

ANALYSIS OF FACTORS THAT INFLUENCE THE CONTACT DERMATITIS EVENTS IN MOTORBIKE WORKSHOP WORKERS

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ABSTRACT : Occupational skin diseases in some countries reach 50-70 cases per 100,000 workers per year. Contact dermatitis is the response of the skin in the form of inflammation caused by a substance or substance attached to the skin. Contact dermatitis in motorbike workshop workers is caused by exposure to the use of battery water (sulfuric acid), as well as petroleum products such as lubricating oil, gasoline, and coolant. Occurrence of occupational contact dermatitis can generally be caused by factors such as duration of contact, history of skin diseases, personal hygiene and the use of Personal Protective Equipment (PPE). This study aims to analyze the factors that influence the incidence of contact dermatitis in workers in motorbike workshop in Kendari City 2018. This study uses a quantitative approach with cross sectional study design. The population in this study was all workers in motorbike workshop in Kendari City on 2018 with a total sample of 59 people. The statistical analysis used chi square and logistic regression. Based on result showed that the dominant factors that influence contact dermatitis are the duration of contact and the use of PPE. Likewise in this study that contact time > 8 hours a day can be 29 times the risk of suffering from contact dermatitis compared with contact time ≤ 8 hours a day. Based on risk analysis, if the workers do not use PPE, it can risk 19 times suffering from contact dermatitis compared to using PPE completely.

KEYWORDS: History of Skin Disease, Length of Contact, Occurrence of Dermatitis, Personal Hygiene, Use of PPE

I. INTRODUCTION

Occurrence of work-related diseases and occupational diseases often occur in workers, especially in the informal sector workers. One of the problems in occupational health is occupational diseases [1]. Occupational Disease is a disease caused by work or the work environment. Occupational diseases that often occur are contact dermatitis. Contact dermatitis is dermatitis caused by substances or substances that enter to the skin [2]. Skin diseases constitute up to 40% of all notified occupational diseases (OD) in most European countries involving contact dermatitis, contact urticaria, and in some countries, skin cancer. In general, national registries are often incomplete as a result of a high under-diagnosing and under-reporting. The average incidence rate of registered occupational contact dermatitis is around 0.5–1.9 cases per 1000 full-time workers per year, with a significant social and economic impact. In Europe, the incidence of a newly reported case is estimated at 0.5–1 per 1000 workers annually [3][4].

In the United States, 90% of health claims due to skin disorders in workers are caused by contact dermatitis. Consultation to a dermatologist for 4-7% is caused by contact dermatitis. Hand dermatitis affects 2% of the population and 20% of women will be affected at least once in their lifetime. Children with 60% contact dermatitis will test positive on the patch test result [5]. The prevalence of contact dermatitis is certainly unknown, but the results of a previous survey showed a significant proportion of work-related diseases nearly 50% were caused by work-related injuries, and the most frequently affected injuries were hands. Contact dermatitis presents a significant economic burden. From all patients of contact dermatitis, 80% patients are caused by irritant contact dermatitis, while 10-20% patients are allergic contact dermatitis [6].

Occurrence of contact dermatitis due to work can generally be caused by factors such as length of service, duration of contact, personal hygiene, history of skin diseases and the use of PPE, from these factors it can be seen that workers with long working ≤ 2 years can be one of the factors indicates that the worker does not have enough experience in doing his work. Personal hygiene seen from the personal hygiene of workers can prevent the spread of germs and diseases reduce exposure to chemicals and contamination, prevent skin allergies, skin conditions and sensitivity to chemicals. A history of previous skin disease can produce severe

dermatitis from allowing irritants to easily enter the dermis. Using PPE can avoid chemical splashes and avoid direct contact with chemicals [7]. Contact dermatitis in workers of motorbike workshop is caused by exposure to the use of battery water (sulfuric acid), as well as petroleum products such as lubricating oil, gasoline, and coolant. *Accu zuur* (concentrated H₂SO₄) is one of the examples of chemicals that can cause contact dermatitis in workers of motorbike workshop [8].

