

Exploring The Effect of Occupational Dermatitis at the Workplace: A Literature Review

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Abstract:

Occupational dermatitis is work-related diseases experienced by employees working under different sectors mainly exposed with chemicals, irritants or allergens. This review aims to identify the implications of occupational dermatitis for employee's health and organization's performance. The condition is known to primarily affect the hands, which poses a high risk for companies in terms of medical expenses to treat the condition, lost wages, and legal issues. It also leads to social problems by isolating the employees or their colleagues due to the skin conditions, increased absenteeism and presenteeism. Conditions may become chronic and have adverse effects on function both in personal and workplace settings. Failure to prevent dermatitis and poor handling of resources including medical equipment worsens the risk of dermatitis among manufacturing, health and construction industries. Consequently, one can state that having a solid health and safety scheme together with adequate protective tools and measures can help minimize the occurrence of occupational dermatitis. Employers should therefore endeavor to implement health and safety measures to reduce health risks and their impact on employees and the organizations they serve. Therefore, this paper analyses the effects that occupational dermatitis has on the employee and the organizations in different aspects.

Keywords: Occupational Dermatitis, Health Hazard, Turnover, Chronic Skin Disease

1. Overview of Occupational Dermatitis

Maintaining excellent safety and health at work involves many obstacles, including the possibility of illnesses that could affect an employee's productivity. Therefore, dermatitis is among the illnesses that impact employees at the workplace. The term “dermatitis” is an inflammation of the skin. Being the body's largest organ, the skin plays an essential part in overall health and acts as an important sign of internal health (Mitchell, 2022). It is a broad word used to describe a variety of skin disorders marked by redness, itching, swelling, and other signs of skin inflammation. Dermatitis can be caused by a variety of circumstances, such as allergic reactions, irritants, underlying medical disorders, or genetic factors. The human body does not suffer any major damage from dermatitis. It is not transmissible, neither does it imply that the surface of the skin is soiled or contaminated. If the exposure is not stopped, these symptoms may get more severe over time. The symptoms can be managed with certain therapies and drugs. Furthermore, there are various forms of dermatitis, including contact dermatitis, atopic dermatitis (eczema), and seborrheic dermatitis, each with distinctive causes and characteristics. According to Chu et al. (2020), to reduce the risks associated with dermatitis in workplaces and limit the incidence, personal protective equipment, gloves, and avoiding direct skin contact are the most important preventative measures.

According to Jacobsen et al. (2021), contact dermatitis has been defined by the European Society of Contact Dermatitis (ESCD) as an eczematous local inflammatory skin reaction caused by direct and usually repeated exposures, to harmful objects or chemicals, which, depending on location of contact, can occur anywhere on the body. International Labour Organization and World Health Organization (2021) stated the association makes biological sense that repeated exposure can damage skin structures, causing dryness, cracking, and dermatitis. Besides, in irritant contact dermatitis, patients present with symptoms manifesting within minutes to hours of coming in contact with an irritant. This type of skin rash is usually localized only to the areas that the person has come into direct contact with the irritant. This is why classically pain, burning, stinging, or discomfort is considered to be more significant than itching (Bains et al., 2018). Repeated exposure to the causative agent results in chronic dermatitis accompanied by lichenification, fissuring and hyperpigmentation.

Once there is lichenification present, then the changes cannot be readily erased in their entirety (Bohl, 2019). Due to the long duration of occupational dermatitis, any skin changes in patients should be evaluated as early as possible to avoid exacerbations with severe negative effects on patients' health and the overall health-care system.

Like any other part of the body, one's hands is most vulnerable to injuries, but other parts can also be endangered. The financial implications include increased costs of healthcare; loss of income due to disability either through wage deduction, unemployment, or termination. According to Begolka et al. (2020), the multidimensional burden of atopic dermatitis is also associated with considerable indirect costs to society, including sick days and lost work productivity. In many cases, it might be completely avoidable with low-cost and straightforward steps. The workers' opinions about how much their skin condition was related to their jobs differed. Some participants were certain that their skin disease was brought on by their profession; others connected their ailment to a particular causative agent at work; yet others were unsure or thought it might have been caused by something else. According to Shrestha and Basukala (2018), most occupational dermatitis patients were construction workers (24.28%), followed by housekeeping (18.57%) and hospital staff (17.14%). People with a history of skin issues reported being more aware of changes in their skin, potential risks, and proactive preventative measures. Nguyen et al. (2020) stated there is a need to enhance the general public awareness regarding skin cancer and the possible approaches that can be used to curb the issue. Consequently, the general public may not recognize the symptoms of skin cancer resulting in late diagnosis.

