

## **Risk Factor Analysis for Dermatitis Due to Work in Rubber Plantation Farmers**

*Analisis Faktor Risiko Dermatitis Akibat Kerja pada Petani Perkebunan Karet*

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### **ABSTRAK**

Dermatitis kontak akibat kerja merupakan kelainan kulit yang sering dijumpai pada petani perkebunan karet. Pemaparan zat kimia dalam proses penggumpalan karet dapat menyebabkan dermatitis kontak, mengakibatkan iritasi dan gangguan kulit lainnya dalam bentuk gatal-gatal, kulit kering dan pecah-pecah, kemerah-merahan, serta koreng yang tidak sembuh-sembuh. Dermatitis kontak akibat kerja di pengaruhi oleh lama kontak, personal hygiene, riwayat pekerjaan dan penggunaan Alat Pelindung Diri, riwayat penyakit kulit sebelumnya dan masa kerja. Tujuan penelitian ini ingin mengetahui faktor risiko kejadian dermatitis akibat kerja pada petani penyadap karet pada perkebunan karet lahan basah. Penelitian ini merupakan survei analitik dengan desain penelitian *cross sectional*, penelitian dilakukan pada bulan Januari 2020 di Wilayah Kecamatan Buay Madang Timur, Kabupaten OKU Timur Sumatera Selatan, sampel penelitian berjumlah 73 responden, melalui *simple random sampling*. Analisis data menggunakan analisis univariat (*proporsi*), bivariat (*uji chi square*) dan multivariat (*regresilogistik*). Hasil analisis menunjukkan bahwa lama kontak ( $p= 0,013$ ), personal hygiene ( $p= 0,011$ ), riwayat pekerjaan ( $p= 0,001$ ) dan penggunaan Alat Pelindung Diri ( $p= 0,001$ ) memiliki hubungan signifikan dengan kejadian dermatitis akibat kerja, sedangkan riwayat penyakit kulit sebelumnya ( $p= 0,097$ ) dan masa kerja ( $p= 0,95$ ) tidak memiliki hubungan yang signifikan terhadap kejadian dermatitis akibat kerja dan variabel penggunaan Alat Pelindung Diri (APD) merupakan variabel yang paling dominan dalam menimbulkan penyakit dermatitis akibat kerja. Hasil analisis diperoleh bahwa variabel penggunaan Alat Pelindung Diri (APD) merupakan variabel paling dominan dalam menimbulkan penyakit dermatitis akibat kerja.

Kata kunci: lama kontak, personal hygiene, riwayat pekerjaan

### **ABSTRACT**

Occupational contact dermatitis is a skin disorder that is often found in rubber plantation farmers. Exposure to chemicals in the process of rubber clumping can cause contact dermatitis, resulting in irritation and other skin disorders in the form of itching, dry and cracked skin. Occupational contact dermatitis is affected by contact duration, personal

hygiene, work history, use of personal protective equipment, history of previous skin diseases and years of service. The purpose of this study was to determine the risk factors for the incidence of dermatitis due to work in rubber tapping farmers on wetland rubber plantations. This research is an analytic survey with cross sectional research design, the study was conducted in January 2020 in the Region of East Buay Madang District, Regency of East OKU, South Sumatra, the study sample numbered 73 respondents, through simple random sampling. Data analysis using univariate analysis (proportion), bivariate (chi square test) and multivariate (logistic regression). The results of the analysis show that contact duration ( $p= 0.013$ ), personal hygiene ( $p= 0.011$ ), work history ( $p= 0.001$ ) and the use of Personal Protective Equipment ( $p= 0.001$ ) have a significant relationship with the incidence of occupational dermatitis, while a history of previous skin diseases ( $p= 0.097$ ) and years of service ( $p= 0.95$ ) do not have a significant relationship to the incidence of occupational dermatitis and variable use of Personal Protective Equipment (PPE) is the most dominant variable in causing dermatitis due to work. The results of the analysis found that the variable use of Personal Protective Equipment (PPE) is the most dominant variable in causing dermatitis due to work.

