


Literature Review : The Effect Of Work Stress On The Risk Of Hypertension

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Article Info	ABSTRACT
<p>Keywords: Work stress, Hypertension, Blood pressure, Occupational health.</p>	<p>Hypertension is a leading cause of morbidity and mortality worldwide, with work-related stress identified as a significant risk factor. This study aims to explore the relationship between work stress and the risk of hypertension through a literature review (narrative review). Literature data were obtained from databases such as PubMed and Google Scholar, with inclusion criteria encompassing studies published in the last five years. The analysis results indicate that work stress can elevate blood pressure through the mechanism of stress hormone release, such as cortisol and adrenaline. Additionally, work-related factors such as high workload, long working hours, and unfavorable working environmental conditions contribute to an increased risk of hypertension. The research also indicates that workers experiencing work stress have a higher prevalence of hypertension compared to those who do not experience stress. Preventing hypertension in the workplace requires a holistic approach, including effective stress management, reduction of excessive working hours, and promotion of healthy lifestyles among workers. Company policy interventions and regulations related to occupational health are crucial for reducing the incidence of hypertension among workers. By understanding the relationship between work stress and hypertension, it is hoped that more effective preventive measures can be taken to enhance the health and well-being of workers.</p>
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INTRODUCTION

According to the World Health Organization (WHO), hypertension contributes to nearly 9.4 million deaths from cardiovascular disease each year. Data from the Global Status Report on Noncommunicable Diseases 2010 from WHO, states that 40% of developing countries have hypertension sufferers, while developed countries only have 35%. In the Southeast Asia region, there are 36% of adults who suffer from hypertension and have killed 1.5 million people each year. The number of hypertension sufferers will continue to increase sharply, predicted in 2025 around 29% or around 1.6 billion adults worldwide suffer from hypertension. While in Indonesia it is 14% with a range of 13.4-14.6%. The results of the Household Health Survey (SKRT) conducted by the Ministry of Health showed the prevalence

of hypertension or high blood pressure is quite high, namely 83 per 1000 housewives. South Sulawesi according to the results of a 2013 health survey from 1,343 cases the number of deaths was 11 people Case Fatality Rate (CFR) around 0.81%. Where in 2008 circulatory system disease (hypertension) was the cause of death of 9 people (CFR=1.007%) from 893 cases. The results of RISKESDAS in 2013 showed that the prevalence of hypertension in Indonesia reached 31.7%. And the prevalence of hypertension in Makassar City was 23.5%. (1,2)

Based on data from Riskesdas (2018), it states that employment status can affect the occurrence of hypertension, where those at risk of hypertension in the population aged ≥ 18 years and over are those who work as PNS/TNI/Polri/BUMN/BUMD with a prevalence of 36.91%. Hypertension is also influenced by stress because of the presence of adrenaline hormones that increase heart function. Work stress will have an impact on productivity or performance at work. According to Yulistina, et al. showed that the greater the stress on a person, the greater the risk of getting hypertension. (2)

RESEARCH METHODS

Study This using Literature Review with Narrative Review design for analyze studies related stress work and hypertension in a way descriptive. Literature searching for through PubMed, Google Scholar, Gale, and other sources with relevant keywords.

Inclusions

1. Journal 2019–2024.
2. Study of stress work & hypertension.
3. Full text available.

Exclusions

1. Journal before 2019.
2. The article is not full text or paid.

Literature curated, grouped, and summarized in table descriptive containing information research. Analysis done For find patterns, similarities, and differences findings use withdrawal conclusion.

RESULTS AND DISCUSSION

Results

Study Based on the summary results after conducting the search, 15 journals were obtained that discussed the Effect of Work Stress on the Risk of Hypertension:

Table 1. Results of the literature review study

No	Author/ Year	Research Title	Method	Results Study
1.	Fani Sugiarti, Lia Marlia Kurniawati, By: Yuli Susanti, 2021	Scoping Review: Relationship between Work Stress and Hypertension in	Scoping review conducted with analyze 10 articles relevant research from various databases.	Work stress increases the risk of hypertension in health workers. The prevalence of hypertension reached 61.8% in men and 40% in