Dermatitis became one of the ten major occupational diseases. The Study of Health Department of Indonesia in 2016 found that 44.2% informal workers suffered allergic contact dermatitis. Moreover, on 'Profile of Workers' Health Problems in Indonesia' in 2017, it was found 50.5% workers had health problems that were allegedly related to work, one of which was skin disorders of 5.3% [9][10]. It has been found that 65.7% workers in motorbike workshop suffered contact dermatitis due to work; from the workers with contact dermatitis had poor hand washing habits. Workers who have a bad hand washing habit have a risk to suffer contact dermatitis due to work 18,791 times greater than workers who have good hand washing habits [11].

Based on the results of first survey conducted in August 2018, the number of motorbike workshops in the Kendari City Region was 198 workshops, including 12 formal workshops, and 186 non-formal workshops, while motorbike workshop workers in Kendari had 459 mechanical workers, some workers complained of itching on the skin, peeling hands, redness, dry skin and wound on the hands after work. In addition, there were 5 workers of motorbike workshop with contact dermatitis after they were exposed or in contact with chemicals [10]. Thus, the authors are interested in conducting research on the factors that influence the incidence of contact dermatitis in workers of motorbike workshop in Kendari. This study is expected to be able to find prevention and control measures, so that the workers' health, especially for their skin health, can be guaranteed and they can work more productively.

II. MATERIALS AND RESEARCH METHODS

This research uses a quantitative approach with cross sectional study design. In this study taking the dependent variable and independent variables carried out at the same time. The time and place of research is in October 2018 in all Kendari City workshops. The population in this study was all workers in motorbike workshop in the city of Kendari on 2018 totaling 459 workers. The sample in this study amounted to 59 respondents using stratified random sampling based on the number of workshops per district. The research instrument used was a doctor's examination sheet to diagnose the incidence of contact dermatitis, observation sheets and questionnaires. Statistical analysis is used to look at factors that influence the incidence of contact dermatitis. Chi-square analysis was used to see factors related to contact dermatitis and the dominant factors affecting logistic regression were used. The data obtained and processed will then be displayed in tabular form and interpreted in an explanatory form.

III. RESULT AND DISCUSSION

Characteristics of respondents by sex are 100% male. Whereas based on the age of the respondents is presented in Table 1.

Table1 Distribution of Respondents by Age at Motorbike Workshop
Workers in the Kendari City Work Area on 2018

No	Age (Years)	Total (n)	Percentage (%)
1	15-30	46	78.0
2	31-45	13	22.0
Total		59	100.0

Source: Primary data, processed November 2018

Table 1 shows that of the 59 (100%) respondents, the majority of respondents who worked in the motorbike workshop aged 15-30 were 78.0% and aged 31-45 years were 22%. The age group in this study ranges from 15 - 45 years. Similarly, Anggraini et al (2017) show that the age group of 15-44 years is the productive age group. This group of people is exposed to many sources of allergens, especially from the work environment. They have more opportunities for sensitization in their work, such as factory workers (eg rubber, metals, textiles), health care workers (eg alcohol, drugs, cleaners), and workers (eg cement, ink, paint) [12].

The variables in this study consisted of the dependent variable namely contact dermatitis and the independent variable which was contact time, history of skin disease, personal hygiene, and use of PPE. Table 2 shows that there were 47 (79.7%) respondents who suffered contact dermatitis and 12 (20.7%) respondents who did not experience symptoms of contact dermatitis. Based on the duration of contact at risk ie workers

who on average had worked > 8 hours / day totaling 37 respondents (62.7) and not at risk ($\leq$ 8 hours / day) totaling 22 respondents (37.3%).

Table 2. Distribution of Variables

Variable	Dimention	Total (n)	Percentage (%)
Dermatitis	Yes	47	79,7
	No	12	20,7
Contact Duration	Risky	37	62,7
	Safe	22	37.3
Skin Disease History	Risky	40	67.8
	Safe	19	32.3
Personal Hygiene	Less good	45	76.3
	Good	14	23.7
PPE use	Incomplete	52	88.1
	Complete	7	11.9
Total		59	100.0

Source: Primary Data, processed November 2018

History of skin disease in the form of inflammation of the skin with subjective symptoms such as itching, burning, redness, swelling, formation of small blisters on the skin, peeling skin, dry skin, scaly skin, and thickening of the skin or skin disorders that have previously been and are suffered by workers . Based on table 2, the most respondents have a history of skin diseases at risk with the number of 40 (67.8%) respondents and 19 (35.3%) respondents do not have a history of skin diseases at risk.