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Keywords: contact duration, personal hygiene, work history

## INTRODUCTION

Indonesia is a rich country in natural products, especially in the field of plantations that can produce materials to meet the needs of the community. The use of acetic acid in the process of clotting latex can cause occupational diseases such as skin diseases (Arja, 2018). Although it does not cause death, skin disease is very disturbing for the comfort of sufferers (Vachlevi, 2018). Therefore, skin disease is a very important factor for a decrease in work productivity and an increase in unemployment due to illness (Susmiati et al., 2019). Occupational contact dermatitis can also have an impact on decreasing the productivity of rubber processing (resources) on a certain scale for farmers and the government. (Ahyanti & Purwono, 2019). One of the skin diseases caused by work in rubber plantation workers is contact dermatitis due to work. (Ahyanti & Purwono, 2019) Occupational contact dermatitis is a common skin disorder. (Saftarina et al., 2015). The effects of rubber soaking activities can cause skin disorders. (Kurniasih & Selviana, 2016).

Farmers are at high risk of developing skin diseases as a result of work that might have started when work began (Śpiewak et al., 2017). Sanitary hygiene activities that

can be done in preventing dermatitis due to work is to maintain the cleanliness of clothing, (Audina et al., 2017) always change clothes every day 19 and eat nutritious especially lots of vegetables and fruit, (Venkatachalam et al., 2013) and keep the environment clean (Schwensen et al., 2013). Wash your hair at least 2 times a week, use shampoo/other hair washing ingredients, and you should use hair maintenance tools alone is an effort to maintain hair and scalp hygiene. Hair that is well maintained will make it clean and beautiful, giving rise to an impression of being clean and odorless (Filon et al., 2016). Several studies in agriculture and plantations have found a significant relationship between a history of previous skin diseases, (Vandenplas et al., 2016.) *personalhygiene* (Malik & English, 2015) and use of PPE (Behroozy & Keegel, 2014) with contact dermatitis.

From these data, we need a study of risk factors for occupational dermatoses to reduce the high morbidity caused. In epidemiological studies in Indonesia, data show that 97% of 389 cases were contact dermatitis, of which 66.3% were irritant contact dermatitis and 33.7% were allergic contact dermatitis (Ahyanti & Purwono, 2019). Dermatitis due to work can be influenced by several factors including a

history of skin disease, a person who has previously suffered from dermatitis will be more susceptible to irritants, because the skin's defense will decrease (Suryani et al., 2017), length of contact, the length of time someone works well in a day is generally 8 hours, extending work time more than the ability to work long will usually cause fatigue, health problems and illness, then personal hygiene, habits of workers who pay less attention to their physical conditions such as when come home from work immediately lie down and fall asleep without regard to his cleanliness (Saida, 2019), work period, workers who work > 2 years have more opportunities to be exposed to chemicals, so the longer the work, the longer the exposure to chemicals which ultimately can pose a risk of dermatitis symptoms (Fath et al., 2015). The purpose of this study was to determine the risk factors for dermatitic events due to work on rubber tapping farmers in rubber plantations.

## MATERIALS AND METHODS

This type of research was an observational study with a cross sectional study approach. The independent variables in this study were previous skin disease history, contact duration, personal hygiene, Job Experiences, work history and used of personal protective equipment. Then the dependent variable was occupational dermatitis. The population in this study were all rubber tapping farmers in the region of east Buay Madang District, OKU East Regency, South Sumatra. Where as the sample was 73 rubber tapping farmers who were taken. The research sampling technique Januari and Februari 2020 simple random sampling, which was simple random sampling (Arikunto, 2013).

Primary data was data collected directly by the researchers themselves. For data on dermatitis due to the examination work involving a General Practitioner. Besides that, they also observed and interviewed rubber tapping farmers which included

variables of previous skin disease history, contact duration, personal hygiene, job experience, work history and use of personal protective equipment. Secondary Data was data obtained through observing data from disease data records either from the Health Department or at the Public Health Center in East Buay Madang District, OKU East Regency, as well as from literature review.

