

Job Stress Is More Risky Causing Hypertension Compared to Smoking Habits in Private Workers in Cilacap, Indonesia

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Abstract

Hypertension is a rise systolic blood pressure above 140 mmHg and/or diastolic blood pressure above 90 mmHg. Hypertension is cause of cardiovascular morbidity mortality. In 2019, one billion people aged 30-79 with hypertension live in low-middle-income nations. Internal variables such heredity, age, race, stress, and gender create hypertension, whereas external ones such obesity, smoking habits, alcohol habits, and lack exercise cause hypertension. The study's goal was investigated which is more at risk of causing the incidence of hypertension events between job stress or smoking habits among employees in Cilacap Indonesia. The study used an observational analytic cross-sectional design with primary data. Male machine operator who works at PT. Hasta Cipta Karya aged 18 to 64 years old were included as a subject study. Purposive sampling was utilized with total 92 respondents. The survey discovered 49 (53.3%) severe stress, 55 (59.8%) smokers, and 57 (62.0%) hypertension Chi-square test results, correlation between job stress and hypertension $p < 0.05$, between the smoking habit and hypertension $p < 0.05$. The findings of the logistic regression test, job stress has an OR of 9.04 which is higher than smoking habits has an OR of 4.81. The conclusion, job stress is more at risk of causing hypertension than smoking habits.

Keyword: Job stress, Smoking Habit, Hypertension

Abstrak

Hipertensi adalah keadaan meningkatnya tekanan darah sistolik di atas 140 mmHg dan/atau tekanan darah diastolik di atas 90 mmHg. Hipertensi merupakan faktor risiko utama morbiditas dan mortalitas kardiovaskular. Pada 2019, lebih dari satu miliar orang dewasa berusia 30-79 tahun dengan hipertensi tinggal di negara berpenghasilan menengah ke bawah. Faktor internal seperti keturunan, usia, ras, stres, dan jenis kelamin menyebabkan hipertensi, sedangkan faktor eksternal seperti obesitas, kebiasaan merokok, kebiasaan alkohol, dan kurang olahraga menyebabkan hipertensi. Penelitian ini bertujuan untuk mengetahui manakah yang lebih berisiko menyebabkan kejadian hipertensi antara stres kerja dengan kebiasaan merokok pada karyawan di Cilacap Indonesia. Penelitian ini menggunakan desain observasional analitik cross-sectional dengan data primer. Operator mesin pria yang bekerja di PT. Hasta Cipta Karya berusia 18 hingga 64 tahun diikutsertakan menjadi subyek penelitian. Purposive sampling digunakan dengan total 92 responden. Hasil survei menemukan 49 (53,3%) stres berat, 55 (59,8%) perokok, dan 57 (62,0%) hipertensi Hasil uji chi-square, korelasi antara stres kerja dan hipertensi $p < 0,05$, antara kebiasaan merokok dan hipertensi $p < 0,05$. Temuan uji regresi logistik, stres kerja memiliki OR 9,04 yang lebih tinggi dari kebiasaan merokok memiliki OR 4,81. Kesimpulan, stres kerja lebih berisiko menyebabkan hipertensi dibandingkan kebiasaan merokok.

Kata kunci: Stres kerja, Kebiasaan Merokok, Hipertensi

INTRODUCTION

The Hypertension disease or another term is the Silent Killer disease is often missed by sufferers because of complaints that are less specific. Hypertension is a condition characterized by systolic blood pressure ≥ 140 mmHg and/or diastolic blood pressure ≥ 90 mmHg. This condition is one of the many causes of morbidity and mortality. Internal variables such heredity, age, race, stress, and gender create hypertension, whereas external ones such obesity, smoking, alcohol habits, and lack exercise cause hypertension ^{1,2}. Based on the results of the 2018 Riskesdas, it shows that the prevalence of people in Central Java Province with hypertension is 37.57%. The estimated number of hypertension sufferers aged ≥ 15 years old in 2019 was 8,070,378 people or 30.4% of the entire population aged ≥ 15 years old. There are 47.9% of people with hypertension in Cilacap district ^{1,3}.

Modification factor can be controlled is stress. Stress can be bad for the body. Stress is a non-specific human activity that is difficult to overcome because of emotional, physical or environmental demands. This stress can cause an increase in blood pressure through activation of the sympathetic nervous system, which can cause hypertension intermittently ⁴. One of the causes of stress from outside the individual is workload or job stress ⁵.

