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Review

RISK FACTORS ASSOCIATED WITH CONTACT DERMATITIS IN SCAVENGERS

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ABSTRACT

Risk Factors Associated With Contact Dermatitis in Scavengers. *Contact dermatitis is a common occupational skin disorder among scavengers due to frequent exposure to irritants and allergens in hazardous working environments. This review aims to analyze the association between personal hygiene, duration of work, and the use of personal protective equipment (PPE) with the incidence of contact dermatitis among scavengers. A systematic literature review was conducted using ten relevant journal articles published within the last five years and retrieved from Google Scholar. The findings consistently indicate a significant association between poor personal hygiene and an increased risk of contact dermatitis ($p < 0.05$), with scavengers exhibiting inadequate hygiene practices experiencing skin complaints 8.5 times more frequently than those maintaining good hygiene. Prolonged duration of contact and longer employment periods were also found to significantly contribute to the incidence of dermatitis, as extended exposure to irritants exacerbates skin damage. In addition, inadequate use of PPE showed a strong correlation with higher rates of contact dermatitis, highlighting the protective role of physical barriers in preventing direct exposure to harmful substances. Age and sex were also identified as contributing factors, reflecting physiological differences in skin sensitivity and immune response. This review underscores the importance of targeted interventions, including the promotion of proper personal hygiene, consistent use of PPE, and regulation of working duration, to effectively reduce the incidence of contact dermatitis among scavengers. The findings provide comprehensive insights and preventive recommendations to enhance occupational health management for this vulnerable worker population.*

INTRODUCTION

Skin complaints are signs or symptoms indicating the presence of skin disorders or diseases, with dermatitis being the most frequently reported condition. Dermatitis is an inflammatory skin disorder characterized by itching, erythema, and skin changes resulting from various factors, such as allergic reactions, exposure to sunlight, or the use of products containing fragrances or alcohol. Occupational contact dermatitis accounts for the majority of skin diseases in industrial settings, contributing up to 90% of work-related skin disorders [(3)]. Dermatitis is also a major contributor to the global burden of skin diseases and imposes substantial social and economic impacts on affected individuals [(31)].

In Indonesia, contact dermatitis represents a significant public health problem. Dermatitis ranks third among the ten most common skin diseases, with contact dermatitis being the predominant type, accounting for approximately 92%–97% of occupational skin disease cases. The prevalence of skin diseases such as scabies and dermatitis in Indonesia in 2020 was reported to range from 3.9% to 6% [(5)]. Epidemiological studies indicate that approximately 97% of the 389 dermatitis cases examined were contact dermatitis, of which 66.3% were irritant contact dermatitis and 33.7% were allergic contact dermatitis (Efendi et al., 2023). Provinces with dermatitis prevalence exceeding the national average include South Kalimantan, West Sumatra, Central Sulawesi, and several other regions. In Makassar City, contact dermatitis is one of the most common skin diseases, accounting for 14.60% of all recorded skin disease cases [(13)].

Personal hygiene is one of the primary factors associated with the occurrence of dermatitis. Scavengers are an informal occupational group working in environments heavily contaminated with irritant substances, such as detergents, solvents, oils, and household and industrial waste, placing them at high risk of developing contact dermatitis. Such exposures occur for several hours daily, often under conditions of direct sunlight, dust, and high humidity, which compromise the skin's protective barrier. Studies have demonstrated that individuals with poor personal hygiene are at a significantly higher risk of developing contact dermatitis. Research conducted by Maratus et al. (2021) at the Talang Gulo landfill site in Jambi City found a significant association between personal hygiene and symptoms of contact dermatitis, with a p-value < 0.0001 [(24)].

The use of appropriate personal protective equipment (PPE) also plays a crucial role in influencing the incidence of dermatitis, particularly among workers such as fishermen and scavengers. Contact dermatitis complaints among scavengers most commonly affect the hands and feet. In several cases, skin irritation on the feet has been attributed to allergic reactions to rubber boots worn during work activities.

