Factors that Correlation to Occupational Contact Dermatitis Among Tobacco Farmers in Jember District, East Java Province, Indonesia

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Factors that Correlation to Occupational Contact Dermatitis Among Tobacco Farmers in Jember District, East Java Province, Indonesia

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Abstract

Introduction. Contact dermatitis is positived by most agricultural sector workers. Tobacco farming is one of the places where chemicals are sourced from pesticides, fertilizers, and also nicotine derived from tobacco leaves. This study aims to analyze the factors associated with contact dermatitis in tobacco farmers in Jember, East Java Province, Indonesia. **Method**. The research design is case control with 155 tobacco farmers. The dependent variable of this study is Occuptional Contact Dermatitis (OCD) as measured through the results of a doctor's examination. Independent variables are individual factors and occupational factors. Individual factors include age, sex, education, individual hygiene, use of personal protective equipment, and complaints of GTS. Occupational factors consist of the main job, additional work, types of tobacco leaves, work at risk, work period, length of work, length of rest. Data analysis used Chi-Square test with a significance value of p <0,05. **Result and Discussion**. The results revealed that factors related to OCD in tobacco farmers in Jember Regency were age (p = 0.037), education (0,013), GTS complaints (p = 0,030), type of tobacco leaf (p=0,005), working periode (p=0,042) and working hours (p=0,008). **Conclusion** Individual factors related to OCD in tobacco farmers are age, education, and GTS complaints. Occupational factors related to OCD are the type of tobacco leaves, working periode and length of work. This study revealed that OCD through promotion and integrated occupational health education.

Keyword: *occupational contact dermatitis, tobacco farmers, tobacco workers*

Introduction

Contact dermatitis (CD) is the most widely known occupational disease in many countries, and occupational contact dermatitis (OCD) is not reported [(1).] Dermatitis is inflammation of the skin. The term dermatitis is synonymous with eczema. The skin becomes red, itchy, and can blister. Skin with dermatitis becomes hard, thickened and cracked [(2)]. OCD is a skin disorder caused by contact with certain substances in the workplace. Research has shown that within 10 years after the condition first occurs the worker will still have some skin problems, like allergens and irritants [(3)]. Tobacco farming shows that workers are exposed to or contact pesticides, fertilizers, and nicotine derived from tobacco leaves which can cause contact dermatitis [(4)]. Exposure to chemicals in the workplace can increase risk [(5)].

OCD is one of the occupational diseases that often occurs in agricultural workers such as tobacco farming. OCD accounts for a significant proportion of occupational diseases. Exposure to allergens and long-term or repeated irritation can cause dermatitis which can reduce quality of life [(3), (6)].

The agricultural sector is one of the workplaces that lacks health and safety protection. Farmers, vulnerable to occupational diseases. Manwhile, in Indonesia data regarding work-related diseases are not recorded properly. This study aims to analyze OCD and the factors associated with dermatitis due.

The research findings are factors related to OCD cases beneficial for occupational health policy makers to be used as the basis for occupational health and safety policies so that the quality of life of farmers increases.

Materials and Method

Research Design

This type of research is observational analytic research. The study observes the variables, then analyzes the risk factors or causal factors for the event to be examined. The research design used is case-control.

Location and Time Schedule

The results of previous surveys indicate that there is exposure to substances that have the potential to cause OCD. The time of the research is starting in May 2018-November 2018. The population was chosen by considering the inclusion and exclusion criteria, ie respondents aged between 15-65 years old, not sick or pregnant, no history of skin disease.

Population and Sample

Samples are obtained through formula (7)

P2 = 0.31, Proportion of Exposure to the group that is not sick [8]
P1 =Exposureproportioninthesickgroup[9]
Odds Ratio = 2,31, Odds ratio in previous studies
Z1-α / 2 = value in the standard normal distribution which is equal to the significance level α 0,05, so the value of Z = 1.96
Z1-β = value in the standard normal distribution equal to power by 90%, value 1.28.

From the above calculation results obtained a sample of 129 (≈130) people. In order to anticipate missing data, samples were added to become 155 tobacco farmers.

Research Variable.

The variables of this study are workers and occupational factors. Worker or individual factors are personal characteristics that exist in tobacco farmers which can be a risk of dermatitis. Individual factors consist of age, gender, education, individual hygiene, use of personal protective equipment, and complaints of GTS. Occupational factors consist of the main types of work, types of tobacco leave, risky activities, working periode and working hours per day.

