Relationship Between Hand Soap Use and Incidence of Contact Dermatitis in Healthcare Workers

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Abstract

Contact dermatitis is an inflammatory skin condition caused by direct exposure to irritant chemicals or allergens. It is classified into two main types: irritant contact dermatitis (ICD) and allergic contact dermatitis (ACD). ICD results from direct skin damage caused by chemicals without involving an immune response, while ACD is triggered by an allergic reaction involving T-cell activation and cytokines. Factors such as duration, intensity, and frequency of exposure, as well as individual skin conditions, influence the severity of dermatitis. Among healthcare workers, the prevalence of contact dermatitis is high due to frequent exposure to soaps, hand sanitizers, latex gloves, and masks containing irritants and allergens. Research indicates that up to 74.5% of healthcare workers report experiencing occupational skin reactions. Preventing contact dermatitis among healthcare workers requires careful risk management and the use of appropriate protective equipment.

Keywords. Dermatitis, Hand Soap, Inflammatory Skin, Skin Condition

Introduction

Contact dermatitis is a chronic skin condition characterized by inflammation, dryness, and itching, often accompanied by other atopic conditions such as asthma or allergic rhinitis. Its

prevalence has increased over the past decades, particularly in rapidly industrializing nations with high chemical exposure in workplaces. Healthcare workers are particularly vulnerable due to frequent exposure to irritants like soaps and other cleaning agents as part of strict hygiene protocols[1,2]. Repeated handwashing and excessive soap use can damage the skin's natural protective barrier, disrupting the lipid layer and increasing the risk of irritation and inflammatory skin diseases like contact dermatitis[1].

Studies have shown a link between the use of irritants, such as soaps, and increased incidence of dermatitis among healthcare workers[3]. Certain soaps contain irritative ingredients such as fragrances and surfactants, which can trigger inflammatory responses in sensitive individuals. For example, antiseptic soaps with specific active ingredients may exacerbate conditions in individuals with sensitive or atopic skin[3].

Given the importance of maintaining skin health for healthcare workers and the rising prevalence of dermatitis in this population, this study aims to explore the relationship between soap usage and the incidence of dermatitis in healthcare workers. A deeper understanding of these risk factors can inform prevention and management strategies in demanding work environments.

Methodology

This study employed a literature review methodology, analyzing selected literature from various sources to synthesize conclusions and generate new insights. Primary data sources included national and international journals from the last six years (2019–2024) focusing on the incidence of contact dermatitis in healthcare workers. Literature searches were conducted using Google Scholar with keywords such as "contact dermatitis," "healthcare workers," and "soap." From an initial pool of 30 journals aligned with the study topic, five were selected based on their relevance and expected outcomes.

Discussion

Contact Dermatitis

Contact dermatitis is an eczematous inflammatory skin disease caused by contact with irritants or allergens. Irritant contact dermatitis involves the toxic effects of chemicals without triggering a T-cell response, whereas allergic contact dermatitis results from delayed hypersensitivity reactions to exogenous contact antigens. The immunological response in contact dermatitis is mediated by cytokine and T-cell interactions1[1].

Clinical manifestations and disease progression vary based on internal and external factors. Key differences between the two types of dermatitis include their causes, onset times, symptoms, and immune responses. For instance, ICD results from direct chemical damage, while ACD is due to an allergic reaction to specific substances. ICD typically occurs immediately after exposure, whereas ACD may arise after repeated exposure and take days to manifest.

Irritant substances are classified into strong and weak irritants. Examples of strong irritants include sulfuric acid, sodium hydroxide, chlorine, sulfur, and mercury, while weak irritants include detergents, bleach, pesticides, water, and preservatives. The likelihood of developing ICD increases with the duration, intensity, and concentration of exposure.

Physical irritants like friction, abrasions, occlusion, and detergents such as sodium lauryl sulfate are more likely to cause ICD when combined. The severity of ICD depends on the quantity and concentration of the irritant, the duration and frequency of exposure, and individual skin characteristics (e.g., thickness, dryness, oiliness, or pre-existing conditions). Environmental factors like extreme temperatures and humidity levels also play a role.

Incidence of Contact Dermatitis in Healthcare Workers

Previous studies have highlighted the prevalence of contact dermatitis among healthcare workers. A retrospective observational study involving 1,402 healthcare workers in Denmark reported that 30% had occupational contact dermatitis, while 53.4% had hand dermatitis[4]. Another study of 508 healthcare workers in Canada found that 30.5% experienced hand dermatitis[5]. A cross-sectional questionnaire-based study of 376 healthcare workers revealed that 74.5% reported experiencing unpleasant skin reactions[6].

Frequent use of soap and hand sanitizers containing chemicals like fragrances, benzalkonium chloride, propylene glycol, and cetyl stearyl alcohol contributes to these reactions. Additionally, latex gloves and masks containing formaldehyde and polyurethane are known allergens that exacerbate contact dermatitis.

Conclusion

Contact dermatitis is a common occupational illness among healthcare workers, primarily caused by repeated exposure to chemical irritants in soaps, hand sanitizers, and personal protective equipment (e.g., latex gloves and masks). Irritant and allergic reactions are triggered by substances

like formaldehyde, benzalkonium chloride, propylene glycol, and polyurethane.

Preventing contact dermatitis requires careful management of chemical exposure and the use of appropriate personal protective equipment to minimize irritation or allergic reactions. Individual factors such as skin type (e.g., oily, dry, thick, thin), pre-existing skin conditions, and environmental conditions like temperature and humidity also influence the severity of symptoms. A combination of physical and chemical exposures further increases the risk of dermatitis.

Effective prevention strategies are critical to safeguarding the health of healthcare workers, enabling them to perform their essential roles without compromising their skin health.

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