Length of employment, duration of exposure, and frequency of direct contact with irritant materials further exacerbate the risk. Scavengers are daily exposed to waste containing detergents, solvents, oils, and other chemical substances capable of damaging the skin's protective barrier, while dirty and humid working environments increase the likelihood of irritant contact dermatitis. Non-standardized work characteristics, limited occupational health supervision, and restricted access to healthcare services render scavengers a highly vulnerable occupational group to skin disorders.

Based on this background, the research question of this review article concerns the relationships between age, sex, personal hygiene, PPE use, and length of employment or exposure duration with the incidence of dermatitis among scavengers. This review distinguishes itself from previous studies, which have generally examined these factors separately, by explicitly analyzing these key factors simultaneously within the high-risk occupational context of scavengers. The objective of this review is to synthesize fragmented research findings related to these factors in order to provide a more comprehensive understanding and more targeted preventive recommendations.

MATERIALS AND RESEARCH METHODS

This study employed a systematic literature review design to identify and synthesize evidence regarding risk factors for skin disorders among scavengers. Article searches were conducted using the Google Scholar database with the keywords "skin complaints" and "scavengers," limited to publications from the past five years in either Indonesian or English to ensure data relevance and currency.

The inclusion criteria were as follows: (1) quantitative observational study designs (cross-sectional, case–control, or cohort); (2) a primary study population consisting of scavengers or waste management workers at landfills or integrated waste processing sites (TPA/TPST); (3) reporting the incidence or complaints of skin diseases, particularly contact dermatitis; and

(4) inclusion of at least one risk factor variable, such as personal hygiene, use of personal protective equipment (PPE), length of employment, or duration/frequency of exposure.
Articles were excluded if they: (1) were not primary research studies (e.g., editorials, opinion pieces, or narrative reviews); (2) did not present data specific to scavengers; or (3) contained incomplete data or were not accessible in full text.
The selection process was conducted in stages. Of the 537 articles identified in the initial search, screening of titles and abstracts yielded 65 relevant articles. Full-text assessment based on the inclusion and exclusion criteria further reduced the number to 10 articles eligible for analysis. Each selected article was subsequently appraised for methodological quality and risk of bias, considering clarity of study design, measurement methods, sampling techniques, and control of confounding factors, prior to data extraction and narrative synthesis.

RESEARCH RESULTS AND DISCUSSION

The following table presents the results of the literature search obtained from Google Scholar related to the research topic. This table summarizes relevant references that can be used as review material to strengthen the theoretical foundation and analytical framework of this study.

