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Determinants of Irritant Contact Dermatitis Symptoms Among Waste Collectors in Pasar Raya Padang

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ABSTRACT

Irritant contact dermatitis is one of the most common occupational skin disorders among informal sector workers, including waste collectors who are routinely exposed to irritant materials. This study aimed to analyze factors associated with irritant contact dermatitis symptoms among waste collectors in Pasar Raya Padang. An analytical observational study with a cross-sectional design was conducted involving 75 respondents selected using a total sampling technique. Independent variables included duration of exposure, length of employment, personal hygiene, and use of personal protective equipment (PPE). Data were collected using structured questionnaires and direct observation, then analyzed using the chi-square test with a significance level of 0.05 and presented as odds ratios (OR). The results showed that 58.7% of respondents experienced dermatitis symptoms. Significant associations were found between length of employment (p=0.021; OR=3.10) and PPE use (p=0.013; OR=3.85) with dermatitis symptoms. Meanwhile, duration of exposure (p=0.642; OR=1.28) and personal hygiene (p=0.274; OR=1.54) were not significantly associated. Waste collectors with longer working periods and non-compliance with PPE use had a higher risk of experiencing dermatitis symptoms. In conclusion, length of employment and PPE use were significant factors associated with irritant contact dermatitis symptoms among waste collectors. Strengthening PPE compliance and occupational health education are recommended to reduce the risk of occupational skin disorders in informal sector workers.

Keywords: *Irritant Contact Dermatitis, Waste Collectors, Personal Protective Equipment, Length of employment, Personal Hygiene*

INTRODUCTION

Irritant contact dermatitis is one of the most common occupational skin disorders and remains a major occupational health problem worldwide, particularly among workers who are continuously exposed to chemical and biological irritants. The condition occurs due to damage to the skin barrier

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following repeated exposure to irritant substances without involving specific immunological mechanisms (Behroozy & Keegel, 2018; Nosbaum et al., 2020). Workers in the informal sector are especially vulnerable because occupational safety and health protections are often inadequate.

Globally, occupational skin diseases account for approximately 30–45% of all occupational illnesses (World Health Organization, 2021). Waste collectors are considered a high-risk occupational group because they are routinely exposed to decomposing organic waste, leachate, pathogenic microorganisms, moisture, and other environmental contaminants that may trigger skin irritation and chronic inflammation (Johansen et al., 2022). Continuous exposure under poor environmental conditions can increase the risk of occupational dermatitis and reduce workers' quality of life.

In Indonesia, occupational health problems among informal sector workers remain a public health concern. Limited implementation of occupational safety measures, inadequate supervision, and low compliance with personal protective equipment (PPE) use contribute to increased occupational disease risk (Kementerian Kesehatan Republik Indonesia, 2022). Waste collectors working in traditional markets often face unfavorable working conditions, including prolonged contact with waste, high humidity, and insufficient sanitation facilities.

Pasar Raya Padang is one of the largest traditional markets in Padang City and produces a substantial amount of organic waste each day. Waste collectors in this setting are exposed to various irritants originating from decomposing waste materials and contaminated liquids. Long working hours and direct contact with waste may increase the risk of skin disorders, particularly irritant contact dermatitis. Previous studies in Indonesia reported that waste management workers frequently experience skin complaints related to occupational exposure (Ambarsari & Mulasari, 2018; Sari et al., 2020).

Several factors may contribute to the occurrence of irritant contact dermatitis among waste collectors. Duration of exposure, length of employment, personal hygiene, and PPE use are considered important occupational and behavioral factors associated with skin disorders (Liu et al., 2019). Workers with prolonged exposure and inadequate protective behavior are more likely to experience repeated skin irritation that can develop into chronic dermatitis.

However, previous studies have shown inconsistent findings regarding the factors associated with irritant contact dermatitis among waste workers. Some studies identified PPE use as a significant protective factor, whereas others reported stronger associations with exposure duration or personal hygiene practices. In addition, studies specifically focusing on market waste collectors in the informal sector remain limited, particularly in the context of traditional markets with high organic waste exposure.

Therefore, this study aimed to analyze the association between duration of exposure, length of employment, personal hygiene, and PPE use with irritant contact dermatitis symptoms among waste collectors in Pasar Raya Padang. The findings of this study are expected to provide evidence for occupational health interventions and support preventive strategies to reduce occupational skin disorders among informal sector workers.

