect on work productivity. In addition, systolic ( $p=0.037$ ;  $\beta=-0.212$ ) and diastolic ( $p=0.000$ ;  $\beta=-0.372$ ) blood pressure had significant negative effects on work productivity. These findings emphasize the need to manage workload and caffeine intake to support heart health and productivity. The management of PT Maruki International Indonesia should regulate physical workload as well as employees' smoking and coffee consumption habits through workplace health policies to maintain healthy blood pressure and improve work productivity.

**Keywords:** Blood pressure, Industrial workers, Physical workload, Work productivity, Worker behavior.

### 1. Introduction

In the era of globalization, productivity is a key indicator in determining industrial competitiveness. A healthy and efficient workforce is a crucial factor in increasing sustainable economic growth [1]. ILO data shows that more than 2.78 million deaths and 374 million cases of work-related injuries and diseases occur annually, impacting work absences and ultimately reducing productivity [2]. One global health problem that impacts productivity is hypertension. WHO notes that hypertension affects 1 billion people and causes more than 10 million deaths per year, with a global prevalence of around 22% and an expected increase to 29% by 2025 [3].

In Indonesia, hypertension remains a major public health challenge. Data from the 2023 Basic Health Research and Indonesian Health Survey (Riskesdas and SKI) show that the prevalence of hypertension among people aged 18 years and older reached 30.8%. By age group, the prevalence in the 18–59 age group was 26%, while in the 60–60 age group, the prevalence was much higher, at 56.8% [4]. These figures confirm that hypertension is not only a problem for the elderly but is also increasingly affecting adults of productive age.

Many factors contribute to the risk of hypertension, including age, gender, family history, obesity, stress, smoking, and food and beverage consumption patterns. Some consumption patterns associated with high blood pressure include excessive salt intake, high-fat foods, and coffee consumption [5].

Coffee, the second most popular beverage in the world after water, contains caffeine, which can trigger high blood pressure. Caffeine consumption has been reported to increase systolic blood pressure by 3–14 mmHg and diastolic blood pressure by 4–13 mmHg [6].

Smoking habits are also a significant factor. The WHO states that Indonesia ranks third in the world for the number of smokers after China and India. In 2010, the prevalence of smoking in Indonesia reached 34.7%, up from 20% in 1995. Smoking has been shown to increase the risk of hypertension and cardiovascular disease. Prospective studies show that over an average follow-up of 2.9 years, 13.6% of active smokers developed hypertension compared to 8.3% of non-smokers [7]. The addictive effect of nicotine strengthens dependence, thereby increasing the risk of hypertension in early adulthood [8].

In addition to smoking and coffee consumption, physical activity also affects blood pressure and performance. A high workload increases energy and oxygen requirements, forcing the heart to work harder and resulting in increased blood pressure [9]. Empirical findings show a significant relationship between workload intensity and the incidence of hypertension ( $p = 0.019$ ), while also demonstrating its detrimental impact on workforce productivity [10]. Decreased performance due to these health problems can ultimately weaken a company's competitiveness amidst increasingly fierce global competition [11]. Based on this background, this study aims to analyze how worker behavior and physical workload levels influence productivity through blood pressure as a mediating variable, using a case study of employees at PT Maruki International Indonesia.

