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DESCRIPTION OF THE EVENT OF IRRITANT CONTACT DERMATITIS IN EMPLOYEES OF THE HOME INDUSTRY BATIK

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ABSTRACT

Batik is one of Indonesian culture which has high artistic value. The dyes used in the batik industry can come from natural dyes and synthetic dyes. Synthetic dyes contain hazardous chemical compounds in the form of heavy metals. Heavy metal compounds can cause cancer in living things. Contact with chemicals, such as workers in the batik industry can cause various skin disorders. One of the skin disorders that occurs due to exposure to chemicals is contact dermatitis. Based on research data from 21 employees of the coloring division in the batik home industry, the prevalence of irritant contact dermatitis was 33.33% (7 people) with the most characteristic age being 40-70 years, working duration >5 years, exposure contact duration 0-3 hours. / day, the most common symptoms are itching that occurs on the palms of the hands, backs of hands, forearms, between the fingers, and the backs of the feet. Respondents who had a history of atopic dermatitis were only 9.52% (2 people), and for exposure to chemicals other than batik dyes only 19.05% (4 people). Other chemicals that trigger contact dermatitis are detergents and fragrances. From the incidence of irritant contact dermatitis to employees of the coloring department in the batik home industry, more employees choose to be left alone than treated because the symptoms that appear are mild and do not interfere with work activities.

Keywords: chemichal; home industry batik; irritant contact dermatiti

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INTRODUCTION

Batik has become one of the icons of the State of Indonesia (Paramnesi et al., 2020). The process of batik is carried out through several stages, namely the preparation stage, patterning stage, waxing, then dyeing, waxing or removing batik wax and the last one is finishing. The dyes used in the batik industry can come from natural dyes and synthetic dyes. Natural dyes can be obtained from extracts of leaves, stems, roots, and seeds from plants such as mahogany, jelawi, tingi, teger, mangrove, secang, jackfruit, indigo, ketapang, manga, teak, noni, and biksa. Meanwhile, the synthetic dyes that are widely used are remasol (56%), napthol (25%), and indigosol (19%) (Wardani, 2015). Synthetic dyes contain hazardous chemical compounds in the form of heavy metals. Heavy metal compounds found in the effluents of the printed batik industry are thought to be chromium (Cr), Lead (Pb), Nickel (Ni), copper (Cu), and manganese (Mn). Heavy metal compounds can cause cancer in living things. Batik liquid waste, in addition to containing hazardous compounds, can also increase the COD (Chemical Oxygen Demand) and BOD (Biological Oxygen Demand) of water so that it can disrupt aquatic ecosystems (Jannah and Muhimmatin, 2019).

While in the batik industry, we can't get rid of it by using chemicals. Chemicals that are often used in the batik industry contain sodium hydroxide (NaOH), known as caustic soda or sodium hydroxide, which is a kind of caustic metallic base that is often used in batik factories. Sodium hydroxide is formed from basic oxides. Contact with chemicals, such as workers in the batik industry can cause various skin disorders (Hudyono, 2002). One of the skin disorders that occurs due to exposure to chemicals is contact dermatitis. Contact dermatitis is a non-life-threatening disease, but this disease will have an impact on the quality of life of workers and the quantity of production (Dewi et al., 2019). Contact dermatitis is an inflammatory skin reaction caused by irritating or allergenic substances found in the environment. There are two types of contact dermatitis, namely irritant contact dermatitis (DKI) and allergic contact dermatitis (DKA). Irritant contact dermatitis (DKI) occurs through non-immunological mechanisms, while allergic contact dermatitis (DKA) occurs through immunological mechanisms, namely through delayed type (type IV) hypersensitivity reactions (Dewi et al., 2019).

The prevalence of dermatitis in Indonesia reaches 6.78%. Of this prevalence, 90% of cases occur in contact dermatitis, both irritant and allergic contact dermatitis. Meanwhile, of the 90%, 92.5% were due to occupational contact dermatitis, 5.4% were due to skin infections, and 2.1% were due to other skin diseases. Data from epidemiological studies in Indonesia showed that 97% of 389 cases of contact dermatitis occurred, 66.3% experienced irritant contact dermatitis and 33.7% experienced allergic contact dermatitis (Hadi et al., 2021). Irritant contact dermatitis (DKI) can affect people of all ages, races and genders. The number of DKI Jakarta sufferers is estimated to be quite large, especially those related to work (work-related DKI), but it is said that the exact number is difficult to know. This is caused, among other things, by the large number of patients with mild disorders who do not come for treatment, or even do not complain (Djuanda et al., 2013). Therefore, the purpose of this study was to describe exposure to batik dyes on the incidence of irritant contact dermatitis in batik workers in Surakarta.

