Relationship of Hot Work Climate with Employee Blood Pressure in Binat Installation, Dr. Sardjito

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Abstract

Blood pressure in each individual varies, and depends on age and daily activities such as when blood pressure activity will rise and when the remaining blood pressure will drop. Laundry installations are workplaces where there is a physical hazard in the work process in the form of a hot working climate. In a hot working climate, the body regulates its temperature by accelerating the evaporation of sweat by widening (vasodilation) of blood vessels which results in increased blood circulation and increased capillaries accompanied by physiological responses, such as increased pulse and blood pressure. This study aims to analyze the relationship between the work of heat and blood pressure of workers in the Laundry Installation of RSUP Dr. Sardjito Yogyakarta. This study uses quantitative research design using a cross sectional approach. The population in this study were Laundry Installation workers with a sample of 35 respondents taken with total sampling. Data analysis using Chi-Square. The results showed that there was a relationship between the hot work climate and workers' blood pressure ($p = 0.03$) and there was a relationship between the hot working climate and diastolic blood pressure of workers in the Laundry in RSUP Installation. Sardjito Yogyakarta ($p = 0.01$).

***Keywords**: Hot Work Climate, Blood Pressure*

Introduction

Hospitals as a means of improving health efforts that carry out health services, turned out to have positive and negative impacts on the surrounding environment. Hospitals in the implementation of inpatient care, emergency services, medical and non-medical services use technology that can affect the surrounding environment[1]. Hazard factors that exist in hospitals can cause workplace accidents or work-related illnesses, not only to the direct perpetrators who work in hospitals, but also to patients and visitors to hospitals who have the potential to experience the risk of workplace accidents and work-related illnesses[2].

Dr. Hospital Sardjito is a Type A Hospital that is managed by the Ministry of Health which is a reference for the Special Province of Yogyakarta (DIY) and southern Central Java. Dr. Hospital Sardjito, there are 29 installations, each of which has the potential for physical, biological, chemical, psychological and ergonomic hazards which can cause work accidents or work-related illnesses, one of which is a Laundry Installation. Laundry Installation at Dr. RSUP Sardjito Yogyakarta has a risk of danger, one of which is a physical factor which is a hot working climate caused by the machines used during the work process, which take place from the washing process to drying, ironing, folding to being redistributed. Hot work climate is one of the physical factors that has the potential to cause harm and health problems when working in extreme hot and cold conditions with levels that exceed the Threshold Limit Value (NAV)[3].

Hot work climate can affect health, one of them is increase in blood pressure. Blood pressure is a pressure produced by the blood from the circulatory system or the vascular system against blood vessel walls[4]. Based on the results of a preliminary survey conducted on September 13, 2017 at the Laundry Installation of RSUP Dr. Sardjito Yogyakarta, the result of measurement of hot work climate based on hospital data carried out on previous measurements was carried out 2 times, namely in December 2016 the ISBB results were 31^{o}C and in June 2017 the ISBB was 36^{o}C. The

government has policies related to the workplace

climate, which is about the Physical Factor Threshold Value and Chemical Factors in the Workplace, with the ISBB light category workload not exceeding the NAB of 31 ° C[5]. From the results of interviews with 7 workers from 35 work workers, grievances were felt at the place, often feeling excessive headaches, dizzy eyes, feeling tired, uncomfortable and sweating easily. Based on the description above, the researcher is interested in analyzing the relationship between the hot working climate and the blood pressure of workers at the Laundry Installation of RSUP Dr. Sardjito Yogyakarta.

Research Method

This type of research is a quantitative design, using aapproach *cross sectional,* where the independent variables (hot work climate) and dependent variables (blood pressure) are observed only once at the same time. This research was conducted on February 27, 2018, and was carried out at the Laundry Installation of Dr. RSUP Sardjito Yogyakarta. The number of workers in the Laundry Installation as many as 35 people with samples taken from the entire population of workers in the Laundry Installation. The variable hot working climate uses the appropriate category <31ºC and does not match ≥ 31ºC for the blood pressure dependent variable using the category of increase and decrease. The analysis used is univariate and bivariate analysis with the provisions of thetest *Chi-Square*. If *p value* <0.05, then Ho is rejected and if *p value* > 0.05, then Ho is accepted by

