

Characteristics of Workers and Description of Hand Eczema as Occupational Dermatitis in the Batik Industry

Zuhaira Nabila¹, Alya Nasya Nabila², Deska Ayunda Cahyarani³, Soffy Aura Putri⁴, Dewinda El F⁵, Dinda Amelia⁶

¹²³⁴⁵⁶ Public Health Study Program, Faculty of Health Sciences, University of Pekalongan

Corresponding Author e-mail: zuhairaaa12@gmail.com, nasyaa1901@gmail.com, deskaaayunda4@gmail.com, soffyaauraputri22@gmail.com, dewandratu6@gmail.com, dindaamelia396@gmail.com

Article History:

Received: 15-07-2026

Revised: 16-07-2026

Accepted: 27-07-2026

Keywords: occupational skin diseases, contact dermatitis, hand eczema, batik industry, occupational safety and health.

Abstract: Occupational skin diseases (OSDs), particularly hand eczema and occupational contact dermatitis, are common health problems among workers who are frequently exposed to chemical irritants and allergens. Batik production involves repeated contact with substances such as batik wax, textile dyes, detergents, solvents, and water, which may compromise skin barrier function and increase the risk of occupational dermatitis. This study aimed to describe the characteristics of batik workers and the occurrence of hand eczema as an occupational skin disease. A quantitative descriptive observational study with a cross-sectional design was conducted among seven batik production workers selected using total sampling. Data were collected through a structured questionnaire covering demographic characteristics, occupational history, history of atopy, history of hand eczema, work-related skin complaints, workplace exposure, and the use of personal protective equipment (PPE). Data were analyzed descriptively using frequencies and percentages. Most respondents were female (57.1%), had worked for more than 10 years (57.1%), and worked more than four hours per day (100%). No respondents reported a history of hand eczema, asthma, hay fever, or recurrent flexural dermatitis. However, one respondent (14.3%) had a history of eye allergy and one reported a history of itchy rash on the hands, wrists, or forearms. More than half of the workers (57.1%) did not use protective gloves during work, indicating suboptimal PPE compliance. Although the prevalence of hand eczema was low, continued occupational exposure to chemical agents combined with inadequate PPE use may increase the future risk of occupational skin diseases. Strengthening

occupational safety and health programs through consistent PPE use, skin health education, personal hygiene practices, and regular skin health surveillance is recommended to prevent occupational dermatitis among batik workers.

How to Cite: Zuhaira Nabila, Alya Nasya Nabila, Deska Ayunda Cahyarani, Soffy Aura Putri, Dewinda El F., Dinda Amelia. (2026). Characteristics of Workers and Description of Hand Eczema as Occupational Dermatitis in the Batik Industry. 5(1). pp 1-10
<https://doi.org/10.61536/ambidextrous.v5i01.560>



<https://doi.org/10.61536/ambidextrous.v5i01.560>

This is an open-access article under the [CC-BY-SA License](#).



Introduction

Occupational Dermatology (OCD) is one of the most common occupational diseases in industry, especially in workplaces where workers frequently come into direct contact with chemicals, allergens, and irritants. One of the most common symptoms of OCD is hand eczema, or contact dermatitis, an inflammatory skin condition characterized by redness, itching, and dryness that can lead to cracking due to repeated exposure to the causative agent.

One industry that can pose risks to employee skin health is the batik industry. Throughout the batik production process, from canting (printing), stamping, dyeing, and rolling, workers are potentially exposed to batik wax, synthetic dyes, fixatives, detergents, and solvents. This exposure can increase the risk of skin conditions, especially if proper personal hygiene and proper use of personal protective equipment are not followed.

According to the concept of Occupational Contact Dermatitis, the occurrence of work-related contact dermatitis is the result of an interaction between individual and occupational factors, causing occupational contact dermatitis. In the batik-making process, repeated exposure to chemicals can disrupt the skin barrier, allowing allergens and irritants to penetrate the epidermis. If exposure continues without adequate control, it can develop into irritant or allergic contact dermatitis.