Personal Hygiene is cleanliness seen from the behavior of workshop workers. Hygiene workers to clean hands before and after work, wash clothes used after work, and the absence of stains or splashes of chemicals on workers' clothes while working. Respondents with good personal hygiene with a total of 45 (76.3%) respondents and personal hygiene that is not good with a number of 14 (23.7%) respondents. The use of PPE is the use of personal protective equipment when working. Out of 59 respondents, 52 (88.1%) of incomplete respondents used PPE and 7 (11.9%) respondents used complete PPE.

The results of research on factors related to the incidence of contact dermatitis are presented. Based on table 3, shows that there is a relationship between contact duration and the incidence of contact dermatitis (P value = 0.000), there is a relationship between personal hygiene and contact dermatitis (P value 0.026), there is a relationship between the use of PPE and the incidence of contact dermatitis (P value 0.003) , and there is no relationship between the history of skin disease with the incidence of contact dermatitis (P value 0.174).

Table 3. Factors related to the incidence of contact dermatitis in workers of motorbike workshop in the working area of Kendari City on 2018

Motorbike Workshop in the Working Area of Kendari City on 2019								
No	Variable	Dermatitis				Total		p-value
		Yes		No				
		n	%	n	%	n	%	
1	Contact Duration							
	Risky	35	94.6	2	5.4	37	100	0.000
	Safe	12	54.5	10	45.5	22	100	
2	Skin Disease History							
	Risky	34	85	6	15	40	100	0.174
	Safe	13	68.4	6	31.6	19	100	
3	Personal Hygiene							
	Less Good	39	86.7	6	13.3	45	100	0.026
	Good	8	57.1	6	42.9	14	100	

4	PPE Use							
	Incomplete	45	86.5	7	13.5	52	100	0.003
	Complete	2	28.6	5	71.4	7	100	
	TOTAL	47	79.7	12	20.3	59	100	

Source: Primary Data, processed November 2018

Factors affecting the incidence of contact dermatitis were analyzed using logistic regression. Based on Table 3., the p-value <0.25 can be included in the logistic regression for the simultaneous test. So by using the step (wald) method in logistic regression analysis, the results obtained as in Table 4..

Tabel 4. Logistic Regression Analysis

No	Variabel	Koef B	p-value	Exp (B)	95% CI for Exp (B)	
					Lower limit	Upper limit
1	Constant	-2,763	0,018	0,063	-	-
2	Contact Duration	3,372	0.005	29.148	2.816	301.758
3	PPE Use	2,976	0,024	19,617	1,486	258,987
4	Konstant	-2,763	0,018	0,063	-	-

After being tested with bivariate analysis, the data were then tested using logistic regression analysis to find out the most dominant independent variable. Table 4 shows that the most dominant variables influencing are the duration of contact and the use of PPE. This is indicated by Exp (B) which states the risk of dermatitis. Simultaneously it can be described that the variable contact time > 8 hours a day can be 29 times risk of suffering from contact dermatitis compared to the contact time lama 8 hours a day. Likewise, if you do not use PPE can risk 19 times suffering from contact dermatitis compared to using PPE completely.

IV. DISCUSSION

Effect of contact duration on contact dermatitis occurrence

Occupational health is defined as health science and its application which aims to create a healthy, productive workforce, is in a balance between work capacity, workload and work environment and protected from diseases caused by work and work environment. Occupational health efforts covering workers in the formal and informal sectors are aimed at protecting workers so that they can live healthy and free from health problems and adverse effects caused by work [13][14]. In acute exposure, mucosal responses to the lubricant usually cause skin damage, irritation and skin hair fall out easily due to root damage. Characterized by the start of an acute reaction on the surface of the back of the hands, fingers, and feet, can develop later into a skin disorder, called the perifolliculate papules.