### *1.1. Participants and Methods*

This study uses the ethical clearance issued by the Faculty of Public Health Universitas Hasanuddin with Number 876 UN4.14.1 TP.01.02 2025 as the basis for conducting the research and its publication. This type of research is quantitative with a cross-sectional design conducted at PT Maruki International Indonesia, South Sulawesi, in June–July 2025. The study population consisted of all 232 workers, with the sample determined using the Slovin formula at a 5% error level, resulting in 147 respondents. The sampling technique used was systematic random sampling with intervals of 2, with inclusion criteria of active male workers and exclusion of workers who were sick or on leave. The research instruments included a respondent identity form, a Glover-Nilsson smoking behavior questionnaire (GN-SBQ) with 11 questions, a coffee drinking habits questionnaire with 13 Likert scale questions, a work productivity questionnaire with 12 Likert scale questions, as well as blood pressure measurements using a digital tensiometer and physical workload assessment using an oximeter with %CVL calculations. The validity test results of all instruments showed a calculated  $r$  value of  $> 0.361$ , while the reliability test produced a Cronbach's Alpha of 0.991 for the smoking questionnaire, 0.759 for coffee drinking, and 0.944 for work productivity, indicating that all instruments were valid and reliable. Data analysis was conducted using SPSS 26 for univariate and bivariate analysis, as well as SmartPLS 4 for multivariate analysis, since the data were not normally distributed ( $p > 0.05$ ). The analysis aimed to examine both the direct and indirect effects of smoking behavior variables, coffee drinking habits, and physical workload on work productivity, with blood pressure as a mediator.

## 2. Findings

### 2.1. Univariate Analysis

**Table 1.**

Distribution of Characteristics and Research Variables of Respondents at PT Maruki International Indonesia.

Variables	Category	Frequency (n)	Percentage (%)
Age (years)	17–25	1	0.4
	26–35	13	4.9
	36–45	54	20.1
	46–55	66	24.6
	56–65	13	4.9
Gender	Man	147	100.0
	Woman	0	0.0
Education	Elementary School	2	1.4
	JUNIOR HIGH SCHOOL	3	2.0
	High School/Vocational School	123	83.7
	D3	10	6.8
	S1	9	6.1
Physical Workload	Heavy	53	36.1
	Light	94	63.9
Smoking Behavior	Heavy	54	36.7
	Currently	12	8.2
	Light	8	5.4
Coffee Drinking Behavior	Do not smoke	73	49.7
	Tall	54	36.7
	Currently	46	31.3
	Low	47	32.0
Systolic Blood Pressure (Before work)	Normal	95	64.6
	Abnormal	52	35.4
Diastolic Blood Pressure (Before work)	Normal	113	76.9
	Abnormal	34	23.1
Systolic Blood Pressure (After work)	Normal	65	44.2
	Abnormal	82	55.8
Diastolic Blood Pressure (After work)	Normal	67	45.6
	Abnormal	80	54.4
Work Productivity	Good	86	58.5
	Not enough	61	41.5

The majority of respondents were men of productive age with a high school or vocational high school education and a light physical workload. Although most reported good work productivity (58.5%), the results showed a relatively high proportion of workers with abnormal blood pressure after work, potentially influenced by smoking and coffee drinking habits.

### 2.2. Bivariate Analysis

**Table 2.**

Cross-tabulation of physical workload on work productivity.

Workload Physique	Productivity				Total		<i>P-value</i>
	Not enough		Good				
	n	%	n	%	n	%	
Heavy	36	67.9	17	32.1	53	100.0	0.000
Light	25	26.6	69	73.4	94	100.0	
Total	61		86		147		

The cross-tabulation shows a significant relationship between physical workload and work productivity, with a p-value of 0.000. Employees with heavy workloads tend to have lower productivity at 67.9%, while those with light workloads mostly have good productivity at 73.4%.

**Table 3.**

Cross-tabulation of physical workload on systolic and diastolic blood pressure.

Workload physique	Systolic Blood Pressure				Total		P- value	Diastolic Blood Pressure				Total		P-Value
	Abnormal		Normal					Abnormal		Normal				
	n	%	n	%	n	%		n	%	n	%	n	%	
Heavy	42	79.2	11	20.8	53	100.0	0.000	40	75.5	13	24.5	53	100.0	0.000
Light	40	42.6	54	57.4	94	100.0		40	42.6	54	57.4	94	100.0	
Total	82	55.8	65	44.2	147			80	54.4	67	67	147		

The cross-tabulation indicates a significant relationship between physical workload and both systolic and diastolic blood pressure, with p-values of 0.000. Employees with heavy workloads mostly experience abnormal systolic (79.2%) and diastolic (75.5%) blood pressure, whereas those with light workloads are more likely to have normal systolic (57.4%) and diastolic (57.4%) blood pressure.