In addition to workplace exposure factors, personal characteristics such as age, gender, length of service, allergies, asthma, and certain skin conditions also influence a person's likelihood of developing work-related skin diseases. Therefore, identifying these factors is crucial for developing effective prevention strategies.

Based on the questionnaire results, this study aims to describe the characteristics of workers and the incidence of hand eczema, a work-related skin condition, among batik industry workers. By implementing a sustainable occupational safety and health program, the findings of this study are expected to help control work-related skin conditions.

Research Methods

This study used a quantitative method with a descriptive observational design and a cross-sectional approach. This approach was chosen because it is able to provide an overview of the distribution of respondent characteristics, risk factors, and cases of occupational skin diseases simultaneously. The study population was all workers in the production section of one of the batik



industries. The sampling technique used total sampling, so that all workers who met the research criteria, amounting to seven people, were made respondents. Respondents consisted of workers in the canting, stamping, and dyeing sections, with the work variable also covering all work sections. To collect data, a structured standard questionnaire that had been adapted was used to conduct the study.

The data collected included respondent characteristics (gender, side job), history of atopy (history of recurrent itchy rashes, hay fever, eye allergies, asthma), history of hand eczema, the effect of occupational exposure on skin complaints, improvement of complaints when not working, and the use of personal protective equipment in the form of gloves. Data analysis was conducted descriptively by displaying the frequency distribution and percentage of each research variable. The results of the analysis were used to provide an overview of respondent characteristics, exposure patterns in the work environment, and the frequency of work-related skin diseases among workers in the batik factory. This was used as a basis for determining potential risks and prevention strategies in the work environment.

Results and Discussion

1. Respondent Characteristics

Distribution of respondents based on age, length of service, work department, length of work per day

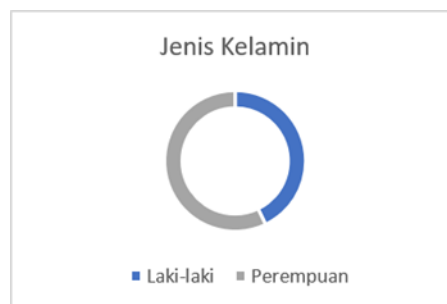
Variable	n	%
Age		
Late teens (17-25)	1	0.14
Pre-elderly (46-55)	3	0.43
Late elderly (56-80)	3	0.43
Total	7	100
Years of service		
Less than 10 years	3	42.9
More than 10 years	4	57.1
Total	7	100
Work section		
Inking	4	57.1
Painting	2	28.6
Tasting	1	14.3
Total	7	100
Working hours per day		
Less than 4 hours	0	0

More than 4 hours	7	100
Total	7	100

Based on the table, the characteristics of the seven respondents indicate that the majority were in the pre-elderly and late-elderly age groups (43% each), had worked for more than 10 years (57.1%), and were predominantly workers in the canting section (57.1%). Furthermore, all respondents (100%) worked more than 4 hours per day.

Distribution of Respondents by Gender

Gender	n	%
Man	3	42.9
Woman	4	57.1
Total	7	100



Based on Table 1, the majority of respondents were female (4 respondents, 57.1%), while 3 respondents were male (42.9%). These results indicate that the majority of batik industry workers who participated in the study were female.

Distribution of Respondents Based on Side Jobs

Side job	n	%
Yes	0	0
No	7	100
Total	7	100

Based on Table 2, all respondents (100%) did not have a side job. This indicates that all respondents work in the batik industry as their primary occupation.

2. History of Atopy and Predisposing Factors

Distribution of Respondents Based on History of Recurrent Itchy Rashes in Skin Folds

Answer	n	%
Yes	0	0
No	7	100
Total	7	100



Based on Table 3, all respondents (100%) had no history of recurrent itchy rashes in skin folds. This result indicates that no history of skin disorders in the form of recurrent itchy rashes in skin folds was found among the study respondents.

Distribution of Respondents Based on History of Hay Fever/Nasal Allergies

Answer	n	%
Yes	0	0
No	7	100
Total	7	100

Based on Table 4, all respondents (100%) had no history of hay fever or nasal allergies.