In some individuals it can cause skin sensitization. Whereas on chronic or repeated exposure for a long period of time can cause damage to the skin, for example causing dermatitis, and effects such as acute exposure. The occurrence of contact dermatitis can also be caused by three factors, namely chemical factors, mechanical/physical factors, and biological factors. From these factors, the most factors are caused by chemical factors. The cause of allergic contact dermatitis is allergens, most often in the form of chemicals weighing less than 500-1000 Da, which are also called as simple chemicals [5].

Workers who come into contact with chemicals cause damage to the outer layer skin cells, the longer the contact with chemicals, the more damage the deeper layer skin cells and make it easier for dermatitis. Contact with chemicals that are irritant or allergen continuously will cause the worker's skin to experience vulnerability ranging from mild to severe stages.

In this study, the contact time with irritants which were relatively risky was contact time> 8 hours / day. The results found that there were 62.7% of respondents who worked in a motorbike workshop had contact time with irritants or chemicals> 8 hours / day. Of the 37 respondents who had a long history of contact> 8 hours / day, 94.6% had contact dermatitis and 5.4% did not experience contact dermatitis. Based on logistic regression analysis, it is found that the contact variable which is the most dominant influence on contact dermatitis that occurs in Kendari City workshop workers. Some studies on tofu artisans mentioned that as many as 60% of workers in the home industry, are related to the relationship between the length of contact

with contact dermatitis as well as the working period > 2 years related to long exposure can help affect dermatitis [15][16]. Likewise in this study that contact time > 8 hours a day can be 29 times the risk of suffering from contact dermatitis compared with contact time $\leq$ 8 hours a day. This mean that occupational exposure to chemicals, even when it is low and does not exceed occupational exposure limits, may result in adverse health effects in the exposed workers [17].

Effects of the use of PPE on Contact Dermatitis

The use of personal protective equipment in this study was work clothes, boots and gloves. Based on the results of direct observation, workers did not use complete personal protective equipment. The average respondents did not use work shoes that covered the entire foot such as boots, they only used sandals and did not use gloves by excuse they felt disturbed because it was hot when they worn it. Moreover, work clothes that they often used were short-sleeved shirts. This could lead to skin disorders in respondents due to incompleteness in the use of PPE. In table 3, there were 52 respondents who were not good based on the use of PPE, 86.5% had contact dermatitis and those who did not experience contact dermatitis were 13.5%. Based on logistic regression analysis it was found that the use of PPE also affected contact dermatitis that occurred on workshop workers in Kendari. Based on risk analysis, if the workers do not use PPE, it can risk 19 times suffering from contact dermatitis compared to using PPE completely.

The present study, similar to previous reports, revealed that nickel sulphate is the most common allergen in allergic contact dermatitis (ACD) cases. Moreover, it was found that the symptoms of disease activity remained constant or increased in a significant proportion of the cases during the working days. Therefore, these workers should seriously follow up on this matter and change their occupation, or limit the exposure to allergens. Exposure should be minimized, work safety be considered, and treatment be continued for those cases who cannot change their occupation. [18] In order to avoid the risk of health problems, business owners must fulfill certain facilities in order to create work protection, safety and health. Currently the form of business risk control that must be done by the owner of a motorcycle workshop is the fulfillment of appropriate personal protective equipment [19].

In this study it was found that the majority of respondents who worked at the motorbike workshop had a history of skin disease were 67.8%. The results of the interview found that the dominant sick workers routinely take medication so it does not affect the occurrence of contact dermatitis again. Based on table 3 it is known that, both in the risk group and no risk group in the history of skin disease have the same percentage suffering from contact dermatitis. In the variable personal hygiene, both workers who have bad habits and good personal hygiene are more to suffer contact dermatitis. This study is in line with other studies regarding the factors associated with contact dermatitis in workers at the processing and filling section of PT. Cosmar Indonesia of South Tangerang which shows that there is no significant relationship between the history of skin diseases and the incidence of contact dermatitis [20].

V. CONCLUSION

Based on this research, it can be concluded that the dominant factors that influence contact dermatitis are the duration of contact and the use of Personal Protective Equipment.

VI. CONFLICT OF INTEREST

Authors declare no conflict interest.

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