Finding

Characteristics of Respondents

Based on the results of data collection of workers in the Laundry Installation, the respondent's age is at least 19 years and maximum age is 57 years. And it was found that some age groups more than 80% experienced an increase inblood pressure *systolic* in the early adult group, late adult, early elderly and late elderly. And almost all age groups experience an increase inblood pressure *diastolic* by 100% for late adolescents, late adults and early elderly. Based on gender distribution in the Laundry Installation section, all male workers experience increased pressure, both *systolic* blood pressure andblood pressure *diastolic* by 100%. Meanwhile, some more than 70% of women also experience an increase in *systolic* blood pressure andblood pressure *diastolic.*

The history of blood pressure showed that the majority in the category did not have a history of blood pressure which many experienced an increase in *systolic* blood pressure andblood pressure *diastolic* by 87%. And in the category that has a history of blood pressure most also experienced an increase in *systolic* blood pressure andblood pressure *diastolic* by 75% and 100%. And more than 80% of workers who work with a light workload also experience an increase in *systolic* blood pressure andblood pressure *diastolic* by 85.8% and 88.6%.

Hot Work Climate

Table 1. Measurement of Hot Work Climate in the Laundry Installation section of Dr. RSUP Sardjito

Measurement Point Measuring	Results (C)	NAB (31 C)	Mean
Point 1 Point 2 Point 3	25 33 35	According Not Appropriate Not Corresponding	33,51

In table 1. based on the measurement results of hot work climate carried out at 3 points in the Laundry Installation RSUP Dr. Sardjito obtained measurements at point I (administrative space) where the measurement results obtained were 25ºC, point 2 (*dirty area)* the measurement results obtained were 33ºC and at point III (*clean area*) the measurement results obtained were equal to 35ºC. The results of the measurement of the hot working climate in the Laundry Installation section of Dr. RSUP Sardjito shows two points that ≥31ºC these results exceed the NAB that has been set[5].

Changes in Blood Pressure

Table 2. Changes in Blood Pressure after Exposure to Hot Work Climate at Respondents in the Laundry Installation Section of RSUP Dr. Sardjito

Blood Pressure	Changes inBlood Pressure				Total	
	Increases		Decreased			
	Frequency	%	Freq	%	Freq	%
Systole	30	85.7	5	14,3	35	100
Diastole	29	82,9	6	17,1	35	100

Based on table 2. From the results ofblood pressure measurements *systolic* showed that of the 35 respondents in the Laundry Installation there were 30 respondents (85.7%) experiencing an increase, while forblood pressure *diastole* there were 29 respondents (82.9%) experiencing an increase in the Relationship of Work Climate to increased blood pressure

Table 3. Work climate to increase systolic blood pressure

Work	Climate Sistole Blood Pressure Change				Total		Sign
	Increases		Decrease				
	N	%	N	%	N	%	
In Accordance with	2	50	2	50	4	100	0.03
Not Corresponding	28	90.3	3	9.7	31	100	

Table 4. Work climate towards increased blood pressure distole

Working Climate	Change of Diastole Blood Pressure				Total		Sign
	Increases		Decrease				
	N	%	N	%	N	%	
Corresponding	2	50	2	50	4	100	0.01
Not Corresponding	29	93,5	2	6,4	31	100	

Based on table 4.statistical test results Chi-Square show Sign for 0.03 < 0.05 which means that Ho is rejected so that there is a relationship between the hot work climateblood pressure systolic andand in table 5. Sign 0.01 <0.05, which means that Ho is rejected so there is a relationship between the hot work climate andblood pressure diastolic. Workers who work in points II and III, namely workplaces that do not comply with the NAB, have experienced an increase in blood pressure, both systolic blood pressure andblood pressure, diastolic

namely 90.3% and 93.5%. Furthermore, at point I workplaces that have a work climate in accordance with the NAB there are 4 workers, of which 2 (50%) workers have increased systolic blood pressure orblood pressure diastolic due to other factors, one of which is a history of blood pressure.