**Table 4.**

Cross-tabulation of smoking behavior on work productivity.

Behavior Smoke	Productivity Work				Total		<i>P-value</i>
	Not enough		Good				
	n	%	n	%	n	%	
Heavy	41	75.9	13	24.1	54	100.0	0.000
Currently	3	25.0	9	75.0	12	100.0	
Light	3	37.5	5	62.5	8	100.0	
No Smoker	14	19.2	59	80.0	73	100.0	
Total	61	41.5	86	45.6	147	100.0	

The cross-tabulation shows a significant relationship between smoking behavior and work productivity, with a p-value of 0.000. Employees who smoke heavily tend to have low productivity (75.9%), while non-smokers predominantly demonstrate good productivity (80.0%).

**Table 5.**

Cross-tabulation of smoking behavior on systolic and diastolic blood pressure.

Workload physique	Systolic Blood Pressure				Total		P-Value	Diastolic Blood Pressure				Total		P-Value
	Abnormal		Normal					Abnormal		Normal				
	N	%	n	%	n	%		n	%	n	%	n	%	
Heavy	44	81.5	10	18.5	54	100.0	0.000	44	81.5	10	18.5	54	100.0	0.001
Currently	7	58.3	5	41.7	12	100.0		6	50.0	6	50.0	12	100.0	
Light	4	50.0	4	50.0	8	100.0		4	50.0	4	50.0	8	100.0	
No smokers	27	37.0	46	63.0	73	100.0		26	35.6	47	64.4	73	100.0	
Total	82	55.8	65	44.2	147	100.0		80	54.4	67	45.6	147	100.0	

The cross-tabulation reveals a significant association between smoking behavior and both systolic and diastolic blood pressure, with p-values of 0.000 and 0.001, respectively. Heavy smokers are mostly found to have abnormal systolic (81.5%) and diastolic (81.5%) blood pressure, whereas non-smokers are more likely to have normal systolic (63.0%) and diastolic (64.4%) blood pressure.

**Table 6.**  
Cross-Tabulation of Coffee Drinking Behavior on Work Productivity.

Behavior Drinking coffee	Productivity Work				Total		<i>P-value</i>
	Not enough		Good				
	n	%	n	%	n	%	
Tall	35	64.8	19	35.2	54	100.0	0.000
Currently	18	39.1	28	60.9	46	100.0	
Low	8	17.0	39	83.0	47	100.0	
Total	61	41.5	86	58.5	147	100.0	

The analysis highlights that coffee consumption patterns are closely linked to work productivity, with the statistical test yielding a p-value of 0.000. Workers who drink large amounts of coffee are predominantly in the low productivity group (64.8%), while those with minimal coffee intake have the highest proportion of good productivity (83.0%).

**Table 7.**  
Cross-Tabulation of Coffee Drinking Behavior, Systolic and Diastolic Blood Pressure.

Cross-Tabulation of Coffee Drinking Behavior, Systolic and Diastolic Blood Pressure.														
Behavior Drinking coffee	Systolic Blood Pressure				Total		<i>P-value</i>	Diastolic Blood Pressure				Total		<i>P-Value</i>
	Abnormal		Normal					Abnormal		Normal				
	n	%	n	%	n	%		n	%	n	%	n	%	
Tall	38	70.4	16	29.6	54	100.0	0.000	37	68.5	17	31.5	54	100.0	0.000
Currently	30	65.2	16	34.8	46	100.0		28	60.9	18	39.1	46	100.0	
Low	14	29.8	33	70.2	47	100.0		15	31.9	32	68.1	47	100.0	
Total	82	55.8	65	44.2	147	100.0		80	54.4	67	45.6	147	100.0	