Data was processed using SPSS 23.0 for Windows. Univariate analysis to see the frequency distribution and profortion of each of the factors included in the study. Bivariate analysis to determine the relationship of independent and dependent variables as well as to identify meaningful variables by using Chi-Square Test, using SPSS software with a significance limit  $\alpha$ : 0.05, the decision of the statistical results obtained by comparing the p value (p value) with a value of  $\alpha$ . Multivariate analysis to see the relationship between the dependent variable with several independent variables and find out which variable was most dominant related then an interaction test was performed. In this multivariate analysis logistic regression analysis method used was aimed at getting the most dominant variable, because the dependent variable was the dichotomous variable and the categorical independent variable (Hastono, 2018).

## RESULTS

### Univariate Analysis

Univariate analysis aimed to look at the frequency distribution and percentage of each variable both the dependent variable (occupational dermatitis) and the independent variable (previous skin disease history, contact duration, personal hygiene, years of service, job experience and used of personal protective equipment) (Table 1).

### Bivariate Analysis

The bivariate analysis aimed to see the relationship between the dependent variable

(occupational dermatitis) and the independent variables (previous skin disease history, contact duration, personal hygiene, years of service, job experience and used of personal protective equipment) by performing Chi Square statistical tests using the system computerization with SPSS version 23 and the significance level at  $\alpha$  (0,05) (Table 2). The results of the analysis of the relationship between the history of previous skin diseases with the incidence of occupational dermatitis obtained that the proportion of respondents who experienced dermatitis was greater in the group who had experienced skin disease (76.9%) compared to the group who had never experienced skin disease (55.9%). Statistical test results obtained  $p=0.097$ , it could be concluded that statistically at 5% there was no significant relationship between the history of previous skin diseases with the incidence of dermatitis due to work on rubber tapping farmers in the District of East Buay Madang, OKU East Regency 2020.

The results of the analysis of the relationship between contact duration and the incidence of occupational dermatitis showed that the proportion of respondents who experienced dermatitis was greater in the group whose contact was at risk ( $> 8$  hours a day) 81.6% compared with the group whose contact was not at risk ( $\leq 8$  hours a day) 51.4%. The statistical test results obtained  $p=0.013$ , it could be concluded that statistically at alpha 5% there was a significant relationship between the duration of contact with the incidence of dermatitis due to work on rubber tapping farmers in the District of East Buay Madang, OKU East Regency in 2020.

From the analysis also obtained OR values: 4.183 means that respondents who have long contact time have a risk of 4.183 times to experience dermatitis due to work compared with respondents who have long contact without risk. The analysis of the relationship between personal hygiene and the incidence of occupational dermatitis showed that the proportion of respondents

who experienced dermatitis was greater in the group with less personal hygiene 79.5% compared to the group with good personal hygiene 48.3%.

The statistical test results obtained  $p=0.011$ , it could be concluded that statistically at alpha 5% there was a significant relationship between personal hygiene with the incidence of dermatitis due to work on rubber tapping farmers in the District of East Buay Madang, East OKU Regency in 2020. From the analysis also obtained OR value : 4.167 means that respondents with poor personal hygiene have a 4.167 times chance to experience dermatitis due to work compared with respondents who have good personal hygiene.

The results of the analysis of the relationship between work period with the incidence of occupational dermatitis showed that the proportion of respondents who experienced dermatitis was greater in the group whose length of work was ( $> 2$  years) 76.2% compared to the group whose work period was new ( $\leq 2$  hours a day) 54.8%. Statistical test results obtained  $p=0.095$ , it could be concluded that statistically at alpha 5% there was no significant relationship between the working period with the incidence of dermatitis due to work on rubber tapping farmers in the District of East Buay Madang, OKU East Regency in 2020.

The results of the analysis of the relationship between work history and the incidence of occupational dermatitis showed that the proportion of respondents who experienced dermatitis was greater in the group whose work history was at risk 81.3% compared to the group whose work history was not at risk 40.0%.

The statistical test results obtained  $p=0.001$ , it could be concluded that statistically at alpha 5% there was a significant relationship between the history of work with the incidence of dermatitis due to work in rubber tapping farmers in the District of East Buay Madang, OKU East Regency 2020.

