A DESCRIPTION OF THE RELATIONSHIP BETWEEN OCCUPATIONAL STRESS AND BLOOD PRESSURE CHANGES IN WORKSHOP MECHANICS

Dadang S Kafi[1*], Erwin Dyah[1]
[1]Department of Occupational Health and Safety, Faculty of Public Health
Universitas Airlangga, Surabaya, Indonesia
Correspondence Address: Dadang Shokhibul Kafi
E-mail: dadangskafi@gmail.com

ABSTRACT

Introduction: Stress is the occurrence of the individual's emotions, thoughts, and physical conditions. Each individual has the potential to experience stress. Stress that comes from the workplace is called occupational stress. Increased blood pressure is one of the physical impacts of work stress that needs attention due to continuous increase in blood pressure will cause high blood in the worker. The purpose of this study was to describe the overview of the relationship between occupational stress and the change in blood pressure on workers. **Methods:** This was descriptive observational research. Respondents were 30 people (mechanics of the workshop). The variables of this research were occupational stress level and systolic blood pressure changes. The stress level was measured by using a questionnaire, while blood pressure was measured by using the tensimeter. The correlation between stress level and blood pressure was analyzed by using cross-tabulation. **Result:** The results showed that the percentage of respondents with moderate stress levels was higher (53.4%) compared to mild stress levels (46.6%). The percentage of respondents with increased systolic blood pressure was higher (63.3%) compared to respondents with decreased systolic blood pressure (3.4%) and constant blood pressure (33.3%). The percentage of respondents with increasing blood pressure was higher for those with moderate stress levels (93.7%) compared to those with mild stress levels (28.5%). **Conclusion:** It can be concluded that the higher the stress level, the higher percentage of respondents with increasing blood pressure would be.

Keywords: occupational stress, blood pressure, workshops, information.

INTRODUCTION

Stress is the occurrence of the individual's emotions, thoughts, and physical conditions. One of the riskiest places to cause stress is the workplace (Zhang, 2012). Stress that comes from the workplace is referred to as occupational stress, which is distinguished into two types namely *eustress* and *distress*. Mild to moderate stress is called *eustress*. While heavy stress is called *distress*. *Eustress* workers are still able to adapt to the demands of work and can also help improve the productivity of their work. However, workers with *distress* will not be able to adapt and they can reduce the productivity of their work (Li, Cao, and Li, 2016). The main cause of occupational stress is 43% due to the severity of working causation, 43% is due to the salary given less, 43% due to the opportunity to develop a career less, 40% due to unfulfilled employment expectations, 34% due to lack of health insurance provided to workers (Orhani and Shehu, 2017).

Physical impacts that arise include increased blood pressure, headache, migraine, gastritis, backache, asthma, fatigue, lethargy, heart disorders, dermatitis, muscle pain, dietary changes, drinking, sleep, and smoking habits (Zurlo, Vallone, and Smith, 2018). The psychic impacts that can be inflicted include anxiety and depression, avoiding work, direction, tension, anxiety, disappointment, and disagreements between employees. If employees are not able to control the stress they experience, it will negatively affect their behavior of workers (Yaacob and Long, 2015).

Wahjono (2010) explained the source of stress derived from 3 factors namely environmental factors, organizational factors, and individual factors (Wahjono, 2010). The first environmental

 License doi: 10.20473/ijph.vl17il.2022.297-304 Received 22 August 2019, received in revised form 14 October 2019, Accepted 16 October 2019, Published online: August 2022

factor, the environment affects stress due to the consequences of economic uncertainty, politics, technology, and security. The second factor of the Organization, in this case, is the design of the work given to each individual, the working conditions, and the physical layout of each. Role demands are given to workers as a function of the roles performed within an organization. Interpersonal demands are the pressures that employees give to other employees with poor interpersonal relationships and a lack of social support. Organizational structures such as rules and regulations that determine the level of differentiation in the organization as well as individual participation are potential sources of stress. The leadership of the organization with leadership style. Certain leadership styles can lead to potentially stressful cultures. The third factor is the individual. the individual factor is the factors that exist in each individual such as family issues, economic problems, and the characteristics it possesses.

Continuous increase in blood will result in hypertension. Hypertension is when a person experiences systolic blood pressure above 140 mmHg and diastolic blood pressure above 90 mmHg. Hypertension means that there is a disruption in blood vessels resulting in a lack of oxygen and nutrients required by the body (World Health Organization (WHO), 2013).