Discussion

The measurement of hot working climate in the Laundry Installation section is carried out at 3 points, namely point I (administrative space) where there are 4 workers at that point, point II (*dirty area*) there are 6 workers, and point III (*clean area*) there are 25 the worker. Point I for employees of Laundry Installation staff, while point II and point III are places where workers do work, where workers also work close to machines. At the time of conducting research the measurement of the hot working climate that was felt when entering into the room was heat because the machines were adjacent to the activities of the workers and the rooms were not so wide. The results of the measurement of hot work climate obtained at point I is 25ºC, at point II of 33ºC and at point III of 35ºC.

According to the Minister of Manpower and Transmigration Regulation based on the calculation of workload obtained is a light workload with hours working 8 hours, the hot working climate must not exceed the Threshold Limit Value (NAB) which is equal to ≥ 31ºC[5]. Based on these regulations the work climate is hot in the Laundry Installation section of Dr. RSUP Sardjito has 2 points that exceed the Threshold Value (NAB), which is point II (*dirty area*) and point III (*clean area*). At point I (administration room) in accordance with the Threshold Value (NAB) because the room is an air-conditioned room for employees of Laundry Installation staff.

Blood pressure measurements were carried out on 35 respondents, of which 35 respondents spread over 3 points, namely point I there were 4 workers, point II Based on the results of theStatistics test *Chi-Square,* a hot working climate with blood pressure *systole* workers at the Laundry Installation RSUP Dr. Sardjito obtained a significance value of 0.03 (P <0.05) so that Ho was rejected, which means there is a relationship between the hot work climate andblood pressure *sisole* in workers at the Laundry Installation of RSUP Dr. Sardjito and obtained a significance value of 0.01 (P <0.05) so that Ho is rejected, which means that there is a relationship between the hot working climate andblood pressure *diastolic* in workers at the Laundry Installation of RSUP Dr. Sardjito. This research is in line with the research conducted by Jaswin (2004), which shows that there is a relationship between heat pressure andblood pressure *systolic* in the production workforce of PT. Tjokro Bersaudara with a sig value of 0.03 <0.05 and there is a relationship between heat pressure andblood pressure *diastole* in the production workforce of PT. Tjokro Bersaudara with a value of sig 0.04 <0.05. This shows that there is a relationship between the hot working climate and the blood pressure of workers in the Laundry Installation section of Dr. RSUP Sardjito Yogyakarta and point III there are 31 workers, where point I and point II have a hot work climate that exceeds NAB. In addition, the results of the measurements also showed that workers who worked in that place experienced a lot of increased blood pressure both *cystole* blood pressure andblood pressure *diastolic* which was equal to 90.3% and 93.5%. Meanwhile, those who experienced a decrease in *systolic* blood pressure andblood pressure were *diastolic* only 9.7% and 6.4%. Furthermore, at point I workplaces that have a work climate in accordance with the NAB there are 4 workers, of which 2 (50%) workers have increased *systolic* blood pressure orblood pressure *diastolic* due to other factors, one of which is a history of blood pressure. Whereas,who experienced a decrease in *systolic* blood pressure orblood pressure *diastolic* there were 2 (50%) respondents.

Conclusion

Measurement of hot working climate in the Laundry Installation section of Dr. RSUP Sardjito is done at 3 points, namely point I (administrative space) 25ºC, point II (*dirty area*) 33ºC, and point III (*clean area*) 35ºC, where the highest measurement results at point II and point III value > 31ºC exceeds the Threshold Value (NAB). Blood pressure measurement in the respondent of the Laundry Installation of RSUP Dr. Sardjito majority experienced an increase in *systolic* blood pressure andblood pressure *diastolic* by 90.3% and 93.5%. The statistical test results obtained the relationship between hot work climate andblood pressure *systolic* on workers in the Laundry Installation obtained a significance value of 0.03 (P <0.05) and the relationship of hot work climate withblood pressure *sisole* on workers in Laundry Installation and obtained a significance value of , 01 (P <0.05).

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Ethical Clearance: the study was approved by the Surakarta University's Ethical Bord of the Muhammadiyah, Faculty of Health Sciences, Publict Health, Study Program.

All subjects have been fully informed about the procedure for signing an informed consent form.

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