**Table 1. Frequency distribution and percentage of independent and dependent variables**

Research Variable	Total	Percentage (%)
<b>Previous History of Skin Disease</b>		
1. Ever	39	53.4
2. Never	34	46.6
<b>Duration of Contact</b>		
1. Risky	38	52.1
2. Not risky	35	47.9
<b>Personal Hygiene</b>		
1. Less good	44	60.3
2. Good	23	39.7
<b>Years of service</b>		
1. Long working period	42	57.5
2. New working period	31	42.5
<b>Job Experiences</b>		
1. Risky	48	65.8
2. Not risky	25	34.2
<b>Used of PPE</b>		
1. Not using	50	68.5
2. Using	23	31.5
<b>Dermatitis due to Work</b>		
1. Any	49	67.1
2. None	24	32.9

**Table 2. Relationship of independent variables and dependent variables**

Independent Variable	Dermatitis Due to Work				Total		Value p	Odd Ratio 95% CI
	Any		None		N	%		
	n	%	n	%				
<b>Disease History</b>								
1. Ever	30	76.9	9	23.1	39	100	0.097	2.632
2. Never	19	55.9	15	44.1	34	100		
<b>Duration of Contact</b>								
1. Risky	31	81.6	7	18.4	38	100	0.013*	4.183
2. Not Risky	18	51.4	17	48.6	35	100		
<b>Personal Hygiene</b>								
1. Less Good	35	79.5	9	20.5	44	100	0.011*	4.167
2. Good	14	48.3	15	51.7	29	100		
<b>Years of Service</b>								
1. Long Working Period	32	76.2	10	23.8	42	100	0.095	4.183
2. New Working Period	17	54.8	14	45.2	31	100		
<b>Job Experiences</b>								
1. Risky	39	81.3	9	18.8	48	100	0.001*	6.500
2. Not Risky	10	40.0	15	60.0	25	100		
<b>The Used of PPE</b>								
1. Not Used	40	80.0	10	20.0	50	100	0.001*	6.222
2. Used	9	39.1	14	32.9	23	100		

Note: \* meaningful at alpha 5%

**Table 3. Independent variables that enter the multivariate model candidates**

Influential Factors Against Dermatitis Due to Work	Log-Likelihood	G	p Value
Previous Disease History	88.798	3.664	0.056
Duration of Contact	84.798	7.664	0.006
Personal Hygiene	84.752	7.710	0.005
Years of Service	88.790	3.672	0.055
Job Experiences	79.978	12.484	0.000
Used of Personal Protective Equipment	80.829	11.633	0.001

Table 4. Final model of logistic regression between 2 independent variables and occurrence of dermatitis due to work

Variable	B	P Wald	OR	95% CI
Duration of Contact	1.813	0.005	8.129	1.736-21.634
Used of PPE	2.174	0.001	8.795	2.472-31.286
Constant	-6.488	0.000	0.002	

Table 5. Interaction test between duration of contact and used of PPE against dermatitis due to work

Interaction	-2 Loglikelihood	G	P Value
Duration of Contact	69.550	22.913	0.720
Used of PPE	69.550	22.913	0.809
Duration of Contact * Used of PPE	69.500	22.721	0.198

From the analysis also obtained OR value: 6.500 means that respondents whose work history was at risk have a 6,500 chance to experience dermatitis due to work compared with respondents whose work history was not at risk. The results of the analysis of the relationship between the used of PPE with the incidence of dermatitis due to work obtained that the proportion of respondents who experienced dermatitis was greater in the group that did not used PPE 80.0% compared to the group that used PPE 39.1%.

The statistical test results obtained  $p = 0.001$ , it could be concluded that statistically at alpha 5% there was a significant relationship between the used of PPE with the incidence of dermatitis due to work on rubber tapping farmers in the District of East Buay Madang, OKU East Regency in 2020. From the analysis also obtained OR values: 6.222 means that respondents who do not used PPE when working have a 6.222 times chance of experiencing dermatitis due to work compared with respondents who used PPE.

### Multivariate Analysis

#### Selection of Multivariate Candidate Variables

The selection of candidate variables was done through bivariate analysis. Bivariate test results that have a  $p \leq 0.25$  then these variables could be entered into the multivariate model, while variables that have a value of  $p > 0.25$  were not included in the multivariate analysis. In this study, there were 6 independent variables included in the multivariate analysis, namely, the

history of previous skin diseases, contact duration, personal hygiene, years of service, job experience and used of personal protective equipment (Table 3).

