

Analisis Hubungan Frekuensi Paparan Pestisida dan Alat Pelindung Diri dengan Keluhan Dermatitis Kontak pada Petani

Analysis of the Relationship Between Pesticide Exposure Frequency and Personal Protective Equipment with Contact Dermatitis Complaints in Farmers

Anggriani S. Rajiku¹/Herlina Jusuf²/Putri Ayuningtias Mahdang³

^{1,2,3}Public Health, Faculty of Sports and Health, Gorontalo State University

✉ Corresponding author: anggiegie49@gmail.com

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*Corresponding author

Anggriani S. Rajiku, Department of Pharmacy, Public Health, Faculty of Sports and Health, Gorontalo State University, E-Mail:

anggiegie49@gmail.com

Abstrak

Keselamatan dan Kesehatan Kerja merupakan upaya perlindungan dalam hal kesehatan, keselamatan dan kenyamanan yang diberikan kepada pekerja/buruh, lingkungan atau orang lain di sekitar tempat kerja. Salah satu sektor ketenagakerjaan yang banyak menyerap tenaga kerja di Indonesia adalah sektor informal. Sektor informal merupakan salah satu industri yang jauh dari budaya Kesehatan dan Keselamatan Kerja (K3). Penerapan K3 pada sektor informal masih jarang dilakukan, hal ini terjadi karena belum semua industri mendaftarkan diri pada Pos UKK (Unit Kesehatan Kerja) sehingga tidak mendapatkan edukasi terkait keselamatan dan kesehatan kerja serta tidak dilakukan pemantauan terhadap terjadinya kecelakaan kerja dan penyakit akibat kerja pada industri informal. Salah satu sektor informal yang jauh dari budaya K3 adalah sektor pertanian. Angka kecelakaan kerja pada sektor pertanian di Indonesia tergolong tinggi dibandingkan dengan industri lainnya. Hal ini perlu mendapat perhatian khusus mengingat mayoritas penduduk bekerja di sektor pertanian dan besarnya kontribusi sektor ini terhadap perekonomian nasional. Peran sektor pertanian adalah sebagai sumber kebutuhan pokok, sandang dan papan, penyedia lapangan kerja bagi sebagian besar penduduk, menyumbang pendapatan nasional yang tinggi, menyediakan devisa bagi negara dan memiliki efek pengganda ekonomi yang tinggi dengan ketergantungan rendah terhadap impor (multiplier effect), yaitu adanya keterkaitan input-output antara industri, konsumsi dan investasi. Dengan pertumbuhan positif yang konsisten. Penelitian ini menggunakan metode kuantitatif dengan desain penelitian survei analitik dengan 59 orang petani yang terdiagnosis dermatitis kontak, kemudian data dianalisis menggunakan uji Chi-Square. Hasil analisis penelitian ini menunjukkan bahwa terdapat hubungan statistik antara keluhan dermatitis kontak dengan frekuensi paparan pestisida dan alat pelindung diri.

Kata Kunci: K3, dermatitis kontak, dan pestisida

Abstract

Occupational Safety and Health are protection efforts in terms of health, safety and comfort provided to workers/laborers, the environment or other people around the workplace. One of the employment sectors that recruits a lot of workers in Indonesia is the informal sector. The informal sector is one of the industries far from the Occupational Health and Safety (K3) culture. The implementation of K3 in the informal sector is still rarely carried out, this occurs because not all industries register with the UKK Post (Occupational Health Unit) so they do not receive education related to occupational safety and health and are not monitored for the occurrence of work accidents and occupational diseases in informal industries. One informal sector that is far from the K3 culture is the agricultural sector. The rate of work accidents in the agricultural sector in Indonesia is relatively high compared to other industries. This needs special attention considering that the majority of the population works in the agricultural sector and the large contribution of this sector to the national economy. The role of the agricultural sector is as a source of basic necessities, clothing and housing, providing employment for the majority of the population, contributing to high national income, providing foreign exchange for the country and having a high economic multiplier effect with low dependence on imports (multiplier effect), namely the input-output

linkages between industries, consumption and investment. With consistently positive growth. This study used a quantitative method with an analytical survey research design with 59 farmers diagnosed with contact dermatitis, then the data was analyzed using the *Chi-Square test*. The results of the analysis of this research show that there is a statistical relationship between complaints of contact dermatitis and the frequency of pesticide exposure and personal protective equipment

