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The Impact of River Water Pollution on Dermatitis Disease Due to Chemical Waste : Literature Review

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Dermatitis is one of the skin inflammations caused by exogenous or endogenous factors. Rivers polluted with chemical waste are often one of the causes of dermatitis because they contain chemical substances in the form of soaps, detergents, surfactants, organic solvents, and oils. These chemicals can cause dermatitis. According to the world, in 2010 around 230 million people were affected by dermatitis, equivalent to 3.5% of the world's population. This study method is a Literature Review with the keywords dermatitis skin disease, river water pollution, household waste, detergent waste obtained from Google Scholar, ResearchGate, and Pubmed databases with a total of 20 national journals and 7 international journals and the number of journals included in the review is 6 journals. This study were obtained from most of the participants who lived around the river that was polluted with chemical waste experienced dermatitis. In addition, household waste in the form of detergents can also cause dermatitis.

1. Introduction

Dermatitis is one of the skin inflammations caused by exogenous or endogenous factors. Rivers polluted with chemical waste are often one of the causes of dermatitis because they contain chemical substances in the form of soaps, detergents, surfactants, organic solvents, and oils. These chemicals can cause dermatitis. According to the world, in 2010 around 230 million people were affected by dermatitis, equivalent to 3.5% of the world's population.

This study method is a Literature Review with the keywords dermatitis skin disease, river water pollution, household waste, detergent waste obtained from Google Scholar, ResearchGate, and Pubmed databases with a total of 20 national journals and 7 international journals and the number of journals included in the review is 6 journals.

The results of this study were obtained from most of the participants who lived around the river that was polluted with chemical waste experienced dermatitis. In addition, household waste in the form of detergents can also cause dermatitis.

2. Research Method

The use of the method in this study is a literature review study, which is a study conducted by analyzing selected literature from several sources with the aim of collecting and taking the essence of previous research as well as analyzing some of the experts' overviews written in the text. Literature review provides an understanding of the development of knowledge, a source of stimulus for policy-making, sparks the creation of new ideas, and useful for guidance on research specific fields. The method used in this study is a review of review literature sourced from Google Scholars and ResearchGate, PubMed with a publication deadline in the last 5 years (2019-2023). The journals used in this study were selected based on titles, abstracts, and texts that were appropriate to the topic of dermatitis events with

the keywords "Water pollution, waste, dermatitis, irritant contact dermatitis". The source of journals obtained based on keywords is 20 Indonesia journals and 7 international journals.

3. Result and Discussion

Water Pollution

Water pollution is something that causes a concentration of the water to be unclear so that other components such as living things, substances, energy, and other chemicals will enter into it to exceed the predetermined Water Quality Standards and cause a decrease in clean water quality. This decline will result in the usability and productivity of water resources getting worse, damaging existing natural resources (Farida et al., 2021).

Unfounded water management

with water quality management parameters causing water quality to deteriorate. Pollutants contained in water can be harmful substances such as chemical compounds, dyes, heavy metals, detergents, and other products that will have an impact on human health. In addition, if pathogenic microbes flow in contaminated water, it is likely that humans can be infected through food processing or packaging that uses the contaminated water source. The most common sources of water pollution mostly come from rivers and wells. In fact, these two sources are often used by people in their daily lives.

Laundry activities with detergents, dumping garbage into rivers, and indiscriminate disposal of chemical substances cause pollution in rivers, especially chemical waste which will be very dangerous. Polluted water sources if they are still used for daily activities, for example food utensils that are rinsed using contaminated water will cause especially the waste of the Sugar Granulation Factory causes several diseases that attack digestion and respiration. It is seen that there are 54.3% or around 19 00 out of 35 respondents chose factory waste as a major influence of river water pollution.

Health Disorders

According to the results of researchers Samuel et al., 2019 explained that the majority of people around the river will use river water for washing so that the use of water in the river will be polluted.