The relationship between occupational stress to increased blood pressure is still controversial. Its influence is likely through sympathetic nerve activity that can increase blood pressure as a physical reaction when a person experiences an *intermittent* threat (Sartik, Tjekyan, and Zulkarnain, 2017). Long-lasting stress will increase the height of fixed blood pressure. The condition of stress experienced by the individual, the blood vessels will narrow to raise blood pressure (Poerwati, 2008).

The workshop "Rizki Motor" located in Dupak Surabaya stood since the year 2006, is a private company that provides motorcycle repair and maintenance services. The workshop is located on the roadside of a highway that is widely traversed by motor vehicles, motorcycles, and cars.

Workers work 8 hours a day at the workshop. Weekdays are done from Monday to Friday. The workshop has 2 parts, namely the office part consisting of the head of the workshop, branch head, service administration, and Billing Administration unit. The second part, the field is mechanical.

The workshop "Motor Rizki" is a workshop that is engaged in motor services that have good facilities. Facilities owned by the workshop of Rizki Motor such as waiting room service. There are several facilities provided in waiting room service such as a bench with an adequate amount for consumer needs and some drinks that are provided for consumers to drink. However, there are other facilities provided by the workshop such as the sale of complete spare parts tools, workers with good competence, and tools of good quality. The Motor Rizki Workshop starts at 08.00 a.m. until 04.00 p.m.

Blood pressure measurement for all workers was carried out at the initial observation before and after working. For the workers who work in the office, part of blood pressure tends to be normal and does not undergo changes in blood pressure. However, for the mechanical worker, 16 of the 30 workers acquired the result of undergoing a change in blood pressure. Blood pressure can be caused by several factors such as age, heredity, smoking, overweight, lack of exercise, high salt content, liquor, and stress. Of the above factors, the most likely factor is the stress experienced by mechanical workers, therefore the research was done to describe the working stress relationship with the change in blood pressure.

METHODS

This type of research was a descriptive study with an observational research design. Data retrieval with *the cross-sectional* method was only done once or at a certain time without any repetition

and intervention. The population of this study was 30 people, this research used *total sampling* research so that there were samples of 30 people from the total population. Measurement of occupational stress variables was using questionnaire instruments with a *Likert* scale as a measurement guideline.

Assessment of the measurement results of questionnaires further categorized into 3 ordinal levels, namely low stress, moderate and high. While the change in blood pressure variables was measured through two stages, namely when the respondent had not done the work and after doing the work, it was known blood pressure decreased, fixed, and increased. Based on the measurement result, each variable was done by using cross-tabulation (crosstab analysis) so that the picture of the relationship can be recognized. This research had been feasible and through a test of ethics with an ethical certificate of Ethics by the health Research Faculty of Public Health Universitas Airlangga No. 527-KEPK.

RESULTS

Table 1. Characteristics of respondents by the age category of the workers of "Rizki Motor" workshop in 2017

Age (year)	Amount	Percentage (%)
21 - 30	19	63,4
31 - 40	10	33,3
41 - 50	1	3,3
Total	**30**	**100**

Table 1 shows the majority of research respondents aged between 21-30 years, which was 19 people or equivalent to 63.4% of the entire respondent. Respondents aged between 31 to 40 years as much as 10 people (33.3%) And respondents between 41 and 50 years of age amounted to 1 person (3.3%). The oldest age of the respondents was 47 years and the youngest had 24 years old.

Table 2. Characteristics based on the work stress on the workers of "Rizki Motor" workshop in 2017

Occupational Stress	Amount	Percentage (%)
Low	14	46,6
Moderate	16	53,4
Total	**30**	**100**

Table 2 shows that respondents with moderate working stress conditions were being greater than those with low working stress levels. The number of respondents with low working stress amounted to 14 people (46.6%) And respondents with moderate work stress also amounted to 16 people (53.4%).

Table 3. Characteristics of respondents based on the blood pressure condition of the worker before starting work for a day at the "Rizki Motor" workshop in 2017

Blood Pressure Before Working	Frequency	Percentage (%)
110-120 (normal)	26	86,7
130 (high)	4	13,3
Total	**30**	**100**

Table 4. Characteristics of respondents based on the blood pressure condition of the workers after working for a day in "Rizki Motor" workshop in 2017

Blood Pressure After Working	Frequency	Percentage (%)
110-120 (normal)	11	36,7
130-140 (high)	19	63,3
Total	**30**	**100**

Table 3 shows that the number of respondents who had normal blood pressure before work amounted to 26 people (86.7%) And respondents who had high blood pressure before working was 4 people (13.3%).