Keywords: K3, contact dermatitis, and pesticide

BACKGROUND

Occupational Safety and Health (OSH) is a protection effort in terms of health, safety, and comfort provided to workers/laborers, the environment, and other people around the workplace. According to Candrianto (2020), implementing OSH in the workplace is part of an effort to reduce the risk of unsafe conditions that could potentially lead to workplace accidents or occupational diseases. This factor is the main reason for paying attention to and implementing K3 in the workplace so that it can prevent unwanted problems from occurring. Wahyuni (2022) the application of Occupational Safety and Health (K3) is an important element and is very much needed in various sectors, especially in the workplace. The implementation of K3 in the workplace is crucial. This is clearly stated in the Occupational Safety Policy, namely Law No. 13 of 2003 concerning Manpower, Article 86, paragraph 1a, which states that every worker has the right to receive protection regarding occupational health and safety

One of the employment sectors that recruits a lot of workers in Indonesia is the informal sector. The informal sector is one industry that is far from a K3 culture. The implementation of K3 in the informal sector is still rarely carried out, this occurs because not all industries register with the UKK (Occupational Health Unit) Post, thus not receiving education regarding safety and health. Occupational accidents and occupational diseases are not monitored in the informal industry (Romas & Kumala, 2024). One informal sector that lacks a proper occupational safety and health (OHS) culture is agriculture. The rate of occupational accidents in agriculture in Indonesia is relatively high compared to other industries. This requires special attention, given the large proportion of the population working in the agricultural sector and its significant contribution to the national economy (Haerani, 2010).

One of the diseases that farmers often experience is contact dermatitis. Contact dermatitis is a disease caused by an acute or chronic inflammatory response caused by materials or substances that stick to the skin. The incidence of contact dermatitis in agriculture, both irritant and allergic, is most often caused by pesticides. The increasing use of pesticides is certainly followed by increased exposure that can have negative impacts on the workforce, especially for workers in the pest spraying section (Spiewak, 2001). In principle, almost all active ingredients contained in pesticides cause health problems in the form of pesticide poisoning, but this depends on the amount of allergen material entering the body. Factors causing skin disorders due to pesticide exposure are divided into two: internal factors including age, gender, genetics, nutritional status, hemoglobin levels, level of knowledge and health status. Meanwhile, external factors include the amount of pesticide used, type of pesticide, pesticide dose, frequency of spraying, use of Personal Protective Equipment (PPE), duration of spraying and spraying time (SILVIA, 2022). According to the Ministry of Agriculture (2011), the negative impacts of pesticides can occur acutely or chronically due to contamination through 3 pathways, namely the skin (epidermis), breathing (inhalation), and the digestive tract (ingestion) (ALI, 2015). Farmers' skin can be exposed to pesticides through spraying activities, mixing pesticides, and when cleaning and removing pesticide residues on the equipment used. Based on data obtained from the Gorontalo Provincial Health Office, regarding the 10 most common diseases in Community Health Centers in 2023, sufferers of occupational diseases (Dermatitis) were ranked 9th with a total of 537 cases.

Some factors that cause contact dermatitis complaints are the frequency of pesticide exposure and the use of personal protective equipment when in contact with pesticides. This is in line with research by Sujarwati (2023) which found a relationship between the frequency of exposure to pesticides and contact dermatitis in plantation farmers with a risk of 5.20 for a frequency of exposure ≥ 2 times/week (Sujarwati & Nurcandra, 2023) and research by Aina et al. (2019) that there is a relationship between attitudes regarding the use of PPE and the incidence of contact dermatitis (Aina & Idris, 2021).