No	Author/ Year	Research Title	Method	Results Study
2.	Sergio Yudi Midu, Maria Astrid.	Health Workers Factors Affecting the Incidence of Hypertension in Workers: Literature Review	<ul style="list-style-type: none"> - Use literature review method with approach narrative. - Secondary data taken from several databases such as Google Scholar, DOAJ, Pubmed, Science Direct, and Research Gate. - Search literature done For published articles between 2019 to 2023. 	<p>women.</p> <p>Duration Sleep : Sleep less and quality bad increase risk hypertension.</p> <p>Consumption Alcohol : Connection dose-response positive with hypertension.</p> <p>Stres Work : Trigger pressure blood high, influenced by conditions psychological.</p> <p>Hot Environment : Risk increase consequence lost fluid and vasoconstriction.</p> <p>Long Working Hours : >40 hours/ week increase risk hypertension.</p> <p>Hypertension in workers influenced by factors this, improve risks in the environment Work.</p>
3.	Rengganis, Rakhimullah and H Garna	The Correlation between Work Stress and Hypertension among Industrial Workers: A Cross-sectional Study	Cross-sectional study of 100 male workers in the Bekasi manufacturing industry. Work stress was measured by WSQ, while hypertension was classified according to the 2018 ESC/ESH guidelines.	<p>Prevalence hypertension : 27% (27/100 workers).</p> <p>Stres Work increase risk (PR = 5.58, p = 0.005).</p> <p>Pressure blood systolic : 127.16 mmHg (stress) vs. 112.12 mmHg (without stress, p < 0.001).</p> <p>Pressure blood diastolic : 78.51 mmHg (stress) vs. 68.48 mmHg (without stress, p < 0.001).</p> <p>Conclusion: Stres Work relate significant with hypertension in workers industry.</p>
4.	Tamotsu Nagao, Kazuhiro Nogawa, Koichi Sakata, Hideki Morimoto, Kotaro Morita,	Effects of Alcohol Consumption and Smoking on the Onset of Hypertension in a Long-Term Longitudinal	<ul style="list-style-type: none"> - Involving 7511 workers non-hypertensive men during 8 year period. - Measurement pressure blood and consumption data collection alcohol as 	<p>Connection Dose-Response : Consumption alcohol relate positive with the onset of hypertension.</p> <p>Odds Ratio (OR) for hypertension : 1.51 (154 g ethanol / week, non- smoker).</p>

No	Author/ Year	Research Title	Method	Results Study
	Yuka Watanabe and Yasushi Suwazono	Study in a Male Workers' Cohort	well as smoke done through survey yearly.	1.81 (154 g ethanol / week, smoker). Interaction Alcohol & Smoking : Combination both of them increase risk hypertension. Conclusion: Reduce alcohol and smoking in a way simultaneously can lower risk hypertension, supporting prevention strategies for worker.
5.	Nabilla Damar Sukma Andjani, Dian Mediana	cable industry factory employees	Analytical methods observational with approach cut cross - sectional. - Respondents : 78 employees man aged 22-53 years in the factory cable in West Java. - Election sample using stratified random sampling.	Respondents : 78 employees factory cable (male, 22–53 years). Pressure Blood : Normal 23.1%, Prehypertension 39.7%, Hypertension 37.1%. Intensity noise : <85 dB(A) 32.1%, ≥85 dB(A) 67.9%. Connection significant : Intensity noise (p = 0.007) and age (p = 0.019). Not significant : Type noise, working hours, consumption cigarette. Conclusion: Intensity noise and age relate with hypertension.
6.	Septyani Prihatiningsh	Sleep Duration, Perceived Job Stress and Risk of Hypertension Among Engineering Workers	Observational design analytic with cross-sectional approach on 104 workers engineering at PT Y. Criteria inclusion : working ≥1 year. Data collected through questionnaire (demographics, duration sleep, stress work, activity physical) and measurement pressure blood with a sphygmomanometer.	Characteristics : Average age 42.55 years, 58.2% hypertension. Pressure blood : Systolic 124.90 mmHg, Normal 27.9%, Prehypertension 59.6%, Hypertension 12.5%. Duration sleep : 49% abnormal, pressure blood more high (128.43 mmHg, p < 0.001). Stres work : 66.3% stress, pressure blood more high (127.32 mmHg, p < 0.001).

