



Research Article

Factors Absociated With Occupational Irritant Contact Dermatitis In Cleaning Service

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ABSTRACT

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Occupational contact dermatitis is one of the occupational diseases which often arises due to contact with materials in the work environment. Cleaning service (CS) is an example of a job exposed to daily irritants that can cause skin irritation. The study used an analytic observational method with a cross-sectional approach. The population of CS throughout the University of Muhammadiyah Malang is 42 people with simple random sampling. The research data used a questionnaire from the Health and Safety Executive UK (HSE UK). The analytical technique used is the Fisher Exact and Kruskal Wallis test (alternative chi-square) in the bivariate test and logistic regression in the multivariate test. Bivariate analysis showed there was no specific relationship between the length of work ($p= 0.178$), duration of exposure ($p= 0.068$), and length of exposure ($p= 1,000$) in CS employees at the University of Muhammadiyah Malang, while in multivariate analysis it was not influenced by the same effect, significance (sig wald duration of exposure 0.851 and length of work 0.070). The incidence of occupational contact dermatitis caused by irritants often occurs after exposure, so there is no conclusion on the length of work, duration of exposure, and length of exposure.

1. Introduction

Occupational diseases are illnesses that develop as a result of coming into touch with or being exposed to substances found in the workplace. The two types of contact dermatitis that are brought on by products, substances, and practices employed at work are irritant and allergic dermatitis. Skin inflammation, which can be either acute or chronic, results from exposure to external irritants or topical substances that come into contact with the skin. (Jumiati, A. et al. 2020; Loode, B. et al., 2012).

Occupation that is humid or comes into contact with water, soap, or other chemicals, either topically or repeatedly, is one of the main causes of dermatitis instances. Cleaning service (CS) is one case in this point. Products for cleaning floors contain a number of chemicals that can lead to contact dermatitis. These include table cleaners and floor cleaning soap products. Acids and bases, detergents, surfactants, and solvents with other components, such as scents and dyes, are the substances that cause dermatitis. (Behroozy A, et al. 2014; Wu B., 2015; Jungbauer, F., H., 2019).

One of the occupations where dermatitis is most likely to occur is CS. According to data base obtained from the Mayor's Office in North Jakarta, out of 125 individuals with a range of ailments, 18.5% developed dermatitis as a result of being exposed to chemicals that reduced CS productivity (Septiani S., 2012).

this study's goal is to identify any particular factors that may be connected to dermatitis in the workplace and to establish a connection between long periods of time working, long periods of time working, and long periods of working in CS (Hadi, A. et al., 2021).

2. Method and Data Analysis

This cross-sectional, analytical observational study was executed out at the University of Muhammadiyah Malang from May to June of 2022. Simple random sampling was used to select participants from the University of Muhammadiyah Malang's entire cleaning service population. CS who agreed to take part in the study met the inclusion criteria, while samples receiving treatment with topical skin medications (steroid creams, topical antibiotics, topical antihistamines, local anesthetics, topical medications containing parabens or lanolin) and samples experiencing contact dermatitis from household chores (laundry, dishes, cleaning, crafts) and non-CS work (carpentry, gardening, handicrafts) were excluded.

The study's methodology involves gathering primary data from a sample of respondents chosen based on a comparative categorization formula derived from the British Health and Safety Executive's modified questionnaire responses. According to Adilah's research, an internal test is used to conduct the questionnaire's reliability test. The questionnaire was tested once before being subjected to an analysis utilizing the Cronbach Alpha analysis approach to forecast the questionnaire's reliability. The result was a score of 0.8. [10]. When evaluating hypotheses, bivariate analysis with the comparative categorical Chi Square test is utilized if the condition is met (i.e., the multivariate analysis test with logistic regression and an expected count value of less than or equal to 20%).

The research ethics committee of the University of Muhammadiyah Malang's Faculty of Medicine has approved this study, and it has been assigned the ethics number E.5.a / 051.a / KEPK-UMM / III / 2022.

The data was analyzed using IBM Corporation's statistical program for social sciences (SPSS) version 26.0 in Armonk, New York, USA.