METHODS

This research was conducted in Bubaa village, Paguyaman Pantai sub-district, Boalemo district in April – May 2025. This study used 59 farmers who had been diagnosed with occupational skin diseases. The method used is a quantitative method with an analytical survey research design. Quantitative research is defined as a systematic investigation of a phenomenon by collecting measurable data using statistical, mathematical, or computational techniques (Ahmad et al., 2024). Data collection uses questionnaires that have been tested for validity and reliability, which are then subjected to univariate and bivariate analysis using the chi-square statistical test.

RESULT

The total number of farmers in Bubaa village is 225 farmers and 59 of them were diagnosed as sufferers of occupational skin diseases (contact dermatitis) where 50 male farmers and 9 female farmers were divided into four age groups, namely (Late Teenagers) 17-25 Years as many as 11 farmers, (Early Adults) 26-35 Years as many as 26 farmers and (Late Adults) 36-45 Years as many as 22 farmers. All research respondents were farmers who were actively exposed to irritants such as pesticides and fertilizers every day and were diagnosed as sufferers of occupational skin diseases (contact dermatitis)

Risk factors assessed based on the questionnaire include the frequency of pesticide spraying per day, namely the number of times farmers spray pesticides per week, assessed with a *score of* 0 = >2 times/week and 1 = ≤2 times/week. The use of personal protective equipment (PPE), namely the use of personal protective equipment in the form of masks, gloves, boots, hats, long-sleeved shirts, and long pants. 0 = never, 1 = sometimes, and 2 = always.

Table 1. Respondent characteristics

Characteristics	n	%
Gender		
Man	50	84.7
Woman	9	15.3
Age		
(Late Teenagers) 17-25 Years	11	18.6
(Early Adulthood) 26-35 Years	26	44.1
(Late Adulthood) 36-45 Years	22	37.3

Table 2. Univariate Analysis

Characteristics	n	%
Contact dermatitis complaints		
Light	16	27.1
Currently	18	30.5
Heavy	25	42.4
Frequency of exposure		
Bad (> 2 times/week)	31	52.5
Good (< 2 times/week)	28	47.5
Use of Personal Protective Equipment		
Always	0	0
Sometimes	22	37.3
Never	37	62.7

The relationship test for independent variables includes the frequency of pesticide exposure and the use of personal protective equipment in Bubaa village with complaints of contact dermatitis in corn farmers.

Table 3. Bivariate Analysis

Risk factors	Contact dermatitis complaints			P value
	Light	Currently	Heavy	
Frequency of pesticide exposure	1	5	25	0.00
Bad (> 2 times/week)	15	13	0	
Good (≤ 2 times/week)				
Use of personal protective equipment	0	0	0	0.00
Always	5	14	3	
Sometimes	11	4	22	
Never				

The results of the bivariate analysis showed that there was a significant relationship between the frequency of pesticide exposure, the use of personal protective equipment and complaints of contact dermatitis with p-value = 0.00 < α = 0.05.

DISCUSSION

According to Suparti et al (2016) the recommended spraying frequency is a maximum of 2 times a week. Exposure to pesticides on the human body with frequent frequency and short intervals causes pesticide residues in the human body to be higher (Irjayanti and Irmanto, 2017). The univariate results of the frequency of bad pesticide exposure that experienced a mild level of complaints were 1 farmer (3.2%), a moderate level of complaints were 5 farmers (16.1%) and a severe level of complaints were 25 farmers (80.6%), while 28 highland corn farmers with a good frequency of pesticide exposure experienced a mild level of complaints were 15 farmers (53.6%), a moderate level of complaints were 13 farmers (46.4%) and no farmers had a severe level of complaints at a good frequency of pesticide exposure. Based on the bivariate results of the study, it is known that there is a relationship between the frequency of exposure pesticides with complaints of contact dermatitis in highland corn farmers in Bubaa village, Boalemo district, with the results of the *chi-square test* obtained a *p-value* (0.00) $< \alpha = (0.05)$. This is because the condition of highland agricultural land requires a longer time in spraying pesticides so that farmers spray more than the recommended spraying frequency considering that pesticide spraying is carried out repeatedly with different types of pesticides.