As pointed out by Royal College of Physicians of Edinburgh (2023), dermatology has relatively a short history. As the subject of dermatology has appeared in the 1500s the formal definition of the subject has emerged only in the 1700s. According to Parish (2019), many societies and journal exist, whose purpose is to encourage the scholarly study of dermatology's history. The discovery in the 19th and 20th century of specialized techniques still more in the scientific revolution and the advancements in technology have helped to advance diagnoses and to avail therapeutic alternatives in dermatologic problems (Ferreira et al., 2021).

As dermatology developed into a separate medical specialty in the 19th century, doctors there started to classify and define a range of skin conditions, including dermatitis. According to Kramer et al. (2017), the nineteenth century is considered to be the time of the growth and development of dermatology as a science. English physicians Robert Willan (1757–1812) and Thomas Bateman (1778–1821) established, a modern classification system that would categorize dermatologic diseases based on their primary skin lesion, though, the system caused controversy for its failure to distinguish the cause and origin of the diseases. Consequently, specialization in the skin by the physicians and surgeons was inevitable to arrive at today's grasp of skin ailment (Jackson, 2022).

When an individual is exposed to allergens or irritants that are usual in an occupational setting, the process of occupational asthma might begin. According to Shakik et al. (2019), the majority of irritants are chemicals, including cleaning agents, metal working fluids and organic solvents that damage the epidermal barrier after cumulative exposure to the agent. León (2023) has stated the sensitization phase in allergic responses is characterized by the initial encounter with allergens, leading to the development of allergen-specific T helper 2 (Th2) cells. The exposure can lead to either irritative contact dermatitis or allergic contact dermatitis depending on the causes that are involved. However, irritant contact dermatitis and allergic contact dermatitis could be difficult to distinguish since its signs might be similar, although patch testing could be required in order to distinguish the two clearly (Hadžavdić et al., 2018). In addition, Di Altobrando et al. (2020) stressed that, to prevent skin damage skin protection guidelines, appropriate use of personal protective equipment, necessary precautions regarding its utilization as well as skin protection measures should be followed. Thus, occupational contact dermatitis is a complex disease with a negative impact on workers and their families, employers, and insurance companies (Houle et al., 2021).

According to Tramontana et al. (2023), chronic dermatitis can develop when eczema is left untreated or when exposure to allergens or irritants persists. The skin condition known as chronic dermatitis causes ongoing discomfort for the affected employee. The result might be skin that is thickened, dry, and scaly, which is not only unsightly but also difficult to manage and treat. In addition, this chronic dermatitis is more common in women than men and 9.6 million children had developed dermatitis since the age of 5 (National Eczema Association, 2023). People with chronic dermatitis may need to make adjustments to their working conditions and daily routines in order to reduce the frequency and severity of flare-ups, in addition to receiving ongoing medical treatment. This continuing risk demonstrates that dermatitis is not simply an occupational disease but has multiple-factorial issues. According to Ring (2017), apart from the immanent problems of continuously appearing new substances in the environment due to the progress in chemical and pharmaceutical industry and the limited possibilities for preventive testing also the lack of information in affected individuals or persons at risk is immense. Moreover, the persistence of the disease entails treatment by dermatologists, allergists, and occupational health workers to help minimize the effects of the disease on the day-to-day lives and work output of afflicted individuals.

Workplace safety and health are essential because to the possible impact of dermatitis on employee productivity and well-being. Dermatitis, which causes skin inflammation, can be caused by allergies, irritants, medical disorders, or genetics. According to Novak-Bilić (2018), contact dermatitis (CD) is an inflammatory skin disease caused by chemicals or metal ions that exert irritant (toxic) effects, or by small reactive chemicals (contact allergens) that modify proteins and induce immune responses (predominantly by T-cell response). Although it is noted that such skin problems do not impact the response rates on longitudinal studies, it makes workers to leave jobs due to health-related complications (Alfonso & Johannessen, 2019). Thus, Schütte et al. (2022) explains occupational contact dermatitis (OCD) is an important work-related skin disease that depends on several parameters. Chemical agents are the principal cutaneous risks, although mechanical, physical, and biological risks also feature. But as Christensen and Jafferany (2023) pointed out, chronic dermatitis, and more specifically atopic dermatitis (AD) has substantial psychological effects on the sufferers.