Figure 1 : Pathogenesis of Irritable Contact Dermatitis

Physiologically reviewed (Image The equipment can be indicated to have), All chemicals that cause bacteria to attach and cause dermatitis, either contact dermatitis where bacteria enter the body through irritants or allergic contact dermatitis of the oral tract. That way, transmission can be considered as a disease stimulant will be easier and based on its concentration.

As the community still does not care about examples, DNFB is an irritant in its own hygiene that is not hygienic, the concentration is 0.05% while geraniol, the development of the disease will be an irritant at a concentration of 50%. On the side the faster. Other Only chemicals that are According to the results of a study conducted by Ritiau et al., 2021 in the Village of Allergen Contact Dermatitis, while Cukir, Jalan Irian Jaya Cukir Diwek, that are only irritant in Jombang Regency, East Java, waste will only cause factory dermatitis which can have a large effect on irritant contact. Furthermore, secondary mediators are induced by IL-1 alpha and TNA-Alpha which are important as leukocyte recruitment to the site of inflammation Lack water clean will cause skin diseases that when occurs in the community, it will cause disruption of daily activities. Resti (2019) strengthened by stating that if people often

use unclean water, it can cause the skin to be continuously contaminated with polluted water so that skin tissue is easily damaged and the skin barrier cannot function again as the main protection of the skin. Prolonged contact with chemicals is also a trigger, such as the use of soap and detergent will increase the occurrence of contact dermatitis, causing skin disorders.

Thus, according to the researcher's test through data on the incidence of dermatitis symptoms, dermatitis symptoms occurred in 65 people (60.2%) which means that there is a relationship between the use of river water and water pollution.



Chart 1: Dermatitis Pathways Due to Irritant Contact with Chemicals There are two types of dermatitis, namely irritant contact dermatitis and contact dermatitis

Allergens. Irritant contact dermatitis is known to be a non-immunological inflammation while allergenic contact dermatitis is known to be immunologically inflammatory.

Chemicals that can irritate the skin can cause irritant contact dermatitis, while hapten chemicals such as Nickel can cause allergen contact dermatitis in the presence of repeated contact.

The penetration of chemicals into the skin causes cell organelle organelles such as Lysosomes, Mitochondria, and cell nuclei to be damaged. In addition, membranes, keratinocytes, and lipids will also be damaged which will release arachidonic acid. Arachidonic acid will then also break down and release prostaglandins and leukotrienes as derivatives of arachidonic acid. In addition, in the case of allergen contact dermatitis, chemicals that are haptens will bind to proteins to form antigens and result in physical changes in the skin. However, with the presence of Langerhans cells which are the only dendritic cells in the epidermis, the antigens are then macrophaged by the Langerhans cells. Many studies show that Langerhans cells then transport antigens to local lymph nodes that result in inflammatory cells such as T cells.

Research that Done by Ritiau et al., 2021 in Cukir Village, Jalan Irian Jaya, Cukir Diwek, Jombang Regency, East Java shows that factory waste Sugar can cause 21.2% of respondents to experience dermatitis caused by activities such as washing clothes, washing household furniture, toilets and throwing garbage in the river which causes a decrease in the quality of river water and nutrients contained in the soil.

The Relationship between Dermatitis and Water Pollution Regulation

Skin diseases are common health problems and can vary, such as leprosy, dermatitis, scabies, panu, smallpox, and others. Symptoms that often appear are dry skin, rough texture, scaly on the hands, feet, or face, acne, rashes, and loss of the epidermal layer. According to data from the Moyudan Health Center, 239 people in the region suffered from skin diseases in January 2019 and data shows that the number of skin disease cases in 2019 varied throughout the year with the most cases occurring in April (46 cases) and the lowest in May (33 cases). A preliminary study conducted on May 7, 2019 found cases of community clean water pollution due to household waste. This is in accordance with the statement of the Sanitarian Puskesmas which focuses on environmental issues in the 5th pillar of STBM (Community-Based Total

Sanitation), namely household liquid waste management. Contact dermatitis is an inflammation of the skin caused by contact with foreign substances, both irritating and allergenic.