Farmers with a high pesticide spraying frequency (>2 times/week) are more likely to experience high pest and disease rates, which can reduce yields and require protection as the corn ages. Meanwhile, farmers with a high pesticide spraying frequency (≤ 2 times/week) are more likely to receive assistance from hired workers, resulting in faster completion.

According to the regulation of the Minister of Manpower and Transmigration No. per.08/Men/VII/2016 concerning personal protection, Personal Protective Equipment (PPE) is equipment that must be used when working as needed to maintain the safety of the worker himself and those around him. Personal protective equipment is often also called Personal Protective Equipment (PPE). Personal protective equipment must be used in conjunction with these controls to provide employee safety and health in the workplace. Personal protective equipment includes all (Arika Putri Prahayuni, 2018) . Notoatmodjo (2011) revealed that behavior is influenced by predisposing factors, supporting factors, and driving factors. Predisposing factors in the form of knowledge and attitudes regarding personal protective equipment (PPE). Meanwhile, supporting factors refer to the carrying capacity of the physical environment, including the availability of personal protective equipment (PPE) to support the behavior of using personal protective equipment. The driving factor is the support of human resources around the individual who always supervise the use of personal protective equipment while working. Cleanliness of PPE can prevent the severity of skin conditions due to humid working environments, thus preventing contact dermatitis. Another study conducted by Nugroho found that the completeness of wearing PPE and changing clothes after spraying can affect farmers experiencing skin complaints (Rahmatika et al., 2020) . The use of PPE sometimes experienced mild complaints of 4 farmers (22.7%), moderate complaints of 14 farmers (63.6%) and severe complaints of 3 farmers (13.6%), while 22 highland corn farmers who never used PPE experienced mild complaints of 11 farmers (29.7%), moderate complaints of 4 farmers (10.8%) and severe complaints of 22 farmers (59.5%). Based on the bivariate results of the study, it is known that there is a relationship between the use of PPE with the occurrence of contact dermatitis in highland corn farmers in Bubaa village, Boalemo district, with the results of the *chi-square test* obtained a *p-value* (0.00) $< \alpha = (0.05)$ which means there is a relationship between the use of PPE. The incidence of contact dermatitis among corn farmers in Bubaa Village, Boalemo Regency, is due to a lack of awareness about the importance of using personal protective equipment. Farmers who occasionally use PPE do so because they lack personal protective equipment such as masks. Meanwhile, farmers who never use PPE are more likely to feel uncomfortable wearing masks and gloves

CONCLUSION

Based on the research results and discussion, it can be concluded that there is a statistically significant relationship between the following risk factors, including the frequency of pesticide exposure and the use of PPE with complaints of contact dermatitis in highland corn farmers in Bubaa village.

RECOMMENDATIONS

Farmer :

- Use pesticides that are safer for the skin.
- Use more closed or automatic pesticide sprayers to avoid direct skin contact. Implement integrated pest control such as trap crops. It is recommended to use a hand hoe to remove weeds.
- Schedule spraying sessions to minimize lengthy periods or hire someone else to assist with pesticide spraying.
- Use complete personal protective equipment and wash personal protective equipment to prevent the buildup of pesticide particles.

Student :This research is expected to provide useful information for institutions related to occupational diseases (contact dermatitis).

Obstacles : Many farmers experience symptoms of contact dermatitis but do not want to go to the community health center for treatment, therefore it is very difficult to obtain data on contact dermatitis sufferers who are experiencing and diagnosed with contact dermatitis.

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