#### Determinant Factor Model of Occurrence Due to Dermatitis

From the results of logistic regression analysis in the final model (fit model), 2 variables were found to be statistically significant in relation to the incidence of dermatitis due to work. The two variables were contact duration and PPE usage variables. From model 5 it turns out that the variable with the greatest effect on the incidence of dermatitis due to work was the variable used of PPE. (Table 4).

#### Interaction Test Between Independent Variables

From the interaction test, there was no interaction between contact duration and the used of PPE ( $p = 0.198$ ). This kind of situation provides a clue that the relationship of PPE used with the incidence of dermatitis due to work does not have a different effect for respondents whose long contact was at risk and whose contact duration was not at risk (Table 5).

## DISCUSSION

#### Relationship Between the History of Previous Skin Diseases with the Incidence of Dermatitis Due to Work

This study is different from the study conducted by Mekonnen et al. (2019) who states that having a history of previous personal allergies is significantly related

to the incidence of contact dermatitis due to work (Mekonnen et al., 2019). There is no relationship between the history of skin diseases in rubber tappers farmers with the incidence of contact dermatitis, probably due to the dominant farmers doing their disease treatment at the doctor after the skin disease appears. Another cause is that after farmers have suffered from skin diseases, the body of the worker will appear antibodies so that this will be a place of defense if there are the same allergen factors that enter the body of rubber tapping farmers (Saida, 2019), different statement is stated by Mekonnen et al. (2019) that a history of previous skin diseases is related to the incidence of contact dermatitis. This situation is due to having a history of personal allergies before may worsen the occurrence of contact dermatitis. A more reasonable reason is that having a history of previous allergies can lead to the development of contact dermatitis, especially allergic contact dermatitis due to stimulation of body mechanisms, increasing an individual's susceptibility to responses to environmental triggers (Mekonnen et al., 2019).

### **The Relationship Between the Duration of Contact with the Incidence of Dermatitis Due to Work**

Atopic dermatitis (DA) is an inflammatory skin disease that is very itchy and is chronic residif. The etiology and pathogenesis of DA are multifactorial including genetic disorders, skin barrier disorders, immunological disorders and are influenced by environmental factors and stress. The relationship between the nervous system, endocrine and immunological systems has long been known, the three systems communicate through the pathway; electrical signals, biochemical signals and hormone pathways. The communication is coordinated in an effort to maintain the homeostasis of the body. Miter neurotrans are endogenous organic compounds carrying signals between neurons, neurotransmitters stored in synaptic vesicles, before being released

to coincide with the action potential (electrical signal). Neurotransmitters send signals from neurons to target cells at the synapse and then are released into the synaptic cleft, which is bound to the membrane receptors on the postsynaptic side of the synapse. The nervous system with its billions of neurons will produce a neurotransmitter and the presence of electrical signals as a potential action will help release neurotransmitters.

Endocrine system with its hormone products and immune system with various types of cytokines. All of these mediators influence each of the three systems. Psychological stress (stress) is one of increasing neurochemical synthesis and release through a behavior conversion system that affects the signals in the neuroendocrine system both chemical signals and electrical signals and can ultimately reach targets in the immunological compartment.

Once in the bloodstream, neurotransmitters can then diffuse into the extraneuronal space and have an effect on the immune system. Some of these neurotransmitters and cytokines will affect neurogenic inflammation (Citrashanty & Prakoeswa, 2012).

This study is in line with research conducted by Darwadi (2017) where the results of the study showed that almost half of the heavy contact respondents had grade 2 dermatitis which is 18 (30.5%) of 59 respondents and from the results of statistical testing using the Spearman Rank Test (Rho). It can be seen that  $p = \text{value}$  is  $0,000 < \text{from } \alpha = \text{alpha}$  which is 0.05. Which means that  $H_0$  is rejected and  $H_1$  is accepted, then there is a relationship between chemical contact with dermatitis among farmers in the farmer group in Sekaran Village, Tuban Regency in 2017. And it can be seen that a close relationship is strong with  $p = 0.770$  (Susmiati et al., 2019). Skin contact with chemicals that are irritant or allergen continuously with a long duration and the amount of material, will cause vulnerability in workers ranging from mild to severe stages.