METHODS

This study employed an analytical observational design using a cross-sectional approach and was conducted among waste collectors at Pasar Raya Padang in January 2026. The cross-sectional design was used to analyze the association between occupational risk factors and irritant contact dermatitis symptoms at a specific point in time (Levin, 2020; Wang & Cheng, 2020). The study population consisted of all waste collectors working in the Pasar Raya area, totaling 75 workers. A total

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sampling technique was applied, in which all members of the population were included as respondents to improve representativeness and minimize selection bias (Etikan & Bala, 2017).

The independent variables in this study were duration of exposure, length of employment, personal hygiene, and use of personal protective equipment (PPE). Duration of exposure was categorized into >8 hours/day and ≤8 hours/day, while length of employment was classified into >8 years and ≤8 years. Personal hygiene was assessed based on respondents' hygiene practices, including handwashing habits, bathing after work, nail cleanliness, and work clothing hygiene. PPE use was assessed based on the consistency of PPE use during work activities, including gloves, masks, boots, and work clothing.

The dependent variable was irritant contact dermatitis symptoms experienced by respondents, including itching, redness, dry skin, irritation, and scaling on body parts frequently exposed to waste. The assessment was based on subjective complaints reported by respondents and did not constitute a clinical diagnosis. Data collection was conducted using structured questionnaires and direct observation. Prior to data collection, the questionnaire was reviewed and adjusted according to the study objectives and relevant literature to ensure clarity and suitability of the questions. Direct observations were also conducted to assess workplace conditions and PPE use practices among waste collectors.

All respondents were informed about the objectives and procedures of the study before participation. Participation was voluntary, and informed consent was obtained from all respondents prior to data collection. Respondents' confidentiality and anonymity were maintained throughout the study process. Data processing included editing, coding, entry, and cleaning prior to analysis. Univariate analysis was performed to describe the distribution of each variable. Bivariate analysis was conducted using the chi-square test with a significance level of $\alpha=0.05$ to determine associations between independent variables and irritant contact dermatitis symptoms. The results were presented using p-values, odds ratios (OR), and 95% confidence intervals (CI).

RESULTS

1. Frequency Distribution of Respondents

Table 1. Distribution of Respondents

Variable	Frequency	Percentage (%)
Duration of Exposure		
Normal, if duration of exposure > 8 hours	63	84,0
Abnormal, if duration of exposure ≤ 8 hours	12	16,0
Duration of Employment		
At risk, if employed for > 8 years	54	72,0
Not at risk, if employed for ≤ 8 years	21	28,0
Personal Hygiene		
Good	51	68,0
Poor	24	32,0
Use of PPE		
Compliant	44	58,7
Non-compliant	31	41,3
Symptoms of Dermatitis		
Complaints present	44	58,7
No complaints	31	41,3

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Table 1 shows the distribution of respondents based on duration of exposure, length of employment, personal hygiene, PPE use, and irritant contact dermatitis symptoms. Most respondents worked more than 8 hours per day (84.0%) and had been employed for more than 8 years (72.0%). In terms of personal hygiene, 68.0% of respondents were categorized as having good hygiene practices, while 58.7% were compliant with PPE use. Furthermore, 58.7% of respondents reported experiencing irritant contact dermatitis symptoms.

2. The Relationship Between Risk Factors and Symptoms of Irritant Contact Dermatitis

Table 2. The Relationship Between Risk Factors and Symptoms of Irritant Contact Dermatitis

Variable	Category	Dermatitis (n)	No Dermatitis (n)	Total	OR	95% CI	p-value	Notes
Duration of Exposure	> 8 hours	27	36	63	1,28	0,45–3,62	0,642	Not significant
	≤ 8 hours	4	8	12				
Duration of Employment	> 8 years	27	27	54	3,10	1,19–8,05	0,021	significant
	≤ 8 years	4	17	21				
Personal Hygiene	Poor	13	11	24	1,54	0,60–3,95	0,274	Not significant
	Good	18	33	51				
Use of PPE	Compliant	13	31	44	3,85	1,38–10,70	0,013	significant
	Non-compliant	18	13	31				