This may result in stress, anxiety and depression, social exclusion and reduced quality of life. According to Sibbald and Drucker (2017), atopic dermatitis may cause patients to become self-conscious or embarrassed about their skin, and subsequently become fearful of going out in public.

Machler et al. (2019) noted that 15 adult patients with atopic dermatitis history and a majority with coexisting allergic contact dermatitis achieved 70–100% reduction in dermatitis by dupilumab. In addition, the research done by Gupta et al. (2017) notes that education and training are important preventive measures for occupational contact dermatitis (OCD). According to Alfonso et al. (2017), the definition of prevention should be sufficiently broad and include a pure scientific (medical) approach. Employers must identify and mitigate dermatitis triggers to ensure workplace safety. Thus, efforts to incorporate various elaborate health programs which include skin health as a component of general occupational health may result to high levels of workforce productivity. Although some preventive efforts have not produced a positive impact, other extensive approaches could be useful in mitigating occupational hand dermatitis (Karagounis & Cohen, 2023). Adhering to health and safety practices at work can greatly enhance employees' motivation and tenure, while being advantageous for organizations. Research has indicated that healthcare services under employment have the benefits of offering shield, adding productivity, and enhancing employee's loyalty (Son et al., 2020).

2. Effects of Occupational Dermatitis to Workplace Safety and Health

Occupational dermatitis is stated as one of the leading occupational diseases and it is calculated that this disease takes a proportion of 40% – 70% on the total occupational diseases (Calayag, 2019). Besides the social impact aspect on employees, this condition also opens new concerns for productivity and efficiency in organizations. It is important to deal with it to ensure high productivity and well-being of workers within the organization.

2.1 Workplace Hazard

Workplace hazards present substantial risks to workers' health and safety throughout multiple industries. These hazards may be physical, chemical, biological, ergonomic, and psychosocial (Tharwani et al., 2024). But, Pujianti and Djunaidi (2022) added that climate lighting and noise which exist in the physical work environment could affect the health and productivity of the workers. It primarily manifests as irritant contact dermatitis (ICD) or allergic contact dermatitis (ACD), often occurring in combination (Milam et al., 2020). As stated by Pratama (2021), risk reduction of occupational dermatitis requires the essential usage of personal protective equipment, including to avoid contact with different allergens and irritants. Thus, Sari et al (2022) defines personal protective equipment as eye protection (goggles and face shield), face protector (mask and respirator), gloves, head gear (hair and hood) feet protection (closed shoes and rubber boots) and body protector (coverall and gown). But, for certain employees, it is very clear that wearing personal protective equipment for long hours can be uncomfortable, and frankly inconvenient. For instance, since nurses are susceptible to hypoxia, dyspnea, headaches, weariness, hunger, and stress while on the job wearing the personal protective equipment, it is important for them to take breaks for breathing, eating, and using the restroom (Zhang et al., 2021).

2.2 Psychological Strain

In addition, the workers who are afflicted with this disease may counter psychological strain, which enhances their stress because of discomfort situations that can influence the productivity of employees at workplace. According to Zeidler et al. (2024), patients with itchy dermatoses are more stressed, anxious, and depressed and perceive themselves as more stigmatized than non-itchy patients. Sandhu et al. (2019) also included hidradenitis suppurativa and atopic dermatitis impact work productivity and quality of life. According to Kalboussi et al. (2019), the average score of the Dermatology Life Quality Index (DLQI) for patients with allergic contact dermatitis (ACD) was 6.5. The Dermatology Life Quality Index (DLQI) has been through numerous forms of validation such as factor analysis, test-retest reliability, and forms of validity test (J. R. Johns et al., 2024).

Cheng and Silverberg (2019) further stated that atopic dermatitis patients suffer enhanced depressive symptoms and high amounts of psychological distress than the general populace. Shearer et al. (2019) pointed patients often experience embarrassment due to visible symptoms, odor, or drainage, leading to self-imposed isolation to avoid perceived stigma. Therefore, the psychological load is more extensive than appearance; it also involves pain, fatigue, and cognitive experiences that create a hidden disability concept (Norman et al., 2022).