Anggraenny & Martini, described the relationship between smoking habits and hypertension that smoking behavior associated with systolic blood pressure and diastolic blood pressure ⁶. Another research also described there is a significant relationship between Smoking and Hypertension at the Kawangkoan Health Center ⁷. The research by Nurwidhiana et al. that job stress shows a relationship with the incidence of hypertension in motorcycle taxi drivers in Bekasi City in 2017 but is not related to smoking habits ⁸. In another research at the Kaliwungu Health Center, it was found that there was a relationship between job stress and hypertension in workers ⁹.

From previous research, job stress and smoking habits are related to the incidence of hypertension, so the authors are interested in investigate which is more at risk of causing the incidence of hypertension events between job stress or smoking habits among employees in Cilacap Indonesia.

METHOD

The research study method used in this study used analytic observation with a cross-sectional design. The sample used in this study is machine operator who work at PT. Hasta Cipta Karya as many as 92 respondents who met the inclusion criteria. The required inclusion criteria are male workers, aged 18-64 years, physically and mentally healthy, and

willing to follow the research flow from start to finish. Then for the exclusion criteria themselves workers who have a history of other non-communicable diseases such as diabetes and are not willing to follow the research flow. In this study using diagnostic stress questionnaires by Research and Development Agency of the Indonesian Ministry of Health and sample selection using purposive sampling method. After the data is collected, it will go through bivariate and multivariate analysis. This research has been approved by the Ethics Commission of Fakultas Kedokteran Universitas Muhammadiyah Surakarta under number 4669/B.1/KEPK-FKUMS/I/2023.

RESULT

A. Respondent Characteristics

Table 1. Results of Respondent Characteristics

Characteristics	Frequency (N)	Percentage (%)
Age		
17-25 years old	13	14.1
26-35 years old	29	31.5
36-45 years old	28	30.4
46-55 years old	18	19.6
56-65 years old	4	4.3
Job Stress		
Mild	43	46.7
Severe	49	53.3
Smoking habit		
Non-smokers	37	40.2
Smokers	55	59.8
Blood Pressure		
Normal	35	38.0
Hypertension	57	62.0
Number of Respondents	92	100.0

Table 1 display the characteristics of the respondents that the total number of respondents is 92 subjects. There are 5 age categories with the most number of 26-35 years old, namely 29 subjects (31.5%) then 36-45 years old with 28 subjects (30.4%). This shows that the majority of the subjects taken are of productive age. In this study, the age category used the reference issued by the Indonesian Ministry of Health. There are 2 categories of job stress, mild stress in 43 subjects (46.7%) and severe stress in 49 subjects (53.3%). The smoking habit category was divided into 2 parts, 37 subjects (40.2%) non-smokers and 55 subjects (59.8%) smokers. Meanwhile, the last variable is the blood pressure category where there are 35 normal subjects

(38.0%) and 57 subjects with hypertension (62.0%).

A. Bivariate Analysis

Table 2. Results of Job Stress and Hypertension Variables

Job Stress	Normal		Hypertension		Total		P value	OR value	95% CI
	N	%	N	%	N	%			
Mild	29	31.5	14	15.2	43	46.7	0.03	14.84	(5.112-43.108)
Severe	6	6.5	43	46.7	49	53.3			
Total	35	38.0	57	62.0	92	100			

The result of job stress and hypertension variables (table 2) was p value 0.03 which stated there was a significant relationship between severe job stress and the incidence of hypertension. In

addition, an odds ratio (OR) value of 14.84 was also obtained which stated that stress caused by work can cause 14 times the incidence of hypertension.

Table 3. Results of Smoking Habits and Hypertension

Smoking Habit	Normal		Hypertension		Total		P value	OR value	95% CI
	N	%	N	%	N	%			
non-smokers	25	27.2	12	13.0	37	40.2	0.04	9.37	(3.550 – 24.761)
smokers	10	10.9	45	48.9	55	59.8			
Total	35	38.0	57	62.0	92	100			

The result of smoking and hypertension variables (table 3) was p value 0.04 which stated that there was a significant relationship between smoking habits and the incidence of hypertension. The OR

obtained based on the results of the calculation in the table above is 9.37 which can be interpreted as smoking can cause hypertension 9 times.