Table 2 presents the results of the bivariate analysis between occupational risk factors and irritant contact dermatitis symptoms among waste collectors. The analysis showed that duration of exposure was not significantly associated with dermatitis symptoms (p=0.642; OR=1.28; 95% CI=0.45–3.62). Similarly, personal hygiene did not show a statistically significant association with dermatitis symptoms (p=0.274; OR=1.54; 95% CI=0.60–3.95). In contrast, length of employment showed a significant association with irritant contact dermatitis symptoms (p=0.021; OR=3.10; 95% CI=1.19–8.05). Respondents who had worked for more than 8 years were approximately three times more likely to experience dermatitis symptoms compared to those with shorter employment duration. A significant association was also identified between PPE use and irritant contact dermatitis symptoms (p=0.013; OR=3.85; 95% CI=1.38–10.70). Respondents who were non-compliant with PPE use had a higher risk of experiencing dermatitis symptoms than those who consistently used PPE during work activities.

DISCUSSION

The findings of this study indicate that irritant contact dermatitis symptoms among waste collectors in Pasar Raya Padang are associated with several occupational and behavioral factors. Among the variables analyzed, length of employment and PPE use showed statistically significant associations with dermatitis symptoms, while duration of exposure and personal hygiene were not significantly associated. These findings suggest that occupational skin disorders among informal sector workers are influenced not only by exposure intensity but also by cumulative exposure and protective behavior.

The present study found that duration of exposure was not significantly associated with irritant contact dermatitis symptoms. Although prolonged contact with irritants theoretically increases the risk of skin disorders, the findings suggest that exposure duration alone may not directly determine dermatitis occurrence. The effectiveness of protective measures, particularly PPE use, may reduce direct skin contact with irritants despite long working hours. Similar findings have been reported in previous

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studies indicating that exposure duration does not always show a direct association with dermatitis when protective behaviors are present (Fitriandini et al., 2023).

In contrast, length of employment showed a significant association with dermatitis symptoms. Workers with longer employment duration were more likely to experience skin complaints due to cumulative exposure over time. Repeated and continuous exposure to waste materials, moisture, and irritant substances may gradually damage the skin barrier and increase susceptibility to chronic irritation (Nosbaum et al., 2020). These findings are consistent with previous studies reporting that longer occupational exposure increases the risk of occupational skin disorders among waste workers (Pramana & Utami, 2021; Ulva, 2019).

Personal hygiene was not significantly associated with irritant contact dermatitis symptoms in this study. Although hygiene practices are important in maintaining skin health, good hygiene alone may not be sufficient to prevent dermatitis in highly exposed working environments. Waste collectors are continuously exposed to irritants during work activities, and the intensity of exposure may exceed the protective effect of personal hygiene practices. In addition, the effectiveness of hygiene behavior may depend on the availability of adequate sanitation facilities and consistency of implementation in the workplace.

PPE use was significantly associated with irritant contact dermatitis symptoms. Respondents who did not consistently use PPE had a higher risk of experiencing dermatitis symptoms compared to compliant workers. PPE acts as a protective barrier that minimizes direct skin contact with waste materials and irritants encountered during work activities. These findings support previous studies showing that consistent PPE use is an important preventive measure against occupational skin disorders among waste management workers (Sudarmanto & Nurjazuli, 2016; Pramana & Utami, 2021).

The findings of this study emphasize the importance of occupational health protection among informal sector workers, particularly waste collectors working in traditional markets. Improving PPE compliance, increasing occupational health education, and providing adequate sanitation facilities may contribute to reducing the risk of occupational skin disorders. Preventive interventions should focus not only on reducing exposure but also on strengthening protective behaviors among workers.

This study has several limitations. First, the cross-sectional design cannot establish causal relationships between risk factors and irritant contact dermatitis symptoms. Second, the assessment of dermatitis symptoms was based on respondents' subjective complaints without clinical examination by medical professionals. Third, the study relied on self-reported information, which may introduce recall bias and reporting bias. Despite these limitations, this study provides important information regarding occupational skin health risks among waste collectors in the informal sector.

CONCLUSIONS

This study found that not all investigated variables were associated with irritant contact dermatitis symptoms among waste collectors at Pasar Raya Padang. Duration of exposure and personal hygiene did not show statistically significant associations with dermatitis symptoms. In contrast, length of employment and use of personal protective equipment (PPE) were significantly associated with irritant contact dermatitis symptoms. Workers with longer employment duration and inconsistent PPE use were more likely to experience dermatitis symptoms. These findings indicate the importance of strengthening occupational health protection measures, particularly improving PPE compliance and occupational health education, to reduce the risk of occupational skin disorders among informal sector workers.