Meanwhile, allergic contact dermatitis is the presence of external stimuli and exogenous agents that cause type IV hypersensitivity reactions. Risk factors for contact dermatitis are type of work, working period, age, frequency of exposure to chemicals, discipline in the use of PPE, gender, and history of atopy. The biggest risk factor among others is a history of exposure to chemicals. Contact dermatitis can occur as a result of many things such as work. Research conducted by Wardhana, et al. revealed that workers who are often in contact with chemicals are in the group with a higher incidence of contact dermatitis. In addition, this study was conducted with a sample of almost all workers not using PPE (gloves).

Lack of access to clean water and adequate sanitation can contribute to a variety of skin diseases. Polluted water contains chemicals, one of which is detergent can cause Dermatitis contact. The content of chemical substances such as alkalizing agents, builders, and surfactants is present in detergents. Prolonged exposure to irritant agents increases the likelihood of skin irritation and skin disorders. Surfactants can damage dermal cells by passing through the cell membrane then damaging the cell system. When cells are damaged, inflammatory mediators will be released into the damaged area in response to T cells and mast cells

Symptoms include itching, redness, non-specific. Thus, erythema, scaly, vesicles, and papules are chemicals. In those that pollute the water, it allows dermatitis to contact irritants, cell damage to the occurrence of dermatitis. Epidermis that occurs as a result of a non-immunological reaction of the skin to irritation

carried out by Ritiau et al, . 2021 regarding the impact of river pollution on environmental health in Cukir Village, explaining that rivers polluted by household waste and factory waste have a bad impact on environmental health, especially the health of the surrounding community, it was found that as many as 21.2% of community respondents in Cukir Village admitted to experiencing dermatitis (skin disorders) due to river

pollution caused by factory waste and household waste

Countermeasures Strategy

To overcome the impact of river water pollution on dermatitis, a comprehensive and sustainable strategy is needed. There are several strategies that can be done such as:

River water pollution prevention strategy

Implementing regulations carefully, the Government needs to implement stricter and more careful regulations related to the disposal of waste into rivers. These regulations should include higher water quality standards, stricter penalties for violators, and more effective and efficient monitoring mechanisms. Improving waste management, for industrial and household waste, it is necessary to improve waste management by building adequate waste treatment plants (WWTP). WWTP must be properly operated and maintained

clean that is safe and easily accessible to people living around polluted rivers. This can be done by building a clean water supply system, such as a drilled well or a drinking water treatment plant (IPAM). Providing treatment for dermatitis sufferers, for dermatitis sufferers need to get the right treatment from qualified health workers. This treatment can be in the form of administering topical drugs, oral medications. With the implementation of these strategies, it can be hoped that the impact of river water pollution on dermatitis can be minimized and people can live healthier.

The community must implement Clean and Healthy Living Behavior (PHBS)

With this program, it is hoped that the community can increase their knowledge, awareness and desire to live a healthy life, as well as an effort to realize an optimal standard of living through increasing the active role of the entire community and the business world (Ministry of Health of the Republic of Indonesia, 2007).

4. Conclusion

Based on the literature review of research articles that have been carried out, detergents from household waste are a significant source of river water pollution. The chemicals in the detergent can contaminate river water and disrupt aquatic ecosystems and Human health using water to ensure that the waste is disposed of. There is a clear correlation between rivers that can meet water quality standards.environmental pollution, such as river water

Pollution Impact that Polluted by Detergent and its impact on human health, The government needs to provide water, especially in terms of increasing cases dermatitis, highlighting the need for preventive measures and better management of household waste to protect water quality and public health. This literature study also emphasizes the importance of maintaining personal hygiene and environmental sanitation in preventing dermatitis caused by river water pollution due to detergent waste.

Environmentally friendly detergents are one of the most important practical advice. In addition, prevention strategies include the implementation of strict regulations on waste disposal and improved waste management. On the other hand, strategies to deal with impacts include providing access to clean water and treating dermatitis. Thus, river water pollution can be suppressed and public health is maintained.

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