2.3 Social Impact

Occupational dermatitis could have social implication to the workers and the affected individuals. As Ludwig et al. (2020) pointed out, these conditions are known to bring about some form of discomfort in the physical sphere and may have a toll on the general body image and self-esteem; this aspect of the sexual well-being is impacted negatively. The consequences displayed are shame, perceived incompetence, and social anxiety in social settings (Vani et al., 2019). Nikhil and Meeravath (2021) further highlight that allergic contact dermatitis has severe social, professional, and familial impacts, especially the hand eczema. Similarly, Martin et al. (2017) found that fear of embarrassment that arises from other people's questions and behaviors resulted to concerns on social situations. According to Marron et al. (2020), patients who suffer rejection, stigmatization, and social isolation as they also have concerns over their appearance and treatments' efficacy. Moreover, Rahayu (2024) reported that lack of knowledge was a common problem among the workers, with different studies highlighting those workers have low levels of awareness about occupational dermatitis. Finally, Stingeni et al. (2021) note that occupational contact dermatitis may causes bullying and discrimination, with 39.3% of students experience it and 33.9% of workers feeling discriminated due to atopic dermatitis.

2.4 Loss of Productivity

Company's loss of productivity may be initial effect by occupational dermatitis. Both presenteeism and absenteeism have an impact on worker productivity. As outlined by Lipovac (2020), absenteeism is understood as absence from work, regardless of the reason, which is continuing to become a problem that has immense economic and productivity costs. Whereas, presenteeism, a multifaceted organizational behavior, is referred to as performance of work while ill or other conditions that hamper efficiency (Jayaweera & Dayarathna, 2019). The expenses of presenteeism, absenteeism, unpaid labor, non-formal care, and lost leisure time are all included in the costs of productivity loss by Joanna et al. (2019). According to Social Security Organization. (2023), in Malaysia, the Social Security Organization (SOCSO) provides benefits for workers who suffer from occupational diseases or injuries. The main function of SOCSO is to provide social security protection to employees and their dependents through the Employment Injury Scheme and the Invalidity Scheme. When someone has a lucrative job, their indirect expenses could come from being absent from work due to illness (absenteeism) or being present at work despite illness (presenteeism). According to the Department of Occupational Safety and Health (2017), a total of 6,020 cases of occupational diseases and poisoning were reported.

2.5 Worker's Mental Health

Occupational dermatitis has an impact on another worker's aspect which is their mental health. Hand dermatitis related to their workplace affects the quality of life and causes much mental distress (Sarkar et al., 2021). According to Courtney and Su (2024), atopic dermatitis raises the likelihood of depression, anxiety, and suicidality since inflammation is known to impact the central nervous system. Apart from dermatological approaches, psychological treatments such as cognitive behavioral therapy (CBT) have proven to yield efficacy for skin status and quality of life in several dermatological disorders (Revankar et al., 2022). As for the risk factors and proper precautions, the patients with history in their skin were more sensitive as well. As a result, Rocholl et al. (2023) aver that these conditions impact the economic, social, emotional, physical, and occupational spheres of life, and may require alteration of jobs.

The further consequences affect families where they have to spend more time taking care of their children, being absent from work, and having their sleep schedules disrupted (Barbarot et al., 2022). Thus, to tackle these problems, a complex approach is required, which includes selective educational activities to enhance the implementation of awareness, law enforcement, and health promotion initiatives (Shaikh, 2024).

2.6 Insurance Coverage

Occupational dermatitis therefore has a vast influence on the insurance aspect of a company's safety and health system. In countries that have implemented worker's compensation policies, questions have over time been raised on underreporting and identification of work-related diseases (Fernando et al., 2019). This is additionally compounded by intricate management issues attributable to the varied conflicting stakeholder interests within the insurance firms, employers, workers, and authorities. According to the Department of Occupational Safety and Health (2019), over 80,000 reports of potential occupational illnesses were filed. Thus, employment injury insurance scheme under Social Security Organisation (SOCSO) governs employees in Malaysia to cover employment injuries which also include occupational diseases, and ensure statutory protections (International Labour Organization, 2017). *The Star* (2023) added the government is currently going over amendments to the Self-Employment Social Security Scheme Act 2017, mainly by improving coverage for self-employed individuals in surprising situations in order to better protect their rights. In order to address this problem, The Social Security Organization (SOCSO) under Malaysia's Ministry of Human Resources is introducing a new ceiling for contribution-based salaries effective 1 September 2022. (Sofiah, 2022).