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REFERENCES

Ambarsari, D. D., & Mulasari, S. A. (2018). Factors related to subjective complaints of irritant contact dermatitis in waste collectors in Yogyakarta City. *Jurnal Kesehatan Lingkungan Indonesia*, 17(2), 80–86. https://doi.org/10.14710/jkli.17.2.80-86

Behroozy, A., & Keegel, T. G. (2018). Wet-work exposure: A main risk factor for occupational hand dermatitis. *Safety and Health at Work*, 9(2), 175–180. https://doi.org/10.1016/j.shaw.2017.09.001

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications

Etikan, I., & Bala, K. (2017). Sampling and sampling methods. *Biometrics & Biostatistics International Journal*, 5(6), 00149.

Fitriandini, L. L., Adriyani, R., & Akliyah, D. M. (2023). Personal hygiene, use of personal protective equipment, and the incidence of irritant contact dermatitis in waste collectors. *Media Publikasi Promosi Kesehatan Indonesia*, 7(5), 1041–1047. https://doi.org/10.56338/mppki.v7i5.5134

Hamnerius, N., Svedman, C., Bergendorff, O., & Bruze, M. (2018). Wet work exposure and hand eczema among healthcare workers. *Contact Dermatitis*, 79(6), 321–329. https://doi.org/10.1111/cod.13066

Johansen, J. D., Mahler, V., Lepoittevin, J. P., Frosch, P. J., & Thyssen, J. P. (2022). Contact dermatitis: Causes, prevention, and management. *The Lancet*, 400(10364), 161–172. https://doi.org/10.1016/S0140-6736(22)01072-3

Kementerian Kesehatan Republik Indonesia. (2022). *Indonesia's Health Profile 2022*. Kemenkes RI. https://www.kemkes.go.id

Kementerian Lingkungan Hidup dan Kehutanan Republik Indonesia. (2021). *Indonesian environmental statistics*. KLHK RI.

Law of the Republic of Indonesia Number 1 of 1970 concerning Occupational Safety.

Levin, K. A. (2020). Study design III: Cross-sectional studies. *Evidence-Based Dentistry*, 7(1), 24–25.

Liu, X., et al. (2019). Occupational skin disease risk factors: A systematic review. *International Journal of Environmental Research and Public Health*, 16(20), 1–12. https://doi.org/10.3390/ijerph16203978

Nosbaum, A., Vocanson, M., Rozieres, A., Hennino, A., & Nicolas, J. F. (2020). Allergic and irritant contact dermatitis. *European Journal of Dermatology*, 30(3), 231–240. https://doi.org/10.1684/ejd.2020.3773

Pramana, I. G. S. A., & Utami, N. W. A. (2021). The relationship between personal hygiene and the use of personal protective equipment with dermatitis in waste workers. *Archive of Community Health*, 8(2), 155–164. https://doi.org/10.24843/ACH.2021.v08.i02.p09

Putri, A. R., & Rahman, F. (2021). Risk factors for skin disorders in waste management workers. *Jurnal Kesehatan Lingkungan Indonesia*, 20(2), 85–92.

Sari, D. P., et al. (2020). The relationship between exposure to waste and complaints of skin diseases in cleaning staff. *Jurnal Kesehatan Masyarakat Nasional*, 15(3), 123–130.

Setia, M. S. (2016). Methodology series module 3: Cross-sectional studies. *Indian Journal of Dermatology*, 61(3), 261–264.

Sudarmanto, S., & Nurjazuli, N. (2016). The relationship between the use of personal protective equipment and the incidence of skin diseases in waste transport workers. *Jurnal Kesehatan Lingkungan Indonesia*, 15(1), 6–9. https://doi.org/10.14710/jkli.15.1.6-9

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Ulva, S. M. (2019). Factors associated with dermatitis in waste transport workers. *Miracle Journal of Public Health*, 3(1), 8–14. https://doi.org/10.36566/mjph/Vol3.Iss1/144

Wang, X., & Cheng, Z. (2020). Cross-sectional studies: Strengths, weaknesses, and recommendations. *Chest*, 158(1), S65–S71.

World Health Organization. (2021). *Occupational health and safety statistics*. WHO.