B. Multivariate Analysis

Table 4. Results of Multivariate Analysis of Job Stress and Smoking Habit

Variable	B	Sig.	Exp(B)	95% CI for EXP(B)	
				Lower	Upper
Job Stress	2.202	0.000	9.044	2.918	28.036
Smoking Habit	1.572	0.005	4.817	1.612	14.393

There was significant correlation between job stress and smoking habits to the incidence of hypertension (table 2 and 3), so the analysis was continued with multivariate analysis (multiple logistic regression method) to determine which one had a greater increase in risk. The analysis in table 4 shows that there are 2 variables that are related to each other. Job stress has a p value of 0.00 with an OR of 9.04 and for the second variable is smokers with a p value of 0.005 with an OR of 4.81. The conclusion from the results of this analysis is that job stress has the highest risk of causing hypertension by 9 times.

DISCUSSION

The Relationship between Job Stress and Hypertension

This study found that stress at work was significantly related to the incidence of hypertension

in PT Tri Hasta Karya workers in Cilacap with a risk of 14.84 times and with a p value (0.03). In line with this research, according to research by Nurwidhiana et al., (2020), the relationship between job stress for motorcycle taxi drivers with hypertension in Bekasi in 2017, showed a relationship between job stress and hypertension with a risk level of 18.3 times⁸. On the other hand, Hanson et al. via a cross-sectional study to French workers, concluded that there was no association between job stress and hypertension⁹.

Stress associated with job is a personal response that will arise when faced with demands, work pressure that is not proportional to the level of knowledge possessed and the ability of workers to overcome them^{10,11}. The stress felt by the workers of PT Tri Hasta Karya which is a construction company in the form of a limited liability company or PT due to excessive work activities and high work demands, this is in line with previous research which said that

the occurrence of job stress due to a bad work environment such as control pressure, high work demands, lack of information, and extreme pressure¹².

The Relationship between Smoking Habits and Hypertension

In this study, it was found that smoking habits were significantly related to the incidence of hypertension in workers at PT Tri Hasta Karya in Cilacap, where a risk of 9.37 times was found to cause hypertension with a p value (0.04). This research is in line with previous research according to a study conducted by Umbas and Muhamad entitled the relationship between smoking and hypertension at the Kawangkoan Health Center with p value (0.016) which states that there is a relationship between smoking and hypertension⁷.

For workers at PT Tri Hasta Karya Cilacap, there were more respondents who smoked compared to non-smokers. The results of the study found a relationship between the types of smokers, namely smoking and not smoking. This is in line with research according to Rahmatika which said that cigarettes were dominated by carbon monoxide (CO) gas which can cause a lack of oxygen so that tissues that should receive oxygen are hampered, this is because carbon monoxide gas has the property to bind to hemoglobin which is in the red blood cells, as a result the transport of red blood cells which are supposed to contain oxygen is instead replaced with CO, thus the cells in the body will lack oxygen and try to increase blood pressure¹³.

The Relationship between Job Stress and Smoking Habits with Hypertension

Based on the multivariate findings of the multiple logistic regression method in table 4, it can be concluded that there is a significant relationship between the job stress variable and the smoking variable. In this study, the results showed that job stress had the highest risk of causing hypertension, namely 9.04 times.

This has results that are inverse with research by Gu where in this study examined job stress and smoking simultaneously, based on the results of multivariate analysis it was found that the smoking variable had an OR of 1.52 which was more at risk than the stress variable with an OR of 1.4. This is because in this study found differences in working hours, positions can affect these results. Job stress in this research caused cigarette consumption to increase significantly due to the sedative effect released by nicotine¹⁴.

According to research by Prasetyo in Surabaya, there are three factors that cause job stress which also have an impact on employee health in the form of increased heart rate, increased blood

pressure, causing headaches, and even triggering heart attacks¹⁰. Stress accelerates the body's production of harmful compounds, increases heart rate and demand for blood supply, and soon raises blood pressure and causes heart attacks and strokes. An increase in blood pressure during stress is a physiological response¹⁵.

A person with stress will increase catecholamines where catecholamines are hormones that affect the activity of the sympathetic nerves which will later result in vasoconstriction of blood vessels or commonly called narrowing of blood vessels, because of this it causes retention of blood vessels so that it will lead to hypertension¹⁶.

CONCLUSION

Based on the results of the study, it can be concluded that between job stress and smoking habits are significantly related to the incidence of hypertension. In this study, The findings of the logistic regression test, job stress has an OR of 9.04 which is higher than smoking habits has an OR of 4.8. Job stress is more at risk of causing hypertension than smoking habits.