METHOD

This study is a descriptive study with a cross-sectional approach using primary data. The population of this study were 21 employees of the batik industry in the coloring department, which were taken from 3 batik home industries in Surakarta. The sampling technique used is total sampling where the entire target population that meets the criteria is included in the sample. The research variables consisted of age, smoking habits, length of work per year, use of personal protective equipment, duration of contact with dyes per hour, history of atopic dermatitis, history of suffering from previous allergies to the skin, symptoms that appear on the skin, exposure to chemicals other than dyes. batik, types of exposure to chemicals other than batik dyes, and treatment methods. Sampling was carried out after the respondents signed the informed consent. Data collection was obtained from questionnaires filled out by respondents.

RESULTS

This research was conducted on employees of the dyeing section of the batik industry in the city of Surakarta for 1 month in May 2022. In this study, 21 respondents were used from 3 different home industries. All respondents used were male.

Demographic Characteristics of Respondents

Table 1.

Distribution of respondents by age, smoking habit, length of work, and use of personal protective equipment

Characteristics	f	%
Age		
17 – 39	9	42,9
40 – 70	12	57,1
Smoking habit		
Active smoker	16	76,2
Passive smoker	5	23,8
Length of work		
> 5 years	14	66,7
< 5 years	7	33,3
Use of PPE		
Mask		
Use	18	85,7
Do not use	3	14,3
Gloves		
Use	17	81,0
Do not use	4	19,0
Clemek		
Use	17	81,0
Do not use	4	19,0
Boots		
Use	0	0,00
Do not use	21	100,0

Based on Table 1, it shows that the respondents are divided into two age groups, namely the age of 17-39 years as many as 9 people (42.9%) and the age of 40-70 as many as 12 people (57.1%). Respondents who have a smoking habit are 16 people (76.2%) and 5 people who do not have a smoking habit (23.4%). Respondents who worked for more than 5 years were 14 people (66.7%) and 7 people (33.3%).

Characteristics of Irritant Contact Dermatitis in Batik Industry Home Employees

Table 2.
Distribution of respondents based on length of contact with dyes

Dye contact time	f	%
0-3 hours/day	10	47,62
4-6 hours/day	4	19,05
>6 hours/day	7	33,33

Based on Table 2, 10 people (47.62%) were exposed to batik dyes for 0-3 hours/day, 4 people (19.05%) were exposed to batik dyes for 4-6 hours/day, and 7 people (33.33%) were exposed to batik dyes for >6 hours/day. According to Dewi et al., (2019), length of contact can be a factor causing dermatitis depending on the type of material used. The longer the time required for contact with chemicals, the greater the risk of experiencing skin inflammation so that it can trigger skin disorders in the form of contact dermatitis.

Table 3.
Distribution of respondents based on a history of atopic dermatitis

History of Atopic Dermatitis	f	%
Yes	2	9,52
Not	19	90,48

Based on Table 3, it was found that 2 people (7.5%) had a history of atopic dermatitis in their family, while 19 people (90.48%) had no history of atopic dermatitis. There are fewer employees of the dyeing department in the batik home industry who have a history of atopic dermatitis. a history of atopy will increase the risk of developing contact dermatitis due to damage to skin barrier function and increased penetration of irritants and allergens into the skin. This means that a history of atopy is not an absolute factor for a person affected by contact dermatitis, but is only a predisposing factor or a factor that aggravates the onset of contact dermatitis (Dewi et al., 2019).

Table 4.
Distribution of respondents based on a history of previous inflammation of the skin

Previous history of inflammation of the skin	f	%
Yes	7	33,33
Not	14	66,67
Total	21	100,00

Based on Table 4, 7 people (33.33%) had a history of previous inflammation of the skin, while the other 14 people (66.67%) had no history of previous inflammation of the skin. In this study 7 people who had a history of inflammation of the skin, 2 of whom also had a history of atopic dermatitis.