Distribution of Respondents Based on History of Eye Allergies

Answer	n	%
Yes	1	14.3
No	6	85.7
Total	7	100

Based on Table 5, 1 respondent (14.3%) had a history of eye allergies, while 6 respondents (85.7%) did not have such a history.

Distribution of Respondents Based on Asthma History

Answer	n	%
Yes	0	0
No	7	100
Total	7	100

Based on Table 6, all respondents (100%) had no history of asthma.

Distribution of Respondents Based on History of Itchy Rash on Hands, Wrists, or Forearms

Answer	n	%
Yes	1	14.3
No	6	85.7
Total	7	100

Based on Table 7, 1 respondent (14.3%) had a history of itchy rash on the hands, wrists, or forearms, while 6 respondents (85.7%) did not have such a history.

Distribution of Respondents Based on History of Hand Eczema

Answer	n	%
Yes	0	0
No	7	100
Total	7	100



Based on Table 8, all respondents (100%) had no history of hand eczema.

Distribution of Respondents Based on History of Eczema on the Wrist or Forearm

Answer	n	%
Yes	0	0
No	7	100
Total	7	100

Based on Table 9, all respondents (100%) had no history of eczema on the wrists or forearms.

Distribution of Respondents Based on the Effect of Work Material Contact on Eczema Complaints

Answer	n	%
Yes	0	0
No	5	71.4
No answer	2	28.6
Total	7	100



Based on Table 10, 5 respondents (71.4%) stated that contact with work materials did not affect eczema complaints, while 2 respondents (28.6%) did not provide an answer. No respondents

stated that contact with work materials had an effect on eczema complaints.

Distribution of Respondents Based on Complaint Improvement While Not Working

Answer	n	%
No	3	42.9
Don't know	2	28.6
No answer	2	28.6
Total	7	100

Based on Table 11, as many as 3 respondents (42.9%) stated that their complaints did not improve when they were not working, while 2 respondents (28.6%) stated that they did not know and did not provide an answer.

Distribution of Respondents Based on the Use of Protective Gloves While Working

Use of Gloves	n	%
Yes	2	28.6
No	4	57.1
No answer	1	14.3
Total	7	100



Based on Table 12, 4 respondents (57.1%) did not use protective gloves while working, 2 respondents (28.6%) used gloves, and 1 respondent (14.3%) did not provide an answer. These results indicate that the use of PPE in the form of gloves by workers is still suboptimal.

The study results showed that although most respondents had never experienced hand eczema or other occupational skin conditions, a small number of respondents experienced eye allergies and itchy rashes on their hands, wrists, or forearms. If employees are exposed to irritants and allergens in their work environment, this condition is a risk factor that can increase their susceptibility to occupational skin conditions. Furthermore, more than 50% of respondents did not wear protective gloves while working. As a result, the risk of direct exposure to chemicals remains. If the skin is exposed to chemicals, dyes, solvents, or other substances used during the work process, these factors can affect the skin's condition, increasing susceptibility to irritation and allergic conditions.

Overall, the study results indicate that the number of hand eczema cases occurring among batik industry workers is still relatively low. Based on the characteristics of the respondents, workers come from four parts of the batik production process: canting, stamping, coloring, and painting. The majority of respondents are exposed to excessive exposure. Continuous exposure to irritating and allergenic chemicals must be considered because it can cause long-term skin disorders if not

balanced with appropriate preventative measures, such as the use of appropriate personal protective equipment, personal hygiene, and routine skin health monitoring as part of an occupational safety and health (OHS) program.

3. Discussion

This study used a quantitative method with a descriptive observational design and a cross-sectional approach to describe the characteristics of occupational skin diseases in batik industry workers. The cross-sectional approach was chosen because it can provide a picture of workers' health conditions, individual characteristics, and exposures in the work environment at a single observation point. Although this design cannot prove a direct cause-and-effect relationship, the method is suitable for identifying the characteristics of occupational skin diseases and factors that potentially increase the risk of contact dermatitis in workers.