REFERENCES

1. Kementrian Kesehatan RI. Profil Kesehatan Indonesia 2018. 2018
2. Monzo, L., Ferreira, J. P., Lamiral, Z., Bozec, E., Boivin, J.-M., Huttin, O., Sublet, M. L., Girerd, N., Zannad, F., & Rossignol, P. (2021). Isolated Diastolic Hypertension And Target Organ Damage: Findings From The STANISLAS Cohort. *Clinical Cardiology*, 2021; 44(11), 1516–1525. <https://doi.org/10.1002/Clc.23713>
3. Dinas Kesehatan Jawa Tengah. Profil Kesehatan Jateng 2019. 2020
4. Putri, R. (2018). Psychopolytan (Jurnal Psikologi) Faktor Resiko Hipertensi Ditinjau Dari Stres Kerja Dan Kelelahan Pada Anggota Polisi Daerah Riau. 2(1).
5. Sunarsih, S & Ilyas, H. Hubungan beban kerja dengan terjadinya penyakit hipertensi di poliklinik universitas lampung. *Jurnal Keperawatan*. 2017; 13(1), 42– 47.
6. Anggraenny, N., & Martini, S., Kesehatan, K., & Palangkaraya, P. Hubungan Perilaku Merokok Dengan Tekanan Darah Sistolik Dan Tekana Darah Diastolik Pada Awak Kapal Di Wilayah Kerja Kantor Kesehatan Pelabuhan Palangkaraya. In *Medical Technology And Public Health Journal*, 2020; 4 (2).
7. Umbas, I. M., Muhamad, J. T., Program, N., Ilmu, S., & Kedokteran, K. (2019). Hubungan Antara Merokok Dengan Hipertensi Di Puskesmas Kawangkoan (Vol. 7, Issue 1).
8. Nurwidhiana, N., Handari, T., & Latifah, N. (2020). Hubungan Antara Stres Kerja Dengan

- Kejadian Hipertensi Pada Pengemudi Ojek Online Dan Ojek Pangkalan Di Kota Bekasi Tahun 2017. *Environmental Occupational Health And Safety Journal*, 1(1)
9. Magnusson Hanson L L, Westerlund H, Goldberg M, Zins M, Vahtera J, Hulvej Rod N, Stenholm S, Steptoe A and Kivimäki M 2017 Work stress, anthropometry, lung function, blood pressure, and blood-based biomarkers: a cross-sectional study of 43,593 French men and women. *Sci. Rep.*, 7 9282
 10. Rusnoto, & Hermawan, H. (2018). Hubungan Stres Kerja Dengan Kejadian Hipertensi Pada Pekerja Pabrik Di Wilayah Kerjapuskemas Kaliwungu. In *Jurnal Ilmu Keperawatan Dan Kebidanan* (Vol. 9, Issue 2).
 11. Yuan, D., Gazi, A. I., Rahman, A., Dhar, B. K., & Rahaman, A. (2022). Occupational Stress And Health Risk Of Employees Working In The Garments Sector Of Bangladesh: An Empirical Study.
 12. Fortes, A. M., Tian, L., & Huebner, E. S. (2020). Occupational Stress And Employees Complete Mental Health: A Cross-Cultural Empirical Study. *International Journal Of Environmental Research And Public Health*, 17(10).
 13. Rahmatika, A. F. (2021). Hubungan Kebiasaan Merokok Dengan Kejadian Hipertensi. *Jurnal Medika Utama*, 02(02)
 14. Gu, Z., Qu, Y., & Wu, H. (2022). The Interaction between Occupational Stress and Smoking, Alcohol Drinking and BMI on Hypertension in Chinese Petrochemical Workers. *International Journal of Environmental Research and Public Health*, 19(24).
<https://doi.org/10.3390/ijerph192416932>
 15. Setyawan, A.B., Hubungan Antara Tingkat Stres dan Kecemasan dengan Kejadian Hipertensi pada Lansia di Klinik Islamic Center Samarinda. *Jurnal Ilmu Kesehatan*. 2017; 5(1)
 16. Ridho, M., Frethernety, A., & Widodo, T. Literature Review Hubungan Stres Dengan Kejadian Hipertensi. *Jurnal Kedokteran*, 2021; 9(2).