No	Author/ Year	Research Title	Method	Results Study
				Activity physical : 42.3% no fulfil recommendation, no significant ($p > 0.05$). Conclusion: Duration abnormal sleep and stress Work relate significant with hypertension.
7.	Annisa Warda Irvani, Mila Citrawati, Nunuk Nugrohowati	Overview of Systolic Blood Pressure Risk Factors in Limestone Mining Workers in Klapanunggal, Bogor, West Java	Design: Analytic observational, cut latitude. Subject : 47 workers limestone quarry, Klapanunggal, Bogor. Measurement : Noise : Sound level meter. Pressure blood : Digital sphygmomanometer. Analysis : One Way ANOVA & dummy regression	Average pressure blood systolic : Before work 110.3 mmHg, after work 126.2 mmHg. Connection significant ($p = 0.001$): Noise, working hours, duration exposure, smoking. Conclusion: Intensity noise is factor main improvement pressure blood systolic in workers limestone quarry.
8.	Ibrahim, Dyah Marianingrum, Roxane Gloriana Tang	Relationship between Working Hours and Incident Rate Hypertension in Employees at PT. X, Berau Regency East Kalimantan	Research Design : Analytic observational with cross-sectional approach. Population : 98 employees still aged 18-50 years. Sampling Method: Total sampling. Variables : Free : Working hours (≤ 40 hours and > 40 hours per week). Bound : Hypertension, measured using a sphygmomanometer and stethoscope. Data Analysis : Distribution frequency, tabulation cross-sectional, and Chi-square test ($p < 0.05$).	Of the 98 employees : - 65 employees (66.3%) worked ≤ 40 hours/ week, 33 employees (33.7%) worked > 40 hours/ week. - 61 employees (62.2%) have pressure normal blood, 37 employees (37.8%) experienced hypertension. - Of employees who worked ≤ 40 hours, 48 (73.8%) were normal and 17 (26.2%) were hypertensive. - Of employees who worked > 40 hours, 13 (39.4%) were normal and 20 (60.6%) were hypertensive. - The results of the Chi-square test show a p value = 0.001, which means There is connection

No	Author/ Year	Research Title	Method	Results Study
				significant between working hours and hypertension.
				There is meaningful relationship between working hours with level incident hypertension in employees at PT. X, with p value = 0.001. Working employees more from 40 hours per week own risk more tall For experience hypertension.
9.	Siti Nurmala Dewi, Doni Hikmat Ramdhan	Relationship between Heat Stress and Blood Pressure of Construction Sector Workers	Types of research : Quantitative analytic with cross-sectional approach. Sample: 185 workers (126 outdoor, 59 indoor) were taken with method taking sample random simple. Variables : Variables free : Pressure heat and factors individual. Variables bound : Pressure blood worker. analysis : Analysis bivariate using chi-square to test connection between pressure heat and pressure blood.	-Of the 130 workers who experienced pressure heat above the Threshold Limit Value, 56.9% experienced prehypertension and 18.5% hypertension at blood pressure blood systolic. - Under pressure blood diastolic, 32.3% experienced prehypertension and 10% hypertension. Statistical test show connection significant between pressure hot with pressure blood systolic (p = 0.0005) and diastolic (p = 0.043). - There is connection significant between pressure heat and pressure blood on workers sector construction in the indoor and outdoor areas of the Jabodebek LRT project. - Pressure hot can cause prehypertension and hypertension, so that company recommended For do control to exposure

No	Author/ Year	Research Title	Method	Results Study
10	Nisa Nur Kusuma, Sumardiyon, Bhisma Murti	Association between Heat Stress, Work Fatigue, and Elevated Blood Pressure among Construction Workers in Yogyakarta	Design: Observational. Sample: Worker in construction in Yogyakarta. Measurement : Stres hot, tired work (questionnaire), and pressure blood (sphygmomanometer). Analysis : Statistics descriptive and inferential.	heat received worker. Findings : - Connection significant between stress heat and pressure blood. - Fatigue Work contribute to the improvement pressure blood. - Worker with stress hot more tend experience tiredness. Statistics : $p < 0.05$. This study shows that heat stress and work fatigue are important risk factors that can increase blood pressure among construction workers.
11	Fen Yang, Yuanyue Zhang, Ruiying Qiu and Ning Tao	Association of sleep duration and sleep quality with hypertension in oil workers in Xinjiang	Research Design : Survey cut latitude at 3,040 workers oil in Karamay City, Xinjiang. Measurement : - Quality Sleep rated with the Pittsburgh Sleep Quality Index (PSQI). - Hypertension measured by a doctor based on pressure blood. analysis : Regression logistics For evaluate connection between duration sleep, quality sleep, and hypertension.	- Prevalence Hypertension : 15.33% of participants experience hypertension. - Duration Sleep not enough than 7 hours (OR = 1.51) and more than 8 hours at age >45 years (OR = 3.36) is associated positive with hypertension. - Quality Sleep : Quality Sleep bad (OR = 1.78) is related with hypertension. - Analysis Stratification : Risk hypertension more high in women, shift workers, and those with a working period of <10 years. Duration sleep that is not sufficient and quality bad sleep potential influence hypertension in workers oil. Intervention required For increase quality sleep and manage risk hypertension.
12	Yaoqin Lu, Huan Yan,	Occupational stress and	Research Design : Case-control study.	- Psychological Health : Risk factors direct For