2.7 Medical Expenses

A risk that an organization may face in relation to occupational dermatitis is that medical treatment and compensation expenses in relation to cases of it may be extremely high. According to Ministry of Health Malaysia (2023), total health expenditure in 2017 was equal to RM 57,361 million in which health expenditure in was also equal to 4.24% of Malaysia's GDP.

Nonetheless, atopic dermatitis, despite not being limited to Malaysia, has demonstrated considerable economic burdens, with approximately \$5.297 billion being spent annually in the United States (Drucker et al., 2017). According to Olusegun and Martincigh (2021), occupational skin disease may cause several effects on people and organizations. Besides, Begolka et al. (2020) stated out-of-pocket (OOP) expenses for atopic dermatitis management are substantial, with a median annual cost of \$600 and 41.9% of patients spending \$1000 or more annually. These expenses encompass professional care services, prescribed medicine, and non-prescribed goods (Chovatiya et al., 2023). Further, Weil et al. (2022) affirms that patients with atopic dermatitis has incurred direct costs of \$126 more on average than non-atopic dermatitis patients in the reference year. Chovatiya et al. (2021) have elaborated the financial loss aspect by extending those households who mentioned 64. 6% of the respondents said they have encountered serious side effects.

2.8 Company Turnover

Another weakness is that high employee turnover rate due to occupational dermatitis concerns in a particular company. As stated by Dietz et al. (2020), It was identified that 52.6% of workers with occupational contact dermatitis were indicated to be in a different or unknown industry of employment 2 years after notification. It may lead to the fact that the company may have to recruit and train new employees at a higher cost to the company. According to Said et al. (2022), there are some employees who would need to wash and groom themselves as well as other activities that entail running of the company. Additionally, Maulina et al. (2024) revealed that employee absenteeism, which is a strong antecedent of turnover, is also detrimental to innovation and organizational performance. Employee turnover is a critical issue in organizations because of its influence on productivity, sustainability and profitability of an organization (Al-Suraihi et al., 2021). Khan et al. (2023).

A substantial negative relationship is present between organizational profit and employee turnover. Bangura & Lourens (2024) stated the impacts of turnover are lower quality service delivery, increased workload, failure in processes and lack of commitment. Yadav et al. (2018)

added that employee turnover directly affects human resource cost and market value of organizations.

3. Conclusion

In conclusion, working with chemicals often results to occupational dermatitis which has negative impact on the welfare of the employee and productivity of the firm hence calling for more strict measures on health needs on employees. The hands taking so much of hit replicates the financial loss in terms of medical bills, wages, and any legal repercussions that dermatitis brings. Ignorable irritants and allergens in many sectors including manufacturing and healthcare industries this condition not only poses negative impacts on the bodily health but also the mental and social welfare of affected persons. From the discussion above, it was evident that patients with ostensive dermatitis receive negative treatment from colleagues and friends, family members, and the public, which leads to social exclusion, absence from work or school, or even attending work or school while having visible dermatitis. The examples of dermatitis in history prove that its influences are apt to be chronic, therefore, it is necessary to implement preventive measures in advance. Employers require that organizations are safe, healthy promotion, awareness, and if needed prompt medical care of occupational dermatitis. When there are appropriate supplies and policies in place, dermatitis infections are likely to decline and, in turn, improve the productivity of the workforce together with understanding of the organization.

Also, apart from the health and safety problem, lack of adequate resource or equipment to enforce these policy makes occupationally dermatitis more vulnerable. According to Thibaud et al. (2018), Numerous sectors are identified as posing a significant risk or being hazardous, such as healthcare, food supply chain, mining, energy (oil & gas, nuclear), transportation, and building management. According to Magdalena et al. (2018), lack of preventive measures is also evident in managing logistics and medical equipment's which also puts a danger on the employees. Lack of the right equipment and, appropriate treatment will enhance the general incidence of chronic skin diseases among the workers through the manufacturing companies and the healthcare sector (Shakik et al., 2019).



It is also vital for employers to invest resources in the creation and enforcement of safety policies since it takes more than just meeting the set standards to create a safe working environment. The failure to do so threatens not only the lives of the employees, but also the image and efficiency of the organization. Thus, it is crucial that adequate health and safety measures be put into place, with regard to adequate funding and equipment to help reduce occupational dermatitis and its related financial and social impact.

Ethical approval

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Consent

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Author contribution

The authors were involved in drafting and reviewing the manuscript and have seen the final text. All of them contributed equally to the development of the manuscript.

Conflicts of interest disclosure

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Non

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