Table 1. Journal Search Results

No.	Author(s) (Year)	Title	Method	Results
1	Zamli; Resty Ryadinency; Sri Yuliastuti; Fredy Chandra Montolalu (2023)	Relationship between Personal Hygiene and Symptoms of Skin Disease in Scavengers	Quantitative, cross-sectional	A significant association was found between personal hygiene and skin disease symptoms among scavengers (p = 0.005).
2	M. Kafit; Herdianti; Zahara Gema Gatra (2021)	Determinants of Skin Diseases among Scavengers at Telaga Punggur Landfill	Descriptive quantitative, cross-sectional	75.3% had poor hygiene, 73% did not use PPE, and 70.8% experienced skin diseases; significant associations with hygiene (p = 0.006) and PPE use (p = 0.000).
3	Dini Daningrum; Dika Sulastri; Tika Yuliana; Maman Sutisna; Etty Nurkhayati (2022)	Determinants of Skin Disease Complaints among Scavengers at the Landfill	Cross-sectional, total sampling	Significant associations were found between personal hygiene, knowledge, information exposure, and length of employment with skin complaints (p = 0.000).
4	Viktor Edyward Marbun; Johannes Sembiring; Anggun Syafitri (2023)	Relationship between Personal Hygiene and PPE Use with Contact Dermatitis among Waste Transport Workers at Tadukan Raga Landfill	Quantitative, cross-sectional	Personal hygiene (p = 0.004) and PPE use (p = 0.013) were significantly associated with contact dermatitis.
5	Ni Putu Ardiyanti; I Kadek Dwi Arta Saputra; Ni Putu Indah Rosita (2023)	Relationship between Individual Characteristics and Skin Disorder Complaints among Scavengers at Temesi Landfill	Quantitative analytic, cross-sectional	Skin complaints occurred in 77.1% of respondents and were associated with length of employment (p = 0.047), working hours (p = 0.043), PPE use (p = 0.000), and personal hygiene (p = 0.000).
6	Maratus Sholeha; Rumita Ena Sari; Fajrina Hidayati (2021)	Factors Associated with Contact Dermatitis Symptoms among Scavengers at Talang Gulo Landfill, Jambi	Analytic observational, cross-sectional	67.7% experienced contact dermatitis; significant associations were found with age, sex, personal hygiene, PPE use, and duration and frequency of contact (p < 0.05).
7	Sherly Wahyuni; Wardiati; Maidar (2023)	Factors Associated with Skin Disorders among Waste Transport Workers in Bener Meriah Regency	Descriptive analytic, cross-sectional, total population (n = 65)	Skin disorders occurred in 32.2% of respondents and were associated with personal hygiene (p = 0.003), knowledge (p = 0.001), age, length of employment, and PPE use.
8	Tri Septian Maksum; Rahayu M. Sahari (2023)	Relationship between Personal Hygiene and Skin Disorder Complaints among Waste Transport Workers	Analytic observational, cross-sectional, purposive sampling (n = 74)	66.2% had poor personal hygiene and 60.8% experienced skin complaints; a significant association was found (p = 0.018).
9	Melva Saragi; David Siagian (2022)	Determinants of Skin Disease in Scavengers	Analytic observational	Personal hygiene and history of skin disease were significantly associated with the incidence of skin diseases.
10	Ni Putu Ayu Ratna Dewi; I Gede Putu Darma Suyasa; Idah Ayu Wulandari (2021)	Relationship between Personal Hygiene and PPE Use with the Risk of Contact Dermatitis among Scavengers	Correlative analytic, cross-sectional	Most respondents had poor personal hygiene (64%), did not use PPE (66.3%), and were at risk of contact dermatitis (65.7%). Strong correlations were observed (p < 0.001), with r = −0.721 for personal hygiene and r = −0.717 for PPE use.

Of the ten articles reviewed, the prevalence of skin complaints or disorders among scavengers ranged from 32.2% to 77.1%, with irritant contact dermatitis being the most frequently reported condition. Three major risk factors for contact dermatitis among scavengers emerged consistently across the reviewed literature. Poor personal hygiene was consistently reported to be significantly associated with an increased incidence of contact dermatitis ($p < 0.05$), with one study reporting an odds ratio (OR) of up to 8.5, indicating that scavengers with inadequate personal hygiene were at substantially higher risk than those who maintained good hygiene practices. Inadequate or improper use of personal protective equipment (PPE) also contributed significantly, as eight studies found that scavengers who did not use PPE appropriately had approximately two to three times higher proportions of skin complaints compared to those who used PPE adequately. Several studies demonstrated strong correlations between PPE use and reduced risk of dermatitis. Duration of contact and length of employment further amplified the risk; six studies reported that scavengers with contact durations exceeding eight hours per day and/or longer employment periods experienced higher incidences of contact dermatitis than those with shorter exposure durations and employment histories. In addition to these three primary factors, several studies also reported significant associations between dermatitis and age, sex, level of knowledge, and history of skin disease, although these findings were less consistent than those related to personal hygiene, PPE use, and exposure duration.