3. Results and Discussion

The results of research conducted on 42 Cleaning service employees at the University of Muhammadiyah Malang provide information on the characteristics of respondents based on gender, age, marital status and location of work. 42 responses, there were 21 of males and 21 women (50%) in total. And CS that's severed from contact dermatitis 14 (33,3%) and 9 (65,3%) male and 5 (35,7%) .female care of the kids at home. The majority of women work a lot, which increases their risk of developing irritating contact dermatitis (Pacheco, K. A., 2018). According to the National Health Interview Survey, there are more women than men (58% vs. 42%) and more women work in the health field than males [13]. However, our study contrary to previous studies.

The age of the respondent that participated in the study was ranged from 21 to 51 years old, with 34 years being the average. Based on marital status, it is known that 27 respondents (64.3%), or the majority, are married. Muhammadiyah University of Malang's CS cleaned a part that included 18 buildings (42.9% of the section), 7 labs (16.7%), and 17 gardens (40.5% of the section) Table 1. This is consistent with earlier studies in Denmark that found cleaning service personnel to be the ones most impacted by irritating contact dermatitis [13]. German study, which found that cleaning service staff experienced irritating contact dermatitis at a rate of 4.5% per 10,000 cases (Dickel, H., 2012)

Table 1. Characteristic of respondent

Characteristic	n (%)
Gender (%)	
Male	21 (50%)
Female	21 (50%)
Age, mean ± sd	34.07 ± 8.33
Marital Status, (%)	
Not Married	15 (35.7%)
Married	27 (64.3%)
Work Place	
Building	18 (42.9%)
Laboratorium	7 (16.7%)
Garden	17 (40.5%)

Relation of duration contact with chemicals and occurrence of irritant contact dermatitis we found had no significant result $p=0.068$ the distribution of the data showed in Table 2. since the subject of this study is irritant contact dermatitis, which affects everyone and typically manifests at the time of initial contact with the principal irritant. Therefore, prolonged exposure to irritants or brief contact with them will always cause complaints of itching, redness, and even the development of blister-like growths called bullae. The direct effect of irritant who have contact directly with the skin will trigger proinflammatory mediators such as IL-1, IL-6, IL-8 or TNF- α [16]. There is several factor that can induce irritants contact dermatitis some study show that atopic history can induce irritant contact dermatitis, workers with atopy histories are twice as likely to develop contact dermatitis as those without such histories. Workers with a history of atopy will cause skin sawar if there is evidence of increased trans epidermal water loss (TEWL), dehydration of the stratum corneum, which impacts the dilatation of irritating materials, and skin inflammation (Lurati AR., 2015).

Genetic factors had relation with irritant contact dermatitis Increased expression of interleukin (IL)-1, a cytokine essential for the start of the inflammatory response in ICD, is linked to filaggrin loss-of-function mutations.

Both of atopy history and genetic factor such as filaggrin mutation demonstrated to increase the severity of irritant contact dermatitis affecting the hands (Alvira, Y., Budi, D. S.,2020). Workers with atopic dermatitis react more physiologically to an irritant, which may be caused by mutations that cause filaggrin to lose part of its function and release more interleukin-1. Filaggrin is a natural moisturizing factor that contributes to epidermal differentiation and hydration. It is a part of the stratum corneum. Lower levels of filaggrin may increase the chance of becoming hurt by dangerous substances (Jakasa, I. 2018) .

Table 2. Relation frequency of exposure with irritant contact dermatitis

Duration	Irritant Contact Dermatitis		%	P Value
	Yes	No		
< 5 times	12 (32,4%)	25 (67,6%)	37 (100%)	0.068
5-8 Times	2 (100%)	0 (0%)	2 (100%)	
> 8 times	0 (0%)	3 (100%)	3 (100%)	

Most of the 21 respondents who worked 8 to 10 hours also had a high percentage of irritating contact dermatitis (76.2%), as did the majority of the 19 officers who worked fewer than 8 hours (52.6%). The 2 individuals who worked more than 10 hours each reported irritating contact dermatitis. The statistical test revealed a value of $p = 0.178$, indicating that there is no correlation between the duration of the work and its frequency showed in table 3. We found that's from 10 respondents work less than 1 year 7 (70%) of them severe from irritant contact dermatitis, and 32 respondents that's work over than 1 years 21 (65.6%) of them severe from irritant contact dermatitis however our results was show no significant result p value was show $p=1.000$ Table 4.