Table 4 shows that the number of respondents experiencing normal blood pressure after working amounted to 11 people (36.7%) And respondents who had high blood pressure before working were a total of 19 people (63.3%).

Table 5. Characteristics of respondents based on the increase/decrease in blood pressure of the worker in "Rizki Motor" workshop in 2017

Blood Pressure	Frequency	Percentage (%)
Decrease	1	3,4
Constant	10	33,3
Increase	19	63,3
Total	**30**	**100**

Table 6. Cross tabulation between the stress level with the blood pressure in the "Rizki Motor" workshop in 2017

Blood Pressure	Low Working Stress	
	n	%
Decrease	1	7,2
Constant	9	64,3
Increase	4	28,5
Total	**14**	**100**

Table 5 shows that only 1 respondent (3.4%) whose systolic blood pressure decreased. 10 respondents (33.3%) had systolic blood pressure in constant conditions and as many as 19 (63.3%) of the respondents experienced an increase in systolic blood pressure.

Table 6 is a cross-tabulation between low working stress and changes in blood pressure. This table shows that the percentage of respondents who experienced low working stress and blood pressure increased by 28.5%.

Table 7. Cross tabulation between the stress level with the blood pressure in the "Rizki Motor" workshop in 2017

Blood Pressure	Moderate Working Stress	
	n	%
Decrease	0	0
Constant	1	6,3
Increase	15	93,7
Total	**16**	**100**

Table 7 is a cross-tabulation between moderate working stress and changes in blood pressure. This table shows the percentage of respondents who experienced moderate working stress which increased blood pressure (93.7%) compared to low working stress (28.5%). Based on the above data can be noted that the higher the level of work the more stress is increased and the more respondents have increased their blood pressure. This research can be said that the higher percentage of respondents with increased blood pressure is also the higher respondents who are experiencing moderate working stress levels.

DISCUSSION

The characteristics of a research respondent are seen from age and gender aspects. Judging from the gender, all employees who are selected as research respondents are men. This condition is in accordance with the condition in the field that all personnel of technicians in the "Rizki Motor" workshop are male. Consideration of the selection of workshop technicians all males because the technician work includes the type of heavy work. This condition is in accordance with gender stereotypes that apply especially in Indonesia, such as men are considered strong so that the type of heavy work is more suitable for men (Atusti, 2011).

The elasticity of the muscles will be reduced with age and the incapability of the body to do a lot of things caused by the tightening of muscle tissue and replaced

with connective tissues. An increase in age experienced a process of organ degeneration that makes the organ function decrease so that people more often in experiencing fatigue and pain in skeletal muscles. Workers who are prone to fatigue are workers aged 40 years and more (Amalia and Widajati, 2019).

The results showed that respondents in this study were only experiencing low working stress and moderate working stress. No respondents in the research are experiencing high working stress.

This condition indicates that the condition of employees in the "Rizki Motor" workshop is still in the fair category because no respondents are experiencing high working stress. This is due to the condition of the workplace. All workers are working for the same duration which is 8 hours a day. Weekdays are done from Monday to Friday. The "Motor Rizki" Workshop is a workshop that engaged in motor services with good facilities, the good competency of the workers, and good quality of tools. For business hours at the workshop, the motor Rizki starts from 08.00 a.m. to 04.00 p.m. The work stress that occurs in employees can be positive and negative. On the positive side, stress can make workers passionate about doing their job and improve their productivity, while on the negative side, stress can make workers depressed and ultimately unable to finish their job resulting in decreased productivity (Wahjono, 2010).

The number of respondents with moderate working stress conditions is greater than with low working stress levels. The percentage of respondents with moderate working stress is higher than the low working stress level. Based on the results, workers feel that they receive too many different requests than others and it is difficult to obtain information that can support their duties so this is what causes stress on workers. Working stress conditions that are in the low and medium category of workers in "Rizki Motor" workshop are expected to still have a positive impact. It can encourage the spirit of the worker to work hard and also able to improve productivity. Occupational stress can occur when there is an influence from the environment, whether in the work or outside the work that makes the worker psychologically depressed (Widyastuti, 2018). Stress can also increase or decrease the appetite of someone as the result of choosing a high diet of sugar and fat (Wulandari, Widari, and Muniroh, 2019).

Changes in blood pressure can be noted by comparing the condition of the workers' blood pressure before work and the condition of the workers' blood pressure after work. At the time before work, the condition of the pressure of 26 workers was under normal conditions (110 mmHg and 120 mmHg) and only 4 workers had high blood pressure (130 mmHg).