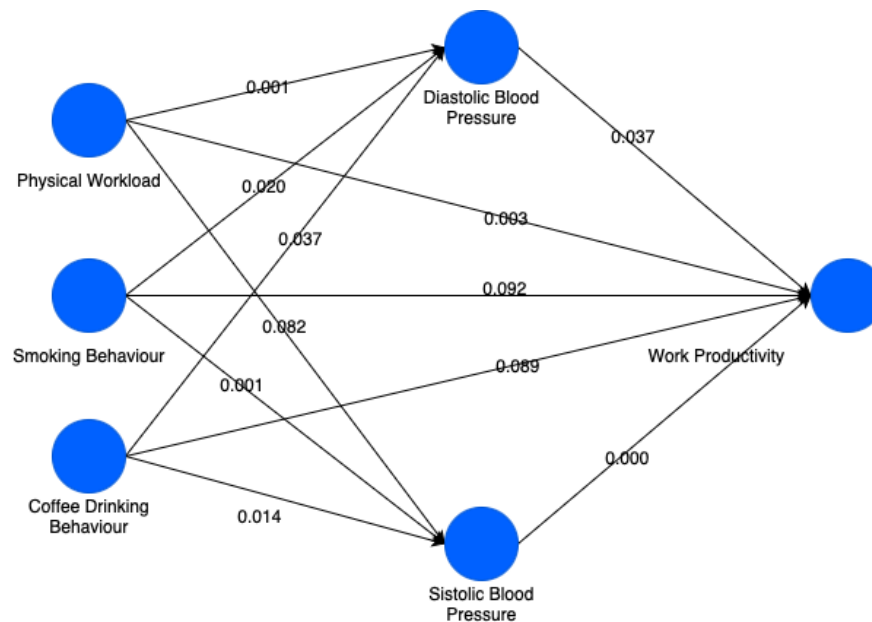
The results demonstrate a strong association between coffee drinking behavior and both systolic and diastolic blood pressure, with p-values of 0.000 for each. Individuals who consume large amounts of coffee show the highest prevalence of abnormal systolic (70.4%) and diastolic (68.5%) blood pressure, while those with low coffee intake are more likely to maintain normal systolic (70.2%) and diastolic (68.1%) levels.

**Table 8.**  
Cross-Tabulation of Systolic and Diastolic Blood Pressure on Work Productivity.

Systolic Blood Pressure	Productivity Work				Total		<i>P-value</i>
	Not enough		Good				
	n	%	n	%	n	%	
Abnormal	56	68.3	26	31.7	82	100.0	0.000
Normal	5	7.7	60	92.3	65	100.0	
Total	61	41.5	86	58.5	147		
Diastolic Blood Pressure							
Abnormal	56	70.0	24	30.0	80	100.0	0.000
Normal	5	7.5	62	92.5	67	100.0	
Total	61	41.5	86	58.5	147		

Cross-tabulation showed that workers with abnormal systolic and diastolic blood pressure were more likely to have low work productivity than those with normal blood pressure. A p-value of 0.000 confirmed a significant relationship between blood pressure and work productivity.

### 2.3. Multivariate Analysis



**Figure 1.**  
Path Analysis.

There are seven hypotheses that can be investigated regarding the direct effect. The following table presents the results of the analysis of the direct effect between variables.

**Table 6.**  
Results of the Direct Influence Hypothesis Analysis.

Hypothesis	T Statistics	p Values
Physical workload -> Work productivity	2,986	<b>0.003</b>
Physical workload -> Systolic blood pressure	3,210	<b>0.001</b>
Physical workload -> diastolic blood pressure	1,740	<b>0.082</b>
Smoking behavior -> Work productivity	1,688	<b>0.092</b>
Smoking behavior-> Systolic blood pressure	2,329	<b>0.020</b>
Smoking behavior -> Diastolic blood pressure	3,285	<b>0.001</b>
Coffee drinking behavior -> Work productivity	1,704	<b>0.089</b>
Coffee drinking behavior -> Systolic blood pressure	2,088	<b>0.037</b>
Coffee drinking behavior -> Diastolic blood pressure	2,460	<b>0.014</b>
Systolic blood pressure -> Work productivity	2,094	<b>0.037</b>
Diastolic blood pressure -> Work productivity	3,734	<b>0,000</b>