Table 3.Relation length of work with irritant contact dermatitis

Time of work	Irritant Contact Dermatitis		n (%)	P Value
	Yes	No		
<8 hours	9 (47.4%)	10 (52.6%)	19 (100%)	0.178
8-10 hours	5 (23.8%)	16 (76.2%)	21 (100%)	
>10 hours	0 (0%)	2 (100%)	2 (100%)	

Table 4.Relation years of service with irritant contact dermatitis

Years of service	Irritant Contact Dermatitis		n (%)	P Value
	Yes	No		
<1 year	3 (30%)	7 (70%)	10 (100%)	1.000
≥ 1 year	11 (34,4%)	21 (65,6%)	32 (100%)	

There is some factor endogenous and exogenous may have role in this study (Setyoningsih, D., 2023). The concentration, volume, and length of exposure to an irritant are all factors that affect how well it penetrates the skin. Increasing the amount and length of exposure will improve an irritant's capacity to permeate the skin (Kiely, L. F. Et al., 2021). A cross-sectional study on irritant contact dermatitis in health workers as a result of the COVID-19 pandemic revealed a significant correlation between the length of work and the incidence of irritant contact dermatitis. Additionally, nearly 99.26% of health workers who routinely washed their hands were found to be immune to irritant contact dermatitis (Rundle, C. W.,2020). According to Higgins et al., irritating contact dermatitis is primarily caused by inadequate hand washing. Inappropriate situations include not promptly washing hands with soap after handling solvents like paint, oil, turpentine, esters, and ketones. Due to the possibility that some of the solvent content may erode the stratum corneum and induce an erythematous reaction on the skin (Jindal R,et al., 2020).

Because the Wald sig. value was $p > 0.05$, the multivariate analysis's findings demonstrated that the length of work and exposure did not significantly affect each other Table 5. These findings are in direct proportion to the idea proposed by Behroozy theory, according to which the incidence of irritating contact dermatitis associated to the workplace is significantly correlated with the frequency and duration of exposure. According to a cross-sectional study of prevalence and risk factors among health workers in the city of Gondar, North West Ethiopia, conducted by Alluhayyan et al. (2020), workers who used personal protective equipment (PPE) for less than two hours per day (38, 6%) were at risk of irritant contact dermatitis. Behroozy's theory aligns with this research (Loi AST, 2022). Healthcare workers may benefit from workplace interventions that include temporary reductions in clinical duties and the substitution of gentler hand hygiene products for highly irritant ones in order to improve the recovery rate of ICD. Certain high-risk areas that have high hand hygiene workloads or high incidences of ICD may choose to implement systemic workplace changes in order to improve recovery and prevent new occurrences of ICD [29,30]. Wearing gloves while working can reduce hand contact with chemicals thus causing irritants not to enter the skin easily. However PPE can also be the source of irritant because glove preventing normal evaporation and then resulting accumulation of moisture that can lead to be ICD (Patel, V., 2021). An allergy test combined with a patch test is the gold standard supportive examination for determining the diagnosis of DKAK. This is a research limitation because the diagnosis is made only by a dermatologist through physical examination and anamnesis.

Table 5. Multivariate analysis length of work and years of service

Variable	Irritant Contact Dermatitis	
	CI 95%	P Value
Length of work	1.141 [0.288 - 4.528]	0.851
Years of Service	3.288 [0.908 - 11.476]	0.070

4. Conclusion

The length of work, years of service, and exposure duration parameters are not correlated for CS employees at the University of Muhammadiyah Malang. This may occur due to exogenous and endogenous factors that can influence the emergence of irritant dermatitis in workers. There are still limitations alongside this study, such as lacking data and sample sizes, which could affect the results. We look for that greater numbers of samples may be required for future research.

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