Blood pressure measurement is also performed after work. The worker did a self-measurement after finishing their work. The result shows that 11 respondents had normal blood pressure (110 mmHg and 120 mmHg) and 19 respondents had high blood pressure (130 mmHg and 140 mmHg).

Existing data indicates that the respondent's blood pressure before work ranged from 110-130 mmHg. Most respondents have normal blood pressure with a percentage of 86.7%. Subsequent data indicates that the respondent's blood pressure after work ranged from 110 mmHg – 140 mmHg. Most of the respondents suffered high blood pressure with a percentage of 63.4%. Based on the measurement of the before and after work, the percentage of respondents with increased blood pressure is greater than the decrease in blood pressure.

The increase or decrease in blood pressure experienced by respondents can be categorized into low, medium, and high. 18 respondents experienced low condition blood pressure, 10 respondents had increased blood pressure in the medium condition, and 2 respondents experienced an increased blood pressure in high conditions.

The strong blood pump in the heart can drain too much blood every second to

cause a stiff artery and can not expand during the pumping so that the blood is forced to go through narrow vessels and occur Increase or rise in blood pressure (Babba, 2007).

Related to the results of this research, increased blood pressure of respondents in the low category does not need to be a concern. Otherwise, the increase in blood pressure in the medium category or the high category needs to get attention from the company. The continuous improvement of blood in the employee can lead to hypertension, which is the lack of oxygen and nutrient supply required by the body caused by disorders of the blood vessels (World Health Organization (WHO), 2013). When the supply of oxygen and nutrients in the body of employees is lacking, the employee's work productivity will be decreased so which will harm the company.

The result of a cross-tabulation between work stress and an increased blood pressure level indicates that the percentage of respondents whose work stress is moderate and the blood pressure rises higher than low working stress. Based on the data gained is known that increased work stress carries a meaningful impact on the increase in blood pressure. Working stress workers are at risk of increased blood pressure. In this case, it can be due to exposure from the workplace that can lead to nerve tension so that workers experience working stress. Occupational stress can affect the work of the heart thus causing changes in blood pressure in the workers both increased and decreased (Kadir, 2013). In this condition, there is a required response to occupational stress. The main nerve response to stress is an active activity of the sympathetic nervous system as a whole. As a result of stress stimulation and increased arterial pressure the blood flow increases for the muscles needed to become active so that motor activity becomes fast which results in the body doing a *fight-to-flight* preparation assisted by the *hypothalamus* (Kadir, 2013).

The results of the research are in accordance with the results of the research conducted by Kurniasari and Hidayat (2018) who showed noted in their research showed a significant relationship between occupational stress and increased blood pressure. Respondents with high working stress will experience elevated blood pressure, while those with low working stress also experience increased blood pressure in the low category (Kurniasari and Hidayat, 2018).

If the stress is not managed properly then the increase in blood pressure can be patoligis/sedentary, so it will cause strokes and heart attacks (Kurniasari and Hidayat, 2018). Companies need to identify the factors that are the cause of stress in this company. There are now guidelines to assess work stress in the company, such as the 5 year old of 2018 about occupational safety and a health [work environment.

According to the estimating 5 years 2018, stress can occur when the psychological factors, among others: role insensitivity, role problems, workload, underpromotion, and responsibility to others (Minister of Manpower of the Republic of Indonesia, 2018). Role undoing is that individuals lack understanding of their rights and obligations to do the work. several studies showed that the result of blood pressure and frequency of heart rate is related to low satisfaction with the job that has been done by the worker. Role conflicts are a psychological symptom of a person that can result in discomfort the taste and a decline in work motivation. Inappropriate expectations delivered by individuals in an organization and outside the organization can lead to role conflicts. The most widely studied individual stressor is a conflict of roles. Various conflicts of roles include erratic and conflicting feelings with supervisors about the job and are required to work with people who do not match themselves. The other conflict is when someone has experienced the burden of work. There are two different types; Quantitative and qualitative. When there is a lot of work to be done but there is not enough time to do it, it is called a quantitative burden. On the other hand, qualitative burden occurs

when the individual feels incapable of performing work or considers that the standard is too high to be achieved. Therefore, companies need to do further research to reduce the level of stress and blood pressure experienced by workers.

CONCLUSION

It can be concluded that most respondents experienced moderate working stress. Most respondents experienced increased blood pressure. The percentage of respondents whose blood pressure increased was higher in respondents who experienced moderate working stress levels. The higher the level of working stress the more respondents have increased systolic blood pressure. Future research are suggested to be done related to the topic of analysis of causal factors and levels of occupational stress, exercise, yoga, vacation, and laughs.

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