Length of contact with the amount of chemicals will increase the occurrence of Contact Dermatitis Due to Work. The longer the contact with the amount of chemicals, the inflammation or skin irritation can occur, causing skin disorders. Farmers who come into contact with chemicals cause damage to the outer layer skin cells, the longer the contact the more damage the deeper layer skin cells and make it easier for dermatitis.

Risk control, namely by limiting the number and duration of contact that needs to be done. For example, such as efforts to control the duration of contact with the amount of chemicals using terminology (Susmiati et al., 2019).

This study is also in line with the research of Ramdan et al. (2018) who found a relationship between work duration and the incidence of dermatitis due to work. Workers with more than 8 hours of work per day show longer contact with irritants longer than workers who work less than 8 hours per day, mainly based on other variables observations found that most respondents did not use personal protective equipment such as proper gloves so that the skin of the hands is not protected from exposure to irritants with exposure time of more than 8 hours per day; and the study also concluded that physical and chemical irritation is related to epidermal cell damage to the skin and removing epidermal lipids from the epidermis. To prevent and treat irritant contact dermatitis, contact time must be minimized/restricted and irritation must be inhibited to come in contact with the skin (Ramdan et al., 2018).

### **The Relationship Between Personal Hygiene with the Incidence of Dermatitis Due to Work**

This study is in line with research conducted by Mekonnen et al. (2019) who states that personal hygiene is significantly related to the incidence of contact dermatitis due to work (Mekonnen et al., 2019). The skin is an important outermost part that functions as the body's defense system, for that skin health must be

maintained and cared for. The skin reflects the first health. The skin must be maintained by increasing personal hygiene. Disturbances or impacts that can arise due to lack of personal hygiene, namely physical and psychosocial impacts (Chen et al., 2017) Physical impact, is a physical disorder that occurs due to a health problem suffered by someone because of not maintaining good personal hygiene.

Disorders that often arise are disorders of the oral mucous membrane, disruption of skin integrity, infection of the eyes and ears, and interference with scales on the nails. Psychosocial impact, is a social problem associated with personal hygiene, including disruption of the need for a sense of comfort, disruption of social interaction and self-actualization.

(Nishihara et al., 2018) Wash your hands repeatedly exposed to constant wetting and drying, removing protective substances from the skin which makes them more flexible and more susceptible to work-related dermatitis (Mekonnen et al., 2019). Poor personal hygiene, such as poorly washing hands can cause chemicals to stick to the hands so that it can facilitate the risk of occupational dermatosis symptoms (Fath et al., 2015).

Observation results show, there are still workers who do not wash their hands before and after work, also seen workers who wash their hands but do not do all the steps of washing hands properly and correctly. The stages that are passed are washing between the fingers and fingernails.

### **Relationship Between Work Period with the Incidence of Dermatitis Due to Work**

This study is different from the research conducted by Suryani et al. (2017) who found an association between work period and the incidence of irritant contact dermatitis in rice farmers with a p value: 0.019 and an Odd Ratio (OR) of 3.900. (Suryani et al., 2017).

Workers who work > 2 years have more opportunities to be exposed to chemicals, so the longer the work, the longer exposure to



chemicals can eventually lead to the risk of symptoms of occupational dermatosis. The longer the work, the longer it will be exposed to the materials in the work environment (Fath et al., 2015).

There is no relationship between work period and the incidence of dermatitis in this study, because workers who have a relatively long work period do not have the risk of developing irritant contact dermatitis, because of the possibility of workers who work longer, their skin has experienced resistance to irritants that are around work environment, on the other hand workers who have a relatively new working period of their skin are more sensitive to irritants, so they are more prone to experience irritant contact dermatitis (Suryani et al., 2017).

#### Relationship Between Work History and the Incidence of Dermatitis Due to Work

The results of this study differ from studies conducted by Suryani et al. (2017) which state that there is no meaningful relationship between work history and the incidence of irritant contact dermatitis in rice farmers with p value: 0.679 with Odd Ratio value (OR): 1,4 (Suryani et al., 2017).

Job experience history is one of the factors that can be considered in determining the cause of irritant contact dermatitis. This is needed because of the possibility of dermatitis suffered as a result of previous work. Some occupations that are at risk of contact dermatitis due to work are workers in agriculture, buildings, color dyes and trade or livestock (Suryani et al., 2017).