Table 5. Distribution of respondents based on symptoms of inflammation that appear on the skin

Symptoms of inflammation that appear on the skin	f	%
Itchy skin	6	28,57
peeling skin	0	0
Reddish skin rash	1	4,76
Dry scaly skin	0	0
Thickening of the skin	1	4,76
Burning hot skin	0	0
The skin has small bumps / blisters, watery / pus	0	0
No symptoms of inflammation	13	61,90

Based on Table 5, 6 people (28.57%) experienced symptoms of inflammation in the form of itching on the skin, 1 person (4.76%) experienced symptoms of inflammation in the form of reddish skin rashes, as many as 1 person (4.76%)) experienced symptoms of inflammation in the form of thickened skin, while the other 13 people (61.90%) did not experience any inflammation of the skin.

Table 6.
Distribution of respondents based on the location of the appearance of inflammation on the skin

Location of inflammation	f	%
Palm	3	14,28
Back of the hand	2	9,52
hand arm	1	4,76
Between the fingers	2	9,52
Face	0	0
Neck	0	0
instep	1	4,76
abstain	12	57,14

Based on Table 6, it was found that 3 people (14.28%) had inflammation of the palms, 2 people (9.52%) had inflammation of the backs of the hands, 1 person (4.76%) had inflammation of the arms. hands, as many as 2 people (9.52%) experienced inflammation between the fingers, as many as 1 person (4.67%) had inflammation on the back of the hand and 12 people (57.14) answered abstained because they had never had a history of inflammation on the skin since working as an employee in the coloring department in the batik home industry.

Table 7.
Distribution of respondents based on exposure to chemicals other than batik dyes

Exposure to chemicals other than batik dyes	f	%
Yes	4	19,05
Not	17	80,95

Based on Table 7, it was found that 4 people (19.05%) were exposed to chemicals other than dyes in batik, while 17 people (80.95%) were not exposed to chemicals other than dyes in batik. Exposure to other chemicals can also be one of the factors influencing the incidence of contact dermatitis.

Table 8.
Distribution of respondents by type of exposure to chemicals other than dyes in batik

Other types of chemical exposure	f	%
Detergent	3	14,29
Car Smoothing	0	0
deodorizer	3	14,29
Cosmetics	0	0
Not exposed to other chemicals	15	71,42

Table 9.
Distribution of respondents based on the method of treatment when experiencing inflammation of the skin

How treatment	f	%
left	6	28,57
Check doctor	3	14,29
abstain	12	57,14

Based on Table 8, 3 people (14.29%) were exposed to detergents daily, 3 people (14.29%) were exposed to fragrances daily, while 15 people (71.42%) were not exposed to other chemicals.

Based on Table 9, it was obtained that 6 people (28.57%) had inflammation of the skin and left it alone, 3 people (14.29%) would go to a doctor for an examination, while 12 people (57.14%) abstained (not provide answers) because while working as a batik employee, he had never experienced symptoms of skin inflammation. Based on the results of the study, employees of the coloring department in the batik home industry, if they experience symptoms of inflammation on the skin, are left without treatment. This is because the itching experienced can still be tolerated by the body and does not prevent employees from doing their jobs.

DISCUSSION

Based on the results of the study, it was found that the majority of respondents were in the age range of 40-70 years. Research conducted by Yasin and Priyono (2016) productive age has better work ability because at productive age has not experienced a decrease in physiological function, whereas if age is above 40 years, physiological function declines. In addition, at the age of 40 years, the skin condition has experienced aging so that the skin becomes dry and thinner. Dry and thin skin when exposed to chemicals will be more prone to inflammation (Dewi et al., 2019). Age is one of the endogenous factors of the risk of contact dermatitis. Based on smoking habits, it was found that 16 employees of the coloring department in the batik industry were active smokers. Cigarettes contain several heavy metals such as Pb, Cd, and so on which are harmful to health. Consumption of cigarettes every day will increase the risk of lead inhalation as a result of cigarette smoke (Laura, 2020). Based on the length of work, 14 employees worked >5 years. According to Indrawan (2014), workers with a working period of > 2 years may have resistance to chemicals used by the company. The period of work greatly affects a person's experience of work and the environment in which he works, the longer he works, the more experience he has. Experienced workers will be more careful so they are less likely to be exposed to chemicals