Instrument

The dependent variable of observed dermatitis cases was measured through doctor's examination Positive cases of dermatitis if the results of examination by a doctor found signs of dermatitis in one part of the body, legs, hands or arms. Negative cases of dermatitis if the results of a doctor's examination found no signs of dermatitis. Data on independent variables were obtained through interviews and questionnaires.

Data Analysis

The collected data were analyzed using the Bivariate Chi-Square test with a significance p <0,05.

Finding

Result and Discussion

Table 1 shows the results of bivariate tests of individual factors and cases of dermatitis in tobacco farmers in Jember Regency. Among 155 tobacco farmers, 36 (23,22%) had dermatitis. The results showed that based on the age of the majority of tobacco farmers aged ≤ 45 years. In the group of farmers who positived dermatitis, it was more common in farmers aged> 45 years, as many as 24 people (66,7%), while in the group of farmers who negative dermatitis, they were dominated by age ≤45 years, as many as 64 people (58,8%). Table 1 indicates that age was associated with dermatitis cases with a significance value of p <0,05 (0,037). This means that young and old age have different risks for OCD.

Based on gender, Table 1 reveals that in the group of farmers who positived dermatitis cases, it was more positived by farmers with female sex. Table 1 provides an illustration that gender is not related to dermatitis cases, meaning that the sexes of men and women have the same probability for the occurrence of OCD p> 0,05 (0,280).

The next variable is the level of education. The majority of tobacco farmers in the both of group had primary school education. Based on education level, Table 1 displays data that educational status is associated with dermatitis cases with p-value <0,05 (0,013). Different levels of education will also be different probability for OCD.

Table 1 proves that the majority of farmers with dermatitis as many as 20 people (5,6%) had good individual hygiene. Individual hygiene is not associated with dermatitis cases with p value> 0,05 (0,482). Tobacco farmers who have good and bad hygiene have the same probability of OCD.

Table 1 shows the results that in the group of tobacco farmers who positive dermatitis as many as 19 people (52,8%) used good personal protection. The use of personal protective equipment is not related to the status of dermatitis with a significance value of p> 0,05 (0,273). Tobacco farmers who use or do not use personal protective equipment have the same chance of occurring OCD.

The next variable is Green Tobacco Sickness (GTS) complaints. GTS complaints are classified into two, there are GTS complaints and no GTS complaints. GTS was associated with dermatitis cases with a significance value of p <0,05 (0,030). Farmers who positive GTS and negative GTS have different opportunities for OCD.

Table 1. Bivariate Analysis Results with Chi-Square Factors Individual Risk Factors and OCD in Tobacco Farmers in Jember Regency

No	Job Factor	Category	Positive Dermatitis	%	Negative Dermatitis	%	P-Value
1.	Age	≤45 years old	12	33,3	64	53,8	0,037
		>45 years old	24	66,7	55	46,2	
		Total	36	100	119	100	
2.	Sex	Male	10	27,8	47	39,5	0,280
		Female	26	72,2	72	60,5	
		Total	36	100	119	100	
3.	Education	Uneducated	13	36,1	27	22,7	0,013
		Primary	20	55,6	54	45,4	
		Secondary	1	2,8	17	14,3	
		Higher	1	2,8	18	15,1	
		Highest	1	2,8	3	2,5	
		Total	36	100	119	100	
4.	Individual Hygiene	Poor	20	55,6	76	63,9	0,482
		Good	16	44,4	43	36,1	
		Total	36	100	119	100	
5.	Personal Protective Equipment	Poor	19	52,8	77	64,7	0,273
		Good	17	47,2	42	35,3	
		Total	36	100	119	100	
6.	Green Tobacco Sickness	No	17	47,2	82	68,9	0,030
		Yes	19	52,8	37	31,1	
		Total	36	100	119	100	

Table 2 shows the results of the bivariate test of occupational factors and cases of dermatitis in tobacco farmers in Jember Regency. The main occupation was not related to dermatitis cases p >0,05 (0,773). Landowners and farm laborers have the same possibility of occurrence of dermatitis cases.

Table 2 reveals cases of dermatitis based on the type of tobacco leaf planted. There are fours types of tobacco leaves that are planted by tobacco farmers in Jember Regency, namely Traditional Oogst Na, Kasturi, Lower Shade Tobacco and Choper Tobacco. The type of leaf will determine the need for pesticides. Tobacco leaf type is associated with dermatitis with p value <0,05 (0,005).

Table 2 shows cases of dermatitis based on risky activities. The majority of tobacco farmers in the all group have more than 5 risk activities. Farmers who have risk activities of more than five or less than five have the same chance for the occurrence of dermatitis p> 0,05 (0,083).