According to interviews conducted with respondents, other than as rubber farmers, it is known that most farmers have side jobs that are at risk of being exposed to irritants which is raising livestock. Livestock manure contains biological agents that can cause irritant contact dermatitis when in contact with the skin repeatedly and for a long time. Parasites and other biological agents presented in animal dung can trigger skin disorders such as itching, swelling and redness.

#### **The Relationship Between the use of PPE and the Incidence of Dermatitis Due to Work**

This study is in line with research conducted by Mekonnen et al. (2019) which states that the use of gloves is significantly related to the incidence of occupational contact dermatitis. This study also showed that a pair of gloves used per day is an important risk factor associated with the incidence of contact dermatitis. This is because gloves may be a barrier and function as a protective skin exposure that may be disturbed by pollutants (Mekonnen et al., 2019). Research conducted in the District of East Buay Madang, OKU East Regency, South Sumatra, found that there is a significant relationship between the use of PPE and the incidence of skin diseases. The rubber tapping activity uses chemicals as a mixture in the coagulation process. These materials can enter the skin and mucosa acutely and chronically. The effect is felt in the form of irritation and allergy with symptoms of itching (during morning, noon, night, or all day), red spots/bumps/bullae that contain clear fluid or pus on the skin surface of the body, arise rashes, sometimes accompanied by fever.

In order to avoid skin diseases due to mixed chemicals, workers should wear masks, gloves and wear non-slippery boots so that the feet are protected from being splashed with water mixed with ant acid during latex clumping. Hands, body and feet are the parts of the body most often affected by contact dermatitis due to work in rubber plantations. The types of PPE that are relevant to work in contact with rubber on plantations are gloves, boots, masks and protective clothing (Ahyanti & Purwono, 2019).

#### **CONCLUSION**

Based on the results of data collection on rubber plantation farmers and the results of statistical analysis shows that the duration of contact, personal hygiene, work history and the use of personal protective equipment have a significant relationship

with the incidence of dermatitis due to work, while a history of previous skin diseases and years of service have no significant relationship significant with the incidence of occupational dermatitis, where the variable use of personal protective equipment is the most dominant variable in causing occupational dermatitis in wetland rubber plantation farmers in Buay Madang Timur District, East OKU Regency, South Sumatera.

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### REFERENCES

- Ahyanti M, Purwono P. 2019. Risk of skin diseases due to work in rubber plantation and processing companies. *Jurnal Kesehatan*. 10 (1): 39–46.
- Arikunto S. 2013. Research Procedure: A Practical Approach. Jakarta: Rineka Cipata.
- Arja AR. 2018. Rubber tapping (*Hevea brasiliensis* Mull-Arg.) at the Gurach Batu Estate rubber plantation, Asahan, North Sumatera, *Buletin Agrohorti*. 6 (1): 1–9. DOI: 10.29244/agrob.v6i1.16817.
- Audina DV, Budiastuti A, Widodo YA. 2017. Factors causing contact dermatitis due to work in salon workers. *Jurnal Kedokteran Diponegoro* 6: 1–11. DOI: 10.14710/dmj.v6i0.18801.
- Behroozy A, Keegel TG. 2014. Wet-work exposure: a main risk factor for occupational hand dermatitis. *Safety and health at work*. 5 (4): 175–180. DOI: 10.1016/j.shaw.2014.08.001.
- Venkatachalam P, Geetha N, Sangeetha P, Thulaseedharan A. 2013. Natural rubber producing plants: An overview. *African Journal of Biotechnology*. 12 (12): 1297–1310. DOI: 10.5897/AJBX12.016.
- Chen Y-X, Gao B-A, Cheng HY, Li L-F. 2017. Survey of occupational allergic contact dermatitis and patch test among clothing employees in Beijing. *Bio Med research international*, 2017.
- Citrashanty I, Prakoeswa CRS. 2012. Damage to the skin barrier in atopic dermatitis (Skin Barrier Dysfunction in Atopic Dermatitis). *Journal Unair*. April 2012.
- Filon FL, Bello D, WCherrie J, Sleeuwenhoek A, Spaan S, Derk H. 2016. Brouwer. Occupational dermal exposure to nanoparticles and nano-enabled products: Part I—Factors affecting skin absorption. *International Journal of Hygiene and Environmental Health*. 219 (6): 536–544. DOI: 10.1016/j.ijheh.2016.05.009.
- Schwensen JF, Friis UF, Menné T, Johansen JD. 2013. One thousand cases of severe occupational contact dermatitis. 68 (5): 259–268. DOI: 10.1111/cod.12045.
- Fath M, Anita DPS, Yunus A. 2015. Risk factors that affect to occupational dermatosis symptoms on the poultry slaughterhouse employees. *Artikel Ilmiah Hasil Penelitian Mahasiswa*. 2015.
- Hastono SP. 2018. Data Analysis in the Health Sector. Indonesia: Raja Grafindo.
- Kurniasih E, Selviana N. 2016. Factors related to the incidence of skin disorders in the community in Puguk Village, Sungai Ambawang District, Kubu Raya Regency in 2015. *Fakultas Ilmu Kesehatan*.
- Mekonnen TH, Yenealem DG, Tolosa BM. 2019. Self-report occupational-related contact dermatitis: prevalence and risk factors among healthcare workers in Gondar town, Northwest Ethiopia, 2018 a cross-sectional study. *Environmental health and preventive medicine*. 24 (1): 11.
- Nishihara S, Kozuka T, Sasaki, K. 2018. Allergic contact dermatitis caused by Solvent Orange 60 dye in the temple tips of eyeglasses and a review of cases of eyeglass allergic contact dermatitis. *Journal of Cutaneous Immunology and Allergy*. 1 (2): 64–68.