The use of personal protective equipment (PPE) which is generally used by employees in the batik industry includes masks, gloves, aprons, and boots. The use of masks in 18 people (85.7%) while 3 people (14.3%) did not use masks. The use of gloves on the respondents as many as 17 people (81.0%) while the other 4 people (19.0%) did not use gloves. There were 17 respondents (81.0%) using apron, while the other 4 (19.0%) did not use apron. For boots, all respondents (100%) did not use boots when coloring. Based on the use of personal protective equipment, most employees only use personal protective equipment in the form of masks, gloves and aprons. There is no use for personal protective equipment such as boots. Even though employees are already wearing gloves, there are still employees who experience inflammation of the hands. This is caused by several factors, namely carelessness, gloves that tear easily, or gloves that are too loose so that the dye can still be directly on the hands. Personal protective equipment is a tool to protect oneself or the body from the dangers of work accidents. However, it is technically recognized that personal protective equipment is not perfect for protecting the body but can reduce the severity of accidents that occur (Indrawan et al., 2014). The use of personal protective equipment is one way to reduce the possibility of contact dermatitis. because by using PPE you can avoid direct contact with allergen-triggering compounds (Zania, 2018).

Based on Table 5, 6 people (28.57%) experienced symptoms of inflammation in the form of itching on the skin, 1 person (4.76%) experienced symptoms of inflammation in the form of reddish skin rashes, as many as 1 person (4.76%)) experienced symptoms of inflammation in the form of thickened skin, while the other 13 people (61.90%) did not experience any inflammation of the skin. Itching of the skin is one of the most common symptoms of contact

dermatitis. However, the main symptom is usually pain or a burning sensation which can then become subacute or chronic dermatitis (Dewi et al., 2019). The itching can become so unbearable that in order to relieve the uncomfortable feeling, you will tend to scratch the itchy area which can cause more damage to the skin. Scratching activities that were initially triggered by an inflammatory reaction can erode the skin layer, causing secondary infection (Jimah et al., 2020). Enforcement of the diagnosis of dermatitis cases requires several types of examinations including history taking, physical examination, and supporting examinations. The history can be done by interviewing about the main symptoms felt such as pain, itching, erythema, burning, discomfort, allergy history, occupational history, history of exposure to irritant factors, and history of medication. The physical examination is based on skin efflorescence (Iswara et al., 2016). In this study, to obtain information on cases of dermatitis, an anamnesis was performed on the employees of the coloring department at the batik home industry.

Hands are parts of the body that are actively exposed to irritants or allergens associated with daily activities and work. This is also stated by Nofiyanti (2017) which states that the highest prevalence of contact dermatitis occurs on the hands. This is because hands are closely related to work and washing activities. High intensity hand washing can also cause repeated exposure to detergents, soapy water, and other chemicals, thereby reducing the skin's natural moisture and damaging the horny layer of the skin (Jimah et al., 2020)

Based on Table 8, 3 people (14.29%) were exposed to detergents daily, 3 people (14.29%) were exposed to fragrances daily, while 15 people (71.42%) were not exposed to other chemicals. other than batik dyes. Exposure to other chemicals that often occurs is due to exposure to detergents and fragrances, where detergents and fragrances are ingredients used in everyday life. According to Jimah et al., (2020) The ingredients that most often cause DKI are detergents, soaps, rubber additives, strong acids, strong bases, organic solvents, and alcohol solutions. DKA is often caused by detergents, metals, rubber additives, parabens, antiseptics, formaldehyde, and fragrances. The difference between a strong irritant and a weak irritant is caused by differences in the concentration of the substance, molecular size, and solubility (Racheva, 2006).

CONCLUSION

Based on research data from 21 employees of the coloring division in the batik home industry, the prevalence of irritant contact dermatitis was 33.33% (7 people) with the most characteristic age being 40-70 years, working duration >5 years, exposure contact duration 0-3 hours. / day, the most common symptoms are itching that occurs on the palms of the hands, backs of hands, forearms, between the fingers, and the backs of the feet. Respondents who had a history of atopic dermatitis were only 9.52% (2 people), and for exposure to chemicals other than batik dyes only 19.05% (4 people). Other chemicals that trigger contact dermatitis are detergents and fragrances. From the incidence of irritant contact dermatitis to employees in the coloring department in the batik home industry, more employees choose to be left alone than treated because the symptoms that appear are mild and do not interfere with work activities.

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