Table 2 shows the dermatitis cases based on working periode. Working periode was related to OCD cases with a significance value of p <0,05 (0,042). Farmers who have a working period of <18 years or ≥18 years have different opportunities for the occurrence of dermatitis.

Table 2 informs dermatitis cases based on working hours. The working hours of tobacco farmers in the group with majority dermatitis is more than 8 hours / day as many as 27 people (75%).Tobacco farmers with less than 8 hours / day and more than 8 hours / day have a different chance of developing dermatitis with a significance value of p <0,005 (0,008).

Table 2. Bivariate Analysis Results with Chi-Square Factor Occupations and OCD in Tobacco Farmers in Jember Regency

No	Job Factor	Category	Postive Dermatitis	%	Negative Dermatitis	%	P-Value
1.	Main Job	Owner and Farmer	14	34,5	41	34,5	0,773
		Workers	22	65,5	78	65,5	
		Total	36	100	119	100	
2.	Tobacco leaf	Na Oogst Traditional	11	30,6	24	20,3	0,005
		Kasturi	12	33,3	28	23,5	
		TBN	12	33,3	28	23,5	
		Choper	1	2,8	39	32,8	
		Total	36	100	119	100	
3.	Risk Activity	<5 activities	9	25	51	42,9	0,083
		≥5 activities	27	75	68	57,1	
		Total	36	100	119	100	
4.	Working periode	<18 years	10	27,8	58	48,7	0,042
		≥18 years	26	72,2	61	51,3	
		Total	36	100	119	100	
5.	Working hours	≤8 hours/day	9	25	62	52,1	0,008
		>8 hours /day	27	75	57	47,9	
		Total	36	100	119	100	

The results revealed that there were 36 people (23,22%) tobacco farmers positived OCD. Nicotine enters the body through the skin together with pesticides attached to the leaves [10]. The leaf nicotine which exposed the peasant's skin can be in the form of granules or liquid form. In the form of granules, nicotine is black and is sticky. Nicotine attached to the hand will cause a persistent eczeme reaction. This reaction extends along with worsening- spreading improvement off work [11]. Figure 1 shows the farmer with a sign of contact dermatitis caused by contact with nicotine.

The main toxic compound found in tobacco farming is nicotine. Nicotine (C10H14N2) is released by fermentation and curing together with ammonium, carbon dioxide and furan aldehydes [11]. Direct contact with tobacco has the potential to cause contact dermatitis [4]. This will also increase with the working hours. The longer working hours, the greater the amount of exposure.

Another toxic ingredient found in tobacco farming is pesticides. Several studies state that tobacco farmers face the danger of pesticides and nicotine all at once [12], [13]. Type of tobacco pesticides are generally organophospate [14]. Types of leaves planted will determine the need for pesticides. Among the four types of tobacco leaves planted, the leaves that need the most pesticides are Na Oogst. Agricultural chemicals present in pesticides can affect health [15], [16], [17].

Other results from this study mention that dermatitis is associated with cases of Green Tobacco Sickness (GTS). GTS is caused by the absorption of nicotine derived from wet sugarcane leaves. Nicotine is absorbed through the skin in direct contact with tobacco [18]. GTS is a disease that is very common in tobacco farmers and occurs in the harvest season [19], [20]. Farmers with dermatitis will be at greater risk for developing GTS.

Research conducted on tobacco farmers in Latino is different. Skin problems diagnosed with contact dermatitis and traumatic skin lesions did not have a significant relationship with GTS in bivariate or multivariate analyzes. Skin conditions do increase the possibility of GTS. However, this skin problem must have enough intensity to attract the attention of agricultural workers. Rash, which harms the surface of the skin and increases the potential for nicotine absorption, is the skin problem most strongly associated with GTS [9].

Conclusion

The findings in this study revealed that the factors associated with occupational contact dermitis among tobacco farmers in Jember Regency, East Java Province, Indonesia were age, GTS complaint, education, type of tobacco leaves, working periode and working hours. OCD can be prevented through promotive and preventive efforts that can be done by maintaining individual hygiene and the use of personal protection. More broadly, it is necessary to have integrated management of occupational health and prevention of occupational diseases by the parties involved, namely from farmers, doctors and agricultural landowners. Suggestions for further research is to conduct research by examining OCD with various examination methods and types of occupational contact dermatitis.

Conflict of Interest: There is no conflict of interest

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Ethical Clearance: Research ethics approval was proposed through the Health Research Ethics Commission of the Faculty of Public Health, Airlangga University, Surabaya. Research has passed the Ethics Review by the Health Research Ethics Commission of the Faculty of Public Health Universitas Airlangga Surabaya, No 472-KEPK August 3, 2018.

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