- Ramdan IM, Ilmiah SH, Firdaus AR. 2018. Occupational irritant contact dermatitis among shipyard workers in Samarinda, Indonesia. *KEMAS: Jurnal Kesehatan Masyarakat*. 14 (2): 239–246.
- Saftarina F, Sibero HT, Aditya M, Dinanti BR. 2015. Prevalence of occupational contact dermatitis and the factors that influence it in cleaning service workers at Abdul Moeloek General Hospital. Paper presented at the Bandar Lampung: *In: Proceedings Seminar Presentasi Artikel Ilmiah Dies Natalis FK Unila ke*. Lampung, Indonesia.
- Saida S. 2019. Determinants of contact dermatitis incidence in workshop workers in Kendari City *Jurnal Keperawatan Muhammadiyah*. 4 (2).
- Śpiewak R, Góra-Florek A, Horoch A, Jarosz MJ, Doryńska A, Golec M, Dutkiewicz J. 2017. Risk factors for work-related eczema and urticaria among vocational students of agriculture. *Ann Agric Environ Med*. 24 (4): 716–721. DOI: 10.26444/aaem/81002.
- Vandenplas O, Froidure A, Meurer U, Rihs HP, Riffart C, Soetaert S, Jamart J, Pilette C, Raulf M. 2016. The role of allergen components for the diagnosis of latex-induced occupational asthma. *Allergy*. 71 (6): 840–849. DOI: 10.1111/all.12872.
- Suryani ND, Martini M, Susanto HS. 2017. Comparison of risk factors for the incidence of irritant contact dermatitis between salt farmers and rice farmers in Kaliori sub-district, Rembang district. *Jurnal Kesehatan Masyarakat (e-Journal)*. 5 (4): 444–454. DOI: 10.14710/jkm.v5i4.18661.
- Susmiati S, Darwadi D, Lutfi EI. 2019. The relationship between urea fertilizer contact with dermatitis on farmers in Sekaran village, Tuban district in 2017. *Nursing Sciences Journal*. 1 (1): 57–65. DOI: 10.30737/nsj.v1i1.85.
- Vachlevi A. 2018. Effect of latex dilution on the characteristics and technical quality of natural rubber. *In: Prosiding Seminar Nasional I Hasil Litbangyasa Industri107*. Palembang, Indonesia p 107–118.
- Malik M, English J. 2015. Irritant hand dermatitis in health care workers. *Occupational Medicine*. 65 (6): 474–476. DOI:10.1093/occmed/kqv067.