Based on the concept of Occupational Contact Dermatitis (OCD), work-related contact dermatitis is an inflammatory skin disease that arises from the interaction between individual and occupational factors. Individual factors include age, history of atopy, history of allergies, skin conditions, and biological susceptibility, while occupational factors include the type of chemical, frequency and duration of exposure, use of personal protective equipment (PPE), and occupational hygiene. Therefore, the incidence of occupational contact dermatitis is influenced not only by exposure to chemicals in the workplace, but also by individual characteristics that determine the level of susceptibility to such exposure.

The results showed that most respondents had no history of hand eczema or work-related skin complaints. The majority of respondents also had no history of allergies and did not experience activity limitations due to skin disorders. These findings indicate that the prevalence of hand eczema among stencil workers is still relatively low. Some respondents had predisposing factors, such as a history of eye allergies and a history of itchy rashes on the hands. Although the prevalence of hand eczema in this study was low, the presence of these predisposing factors indicates a potential susceptibility to occupational skin diseases if exposure to irritants continues.

These findings can be explained using the Skin Barrier Theory as a supporting theory. This theory explains that the epidermis, specifically the stratum corneum, functions as a protective barrier that maintains skin moisture while preventing the penetration of irritants and allergens. Repeated exposure to chemicals can reduce the skin's protective capacity, thereby increasing water loss through the skin (transepidermal water loss), causing the skin to become dry, easily irritated, and more susceptible to inflammation. This condition is more likely to occur in individuals with a history of atopy, such as asthma, or dry skin conditions. Therefore, although this study did not find a high prevalence of hand eczema, the presence of these predisposing factors indicates that workers still have the potential to experience contact dermatitis if exposure continues.

The results of this study are consistent with those of Febriana et al. (2023), who reported that batik workers in Indonesia are exposed to various irritating chemicals and potential contact allergens at every stage of the batik production process. These chemicals include batik wax, textile dyes containing paraffin and beeswax, synthetic dyes, fixatives, detergents, and solvents used during the dyeing and rolling process. The study reported a prevalence of occupational skin diseases of 27.5%, with occupational contact dermatitis being the most common type of disease. Furthermore, only about a quarter of workers routinely use PPE, especially in the dyeing and rolling processes, which have the highest chemical exposure. This condition indicates that chemical exposure and low compliance with PPE use are important factors that increase the risk of contact dermatitis in batik workers. Respondents in this study came from several production areas, so variations in chemical exposure differed between workers.

The difference in the results of this study compared to Febriana et al.'s study is likely influenced by several factors, including the relatively small number of respondents, the characteristics of batik

industry workers, variations in chemical exposure intensity, and differences in the implementation of occupational safety and health programs in each industry. Furthermore, this study is descriptive in nature, so it only describes the characteristics of the respondents and does not analyze the relationship between risk factors and the incidence of occupational contact dermatitis.

The findings of this study are also supported by research by Efrilia et al. (2024), which showed that a history of atopy was significantly associated with the incidence of occupational contact dermatitis in batik workers. Individuals with a history of atopy have a skin barrier function that is more susceptible to damage, making them more susceptible to inflammatory reactions after repeated exposure to chemicals. Therefore, identifying workers with a history of atopy needs to be part of an occupational health surveillance program as an effort to detect occupational skin diseases early.

Furthermore, research by Putri et al. (2024) showed that consistent use of PPE combined with the application of a skin-protecting emulsion can reduce the symptoms of occupational contact dermatitis while improving skin function. These results indicate that preventing contact dermatitis depends not only on the use of PPE as a physical barrier against chemical exposure but also requires maintaining skin barrier integrity through the use of moisturizers after work.

Primayani et al.'s (2025) research also reported that frequency of chemical exposure, duration of exposure, and non-compliance with PPE use were exogenous factors associated with the occurrence of occupational contact dermatitis in batik workers. These findings reinforce the findings of this study, which suggest that although the prevalence of hand eczema remains low, continuous chemical exposure still has the potential to cause skin disorders if not accompanied by adequate risk control efforts.