**Note:** \* p-value < 0.05: There is a significant effect.

Table 6 shows that physical workload significantly increases systolic blood pressure ( $p=0.001$ ;  $\beta=0.264$ ) and decreases productivity ( $p=0.003$ ;  $\beta=-0.166$ ), while smoking and drinking coffee significantly increase systolic and diastolic blood pressure but have no effect on productivity. Systolic ( $p=0.037$ ;  $\beta=-0.212$ ) and diastolic ( $p=0.000$ ;  $\beta=-0.372$ ) blood pressure are proven to decrease worker productivity at PT. Maruki International Indonesia.

**Table 7.**  
Indirect Effect Hypothesis Testing.

Hypothesis	T Statistics	p Values
Physical workload -> Systolic blood pressure -> Work productivity	1,881	0.061
Smoking behavior -> Systolic blood pressure -> Work productivity	1,509	0.132
Coffee drinking behavior -> Systolic blood pressure -> Work productivity	1,502	0.134
Physical workload -> Diastolic blood pressure -> Work productivity	1,466	0.143
Smoking behavior -> Diastolic blood pressure -> Work productivity	2,461	0.014
Coffee drinking behavior -> Diastolic blood pressure -> Work productivity	2,016	0.044

Note: \* p-value < 0.05: There is a significant effect.

Table 7 shows that blood pressure only significantly mediates the effect of coffee drinking behavior on work productivity, both through systolic ( $p=0.014$ ) and diastolic ( $p=0.044$ ). The indirect effect of physical workload and smoking behavior through blood pressure is not significant ( $p>0.05$ ).

### 3. Discussion

#### 3.1. Physical Workload on Work Productivity, Diastolic and Systolic Blood Pressure

The results of the study demonstrated that physical workload significantly affects work productivity, with a p-value of 0.003 and a coefficient of -0.166. This indicates that increased physical workload correlates with decreased worker productivity. Among the 147 respondents, 61 individuals (41.5%) exhibited low productivity, with 36 (67.9%) experiencing a heavy physical workload. Conversely, of the 86 respondents (58.5%) with good productivity, 69 (73.4%) reported a light workload. This underscores the importance of balancing physical workload with individual capacity to maintain efficiency, prevent fatigue, and optimize productivity. Additionally, physical workload significantly impacts systolic blood pressure (p-value 0.001, coefficient 0.264), whereas its effect on diastolic blood pressure was not statistically significant (p-value 0.082, coefficient 0.154). Of the 82 individuals (55.8%) with abnormal systolic blood pressure, 42 (79.2%) experienced a heavy physical workload. Similarly, among the 80 individuals (54.4%) with abnormal diastolic blood pressure, 40 (75.5%) reported a heavy workload. These findings suggest that heavy physical workloads tend to increase the risk of high blood pressure, particularly systolic blood pressure. Therefore, companies should regulate work duration, implement task rotation, and ensure adequate recovery time to prevent fatigue and cardiovascular disorders.

#### 3.2. Smoking Behavior on Work Productivity, Diastolic and Systolic Blood Pressure

The results showed that smoking behavior did not significantly affect work productivity, with a p-value of 0.092 and a coefficient of -0.110, although there was a negative trend. Of the 147 respondents, 61 people (41.5%) had low productivity, of which 41 people (75.9%) were heavy smokers, while 86 people (58.5%) had good productivity, with most being non-smokers or light to moderate smokers. This indicates that other factors, such as skills, motivation, and work environment, are more dominant in determining short-term work productivity, while the impact of heavy smoking is more likely to be observed in the long term. On the other hand, smoking behavior significantly affected blood pressure, both systolic and diastolic. Of the 82 people (55.8%) who had abnormal systolic blood pressure, 44 people (81.5%) were heavy smokers, while of the 80 people (54.4%) with abnormal diastolic blood pressure, 44 people (81.5%) were also heavy smokers. In contrast, the majority of nonsmokers had normal blood pressure (63.0% systolic, 64.4% diastolic). These results suggest that heavier smoking habits increase the risk of hypertension, which can potentially elevate the long-term risk of cardiovascular disease.