No	Author/ Year	Research Title	Method	Results Study
	Jiandong Yang and Jiwen Liu	psychological health impact on hypertension of miners in noisy environment in Wulumuqi, China: a case-control study	Subject : Miners in Wulumuqi, China, are divided become group cases (hypertension) and controls (without hypertension). Measuring instrument : Effort-Reward Imbalance Questionnaire and Self-Reporting Inventory. Analysis : Propensity Score Matching (PSM) and analysis multifactorial.	hypertension (t = 5.080, P < 0.001). - Stres Work : Not significant as factor risk directly (t = 1.760, P = 0.080). - Statistical Model : Significant ($\chi^2 = 20.4$, P < 0.01). - Psychological health, years of service, gender, and age have a direct influence on hypertension, while education and income influence hypertension indirectly through stress. Psychological health miners in the environment noisy influential direct to hypertension, whereas stress Work play a role No direct through health psychological.
13	Xianting Yong, Xiaoyan Gao, Zhe Zhang, Hua Ge, Xuemei Sun, Xiaofan Ma, Jiwen Liu	Associations of occupational stress with job burn-out, depression and hypertension in coal miners of Xinjiang, China: a cross-sectional study	Design: Cross-sectional in Xinjiang Coal Administration Bureau, China. Participants : 1344 workers mining (age 18-60 years, experience work >1 year). Measurement : Questionnaire demographics, Self-Rating Depression Scale (SDS), Effort-Reward Imbalance (ERI) model, and Maslach Burnout Inventory (MBI).	-83% of participants own ERI score >1 (stress Work tall). -21.7% experienced depression heavy. - Connection positive between stress work and burnout; 87.2% of workers with stress tall experiencing burnout. - Stres work, type gender, and depression relate independent with burnout. -35.8% of participants experience hypertension, without difference significant between group stress high and low. - Stres Work relate with burnout, depression, and hypertension in workers

No	Author/ Year	Research Title	Method	Results Study
				mine. -Higher stress levels tall related with better mental and physical condition bad. - The need intervention For reduce stress work and improve health worker.
14	Mihret Melese, Ayechew Adera, Adugnaw Ambelu, Yibeltal Yismaw Gela, Mengistie Diress	Occupational Noise-Induced Pre-Hypertension and Determinant Factors Among Metal Manufacturing Workers in Gondar City Administration, Northwest Ethiopia	Design: Cut study latitude. Participants : 300 metal workers in Gondar, Ethiopia, using method census. Measurement : Noise measured with sound level meter; demographic and pressure data blood collected through questionnaire and mercury sphygmomanometer. Analysis : Regression logistics bivariate and multivariate For identify factor related prehypertension.	- Workers in the metal industry who are exposed noise above 85 dB has risk more tall For develop prehypertension. - Risk prehypertension increase along with increase age, experience work, and habit smoking and consumption alcohol. - Study This recommend the need for prevention strategies For reduce risk prehypertension triggered by exposure noise in place Work.
15	Sumardiyon, Reni Wijayanti, Hartono, Maria Theresia Sri Budiastuti	Effect of Noise on Blood Pressure, with Work Stress as a Mediator Variable	- Research Design : Observational analytic with cross-sectional approach. Population and Sample: 139 workers women in industry textiles, taken in a way random. Measurement : Noise (Sound Level Meter), pressure blood (sphygmomanometer), and stress work (DASS-42 questionnaire). analysis : Use analysis track with AMOS	Characteristics Demographics : - Age > 40 years (57.6%), work period > 10 years (54%). - Average noise : 90.4 dBA (dangerous). Stres Work and Blood Pressure : Average stress work : 22.1 points ; pressure blood systolic : 131.7 mmHg; diastolic : 88.1 mmHg. Connection Variables : - Noise relate significant with stress work and pressure blood (p < 0.001). - Noise increase pressure