Based on the overall results of the study, it can be concluded that the difference in prevalence is likely influenced by the relatively small number of respondents, variations in work sections (canting, stamping, and coloring), the intensity of chemical exposure, and differences in the implementation of the K3 program which is still relatively low. However, based on the concept of Occupational Contact Dermatitis, the presence of individual predisposing factors and exposure to chemicals in the work environment still indicates the potential risk of occupational skin diseases. Meanwhile, Skin Barrier Theory explains that repeated exposure to chemicals can reduce the skin's protective function, thereby increasing susceptibility to contact dermatitis. Therefore, the implementation of occupational safety and health programs needs to be continuously strengthened through hazard identification, the use of appropriate PPE, improved personal hygiene, education on skin care, the use of moisturizers to maintain skin barrier function, and regular skin health checks to prevent the occurrence of occupational skin diseases in batik industry workers.

Conclusion and Recommendation

This study shows that the prevalence of hand eczema among batik industry workers is still relatively low. Most respondents had no history of hand eczema or other work-related skin conditions. However, a small number of respondents had predisposing factors, such as a history of eye allergies and itchy rashes on their hands, which could potentially increase their susceptibility to occupational skin conditions if exposed to chemicals on a continuous basis.

The research also shows that most workers do not use protective gloves while working, so there is still the potential for direct exposure to chemicals used in the batik production process. Therefore, the implementation of the Occupational Safety and Health (K3) program needs to be continuously strengthened through the consistent use of personal protective equipment, improved personal hygiene, education on skin care, provision of hygiene facilities, and regular skin health monitoring as an effort to prevent occupational skin diseases. These efforts are expected to prevent the occurrence of occupational skin diseases and maintain the health of workers in the batik industry.

This study has limitations, namely the relatively small number of respondents and the use of a descriptive observational design with a cross-sectional approach. Therefore, the results only provide a description of the respondents' characteristics and cannot explain the causal relationship between risk factors and the incidence of hand eczema. Therefore, further research is recommended involving a larger number of respondents, using clinical examinations to establish a diagnosis, and analyzing the relationship between risk factors and the incidence of occupational skin diseases.

References

- APD, PP, Emulsion, F., Contact, D., Work, A., Batik, P., & Jambi, M. (2024). The Effect of the Use of PPE and Emulsion Formula on Occupational Contact Dermatitis in Batik Workers in Muaro Jambi. 13(2), 10–18.
- Febriana, SA, Ridora, Y., Indrastuti, N., Dewi, K., Oginawati, K., Tanziha, I., Rosita, C., Prakoeswa, S., Waskito, F., & Schuttelaar, ML (2023). Hazard identification and the prevalence of occupational skin disease in Indonesian batik workers. *Scientific Reports*, 1–11. <https://doi.org/10.1038/s41598-022-17890-w>
- Jacobsen, G., Rasmussen, K., Bregnhøj, A., Isaksson, M., Diepgen, T.L., & Carstensen, O. (2022). Causes of irritant contact dermatitis after occupational skin exposure: a systematic review. In *International Archives of Occupational and Environmental Health* (Vol. 95, Issue 1). Springer Berlin Heidelberg. <https://doi.org/10.1007/s00420-021-01781-0>
- Karagounis, T. K., & Cohen, D. E. (2023). Occupational Hand Dermatitis. *Current Allergy and Asthma Reports*, 23(4), 201–212. <https://doi.org/10.1007/s11882-023-01070-5>
- Patel, K., & Nixon, R. (2022). Irritant Contact Dermatitis — a Review. *Current Dermatology Reports*, 41–51. <https://doi.org/10.1007/s13671-021-00351-4>
- Schütte, M.G., & Groene, G.J. De. (2023). Work-related and personal risk factors for occupational contact dermatitis : A systematic review of the literature with meta-analysis. August 2022, 171–187. <https://doi.org/10.1111/cod.14253>
- Widiawati, S., & Pradnyawati, LG (2024). The Relationship between Atopy History and Occupational Contact Dermatitis in Batik Workers in West Denpasar. Description of Atopy History in Subjects. 4(2), 287–292.