#### 3.3. The Effect of Coffee Drinking Behavior on Work Productivity, Diastolic and Systolic Blood Pressure

The results indicated that coffee drinking behavior did not significantly influence work productivity ( $p = 0.089 > 0.05$ ; coefficient = -0.129). Although respondents with high coffee consumption tended to

have lower productivity, the difference was not statistically significant. Among the 147 respondents, 61 individuals (41.5%) exhibited low productivity, with 64.8% of them engaging in high coffee drinking behavior. Conversely, in the group with good productivity (58.5%), the majority (83.0%) had low coffee consumption.

Coffee drinking behavior significantly influences systolic blood pressure ( $p = 0.037$ ; coefficient = 0.186). Of the 147 respondents, 55.8% had abnormal systolic blood pressure, with high coffee consumption being more prevalent (70.4%), while low consumption was more common among respondents with normal blood pressure (70.2%). These results align with Warni et al. [12], who found that coffee consumption increased the risk of hypertension (OR = 5.917). The biological mechanism involves caffeine, which can elevate blood pressure at high doses [13]. These findings underscore the importance of limiting excessive coffee intake and educating workers to prevent cardiovascular risks.

Coffee consumption also significantly affected diastolic blood pressure ( $p = 0.014$ ; coefficient = 0.239). Fifty-four percent of respondents had abnormal diastolic blood pressure, predominantly those with high coffee consumption (68.5%), while low consumption was more common in normal respondents (68.1%). These findings suggest that high coffee consumption increases the risk of diastolic hypertension, although previous research has shown conflicting results [14]. Caffeine is known to cause vasoconstriction through adenosine inhibition and increased cortisol. It is recommended to limit coffee consumption to two cups per day, with support from health education from the company to prevent long-term effects.

### 3.4. The Effect of Diastolic and Systolic Blood Pressure on Work Productivity

The results of the study showed that systolic blood pressure had a significant effect on work productivity, with a  $p$ -value of 0.037 ( $< 0.05$ ) and a coefficient of -0.212, indicating that higher systolic blood pressure is associated with lower work productivity. Cross tabulation showed that of the 61 respondents with low productivity, 56 people (75.5%) had abnormal systolic blood pressure, while of the 86 respondents with good productivity, 60 people (92.3%) had normal systolic blood pressure. This finding aligns with the research of Marocolo et al. [15], which confirmed an increased risk of hypertension in workers with long working hours and its association with decreased performance.

This condition indicates that systolic blood pressure is an important indicator in determining employee work capacity. Hypertension can trigger fatigue, stress, and impaired concentration, leading to decreased productivity. Conversely, controlling blood pressure through a healthy lifestyle, exercise, and reducing risk factors such as smoking has been shown to support better work performance. Therefore, companies are advised to provide occupational health programs focused on hypertension prevention, including stress management, exercise facilities, and flexible work hour policies to maintain optimal employee health and productivity.

### 3.5. Physical Workload on Productivity Through Diastolic and Systolic Blood Pressure

The analysis results show that the role of systolic blood pressure in mediating the effect of physical workload on work productivity is not significant, with a  $p$ -value of 0.061 ( $> 0.05$ ). This indicates that physical workload does not influence work productivity through systolic blood pressure. However, various previous studies Öhlin et al. [16] have demonstrated that high physical workload can lead to increased blood pressure and reduced productivity through an elevated risk of hypertension, absenteeism, and decreased work capacity. Therefore, these findings suggest that, within the context of this study, systolic blood pressure is not the primary mediating pathway linking physical workload and work productivity.