No	Author/ Year	Research Title	Method	Results Study
			version 22.	blood systolic (1.8 points) and diastolic (0.8 points) through stress Work. - Noise in industry textile increase pressure blood in a way No direct through stress work. Control noise and stress are very important For prevent hypertension.

Discussion

Hypertension is a significant health problem among workers, and much research has been done to understand the relationship between various workplace risk factors and the incidence of hypertension. The following is an analysis of several journals that discuss the relationship between work stress, environment, and other factors with hypertension among workers.

Stres Work and Hypertension

Stres Work relate significant with hypertension. Studies show power health with stress Work own prevalence hypertension up to 61.8% (men) and 40% (women). Workers industry with stress own risk hypertension more high (PR = 5.58, p = 0.005), as well as pressure blood higher systolic and diastolic tall.

Working Hours and Environment

Worker with working hours >40 hours/ week more prone to experience hypertension (p = 0.001). Environment Work heat also contributes to improvement pressure blood, especially among worker construction and industry (p < 0.05).

Noise and Hypertension

Exposure noise ≥ 85 dB(A) increases risk hypertension (p = 0.007). Workers mine experience improvement pressure blood systolic after exposed noise (p = 0.001), suspected through mechanism stress Work.

Lifestyle: Alcohol, Smoking, Sleep

Consumption alcohol and smoking in a way simultaneously increase risk hypertension (OR = 1.81). Sleep <7 hours and quality of sleep Sleep bad also contributes to hypertension in workers oil (OR = 1.78, p < 0.05).

Psychological Health

Stres Work impact on burnout and depression, which are correlated with hypertension. Its effects No direct but through health psychological worker. Stress plays a significant role in the development of hypertension, both through physiological mechanisms and behavioral changes. Physiologically, stress triggers the release of adrenaline and activation of the sympathetic nervous system, which causes an increase in heart rate and blood vessel contraction, thus increasing blood pressure. If stress persists for a long time, the body experiences maladaptation leading to chronic hypertension. Prolonged activation of the

sympathetic nervous system can also increase the secretion of certain hormones, such as norepinephrine, epinephrine, renin-angiotensin, aldosterone, and vasopressin, all of which contribute to increased blood pressure and impaired fluid balance in the body.

In addition to physiological effects, stress also affects a person's behavior and lifestyle. Individuals who experience stress tend to have poor diets, consume foods high in salt and fat, and experience sleep disorders that contribute to increased blood pressure. In addition, stress is often associated with smoking, alcohol consumption, and lack of physical activity, all of which are major risk factors for hypertension.

Chronic stress can also cause disruption of cellular homeostasis that worsens blood pressure regulation. Stimulation of the autonomic nervous system due to stress increases the release of bioactive substances that affect the function of immune cells, adipose tissue, skeletal muscle, and endothelial cells. This process can cause blood pressure to remain high for a long time, increasing the risk of complications of hypertension such as cardiovascular disease and kidney disorders.

Thus, stress is not only a trigger for hypertension, but also worsens the condition of hypertension sufferers through neurohormonal mechanisms and lifestyle changes. Effective stress management, such as relaxation, exercise, and a healthy lifestyle, is important in preventing and controlling hypertension to reduce the risk of further complications.

CONCLUSION

Based on the analysis of the reviewed journals, work has a significant influence on hypertension through various mechanisms, including work stress, long working hours, hot or noisy work environments, and lifestyle factors such as alcohol consumption, smoking, and poor sleep patterns. Work stress is a major factor associated with hypertension, both directly and through workers' psychological health. From various studies that have been compared, it is clear that prevention of hypertension in the workplace needs to be carried out with multifactorial strategies, such as work stress management, reducing the duration of working hours, controlling the work environment (exposure to heat and noise), and promoting a healthy lifestyle. Therefore, interventions in company policies and regulations related to occupational health are very important in reducing the incidence of hypertension among workers.

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