Meanwhile, diastolic blood pressure was also shown to play no significant role as a mediator, with the analysis showing a  $p$ -value of 0.132 ( $> 0.05$ ). Physiologically, increases in blood pressure due to physical activity are more dominant in the systolic component than the diastolic component [17], so this insignificance can be explained by the different nature of the body's response. Based on these results, physical workload does not affect work productivity through diastolic blood pressure. This



finding strengthens the hypothesis that other factors beyond blood pressure, such as work stress, physical fitness, and quality of rest, are more decisive in explaining the relationship between physical workload and worker productivity.

### *3.6. The Effect of Smoking Behavior on Productivity Through Diastolic and Systolic Blood Pressure*

The results of the study indicated that smoking behavior did not significantly influence work productivity through systolic blood pressure, with a p-value of 0.134 ( $>0.05$ ). This suggests that systolic blood pressure does not serve as a mediating variable in the relationship between smoking and work productivity. This finding contrasts with the common assumption that smoking can increase blood pressure and is associated with hypertension. Additionally, the study found that smoking behavior did not significantly influence work productivity through diastolic blood pressure, with a p-value of 0.143 ( $>0.05$ ). Although another study by Bujawati et al. [18] showed a positive correlation between diastolic blood pressure and smoking duration, this variable was not proven to be a significant mediator in this study.

Overall, neither systolic nor diastolic blood pressure played a significant role in mediating the effect of smoking on work productivity ( $p=0.134$  and  $p=0.143$ , respectively). This suggests that smoking may affect productivity through factors other than blood pressure, such as decreased lung function, increased absenteeism due to illness, or impaired concentration due to nicotine dependence. Thus, although this study did not find a significant relationship through blood pressure mechanisms, smoking remains a major risk factor that can reduce worker productivity in the long term. The practical implication is the importance of strengthening the implementation of Smoke-Free Area (KTR) in the workplace as well as providing programs to quit smoking, so that cardiovascular health and workforce productivity can be maintained.

### *3.7. The Effect of Coffee Drinking Behavior on Productivity Through Diastolic and Systolic Blood Pressure*

This study shows that coffee drinking behavior does not directly affect work productivity but rather indirectly through changes in systolic and diastolic blood pressure. Statistical analysis proved that systolic blood pressure plays a significant role as a mediator, with a p-value of 0.014 ( $<0.05$ ), while diastolic blood pressure also showed a significant mediating effect with a p-value of 0.044 ( $<0.05$ ). This means that coffee consumption can increase blood pressure, which ultimately affects workers' productivity. Although coffee is often considered an energy and concentration booster, the physiological impact of increased blood pressure can reduce the body's capacity to maintain focus, endurance, and work effectiveness. This finding is consistent with previous research [19], which confirmed that caffeine contributes to increased blood pressure through sympathetic nerve stimulation. Thus, productivity is not directly affected by coffee consumption but is mediated by changes in blood pressure, especially systolic and diastolic pressure. The practical implication is that coffee consumption should be maintained within moderate limits (200–300 mg of caffeine per day) so that its benefits can still be felt without increasing the risk of cardiovascular disorders that can reduce work productivity.

## **4. Conclusion**

Based on the research results, it can be concluded that physical workload, smoking behavior, and coffee drinking behavior have different relationships with blood pressure and work productivity. Physical workload has been shown to increase systolic blood pressure and decrease productivity, while smoking and coffee drinking behaviors tend to increase both systolic and diastolic blood pressure but have no direct effect on productivity. Blood pressure, both systolic and diastolic, has been shown to negatively affect productivity and is therefore an important variable in maintaining worker performance. Additionally, the role of blood pressure as a mediating variable is only significant in the relationship between coffee drinking behavior and productivity, whereas the relationship between physical workload and smoking is not mediated by blood pressure. The implications of these findings suggest that companies need to balance physical workload, control smoking behavior and excessive coffee

consumption, and conduct regular health monitoring to maintain stable worker blood pressure, so that work productivity can be maintained and the welfare of the workforce at PT. Maruki Internasional Indonesia can continue to improve.

### Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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