Dermatitis may be caused by various factors, including both exogenous factors (external factors such as irritants or allergens) and endogenous factors (internal bodily factors) [17]. A retrospective study conducted at the Dermatology and Venereology Clinic of RSUD Drs. H. Amri Tambunan, Deli Serdang, during the period 2020–2023 recorded 5,989 cases of skin diseases, with allergic contact dermatitis being the most prevalent (55.28%), followed by tinea (17.87%), scabies (11.90%), pyoderma (7.85%), and lichen simplex chronicus (7.11%). Allergic contact dermatitis is characterized by skin inflammation resulting from a type IV hypersensitivity reaction and was most commonly observed among individuals aged 45–64 years, particularly women. This study highlights the high prevalence of environmentally and behaviorally related skin diseases in Indonesia [26].

Clinically, dermatitis comprises several major types, including contact dermatitis, atopic dermatitis, and seborrheic dermatitis. Contact dermatitis itself is further classified into irritant contact dermatitis (ICD) and allergic contact dermatitis (ACD). Irritant contact dermatitis is a non-specific skin reaction to chemical substances that damage the skin barrier, leading to localized inflammation through the release of inflammatory mediators from epidermal cells. In contrast, allergic contact dermatitis is a type IV delayed hypersensitivity reaction involving adaptive immune mechanisms, specifically T-cell–mediated responses to allergens [14].

Dermatitis can occur across all age groups and is non-contagious. Genetic, environmental, and chemical exposure factors influence the risk and clinical manifestations of dermatitis. Atopic dermatitis, one subtype of dermatitis, involves complex genetic and immunological components and frequently coexists with other atopic conditions such as asthma and allergic rhinitis [12]. Factors associated with skin complaints or diseases among scavengers are multifactorial, particularly contact dermatitis, which is commonly observed in this occupational group.

Internal (endogenous) factors include genetic predisposition, immune system dysfunction, and underlying skin conditions. For example, individuals with a history of atopic diseases (atopic dermatitis, asthma, or allergic rhinitis) tend to have more reactive immune systems, rendering them more susceptible to dermatitis. Age also affects skin vulnerability to irritation and allergic reactions, with children's and elderly individuals' skin being more sensitive. Psychological conditions such as stress may exacerbate dermatitis by triggering systemic inflammatory responses. External (exogenous) factors play a dominant role, particularly exposure to irritants and allergens. Chemical irritants such as detergents, industrial chemicals, metals (e.g., nickel), and solvents cause irritant contact dermatitis through direct damage to the skin barrier.

Exposure to allergens, including specific chemicals, latex, cosmetics, and certain plant materials, induces allergic contact dermatitis via delayed-type hypersensitivity reactions. Environmental factors such as humidity, temperature, and personal hygiene also contribute to the development of dermatitis. Furthermore, occupational characteristics strongly influence dermatitis risk, especially in jobs involving repeated contact with water, chemicals, or dust that compromise skin integrity. Duration and frequency of contact with causative agents are key determinants of dermatitis occurrence among industrial workers, farmers, healthcare workers, and domestic workers. The use of PPE and skin hygiene practices also affect dermatitis severity [21].

Based on the literature review, the following discussion elaborates on the main risk factors associated with dermatitis among scavengers.

Individual Characteristics

Individual characteristics represent important factors influencing the occurrence of contact dermatitis. These characteristics include physiological and demographic aspects that affect skin responses to irritant or allergen exposure. Key individual characteristics associated with contact dermatitis include age, sex, and duration of contact.

Age

Age is a major factor due to the effects of aging on skin condition. Age significantly influences immune system function, which tends to decline with increasing age. This decline, known as immunosenescence, increases susceptibility to infections, chronic diseases, and reduced effectiveness of immune responses to new antigens. This finding is consistent with research by Maratus et al., which reported a significant association between age and contact dermatitis symptoms among scavengers, with a p-value of 0.019 (< 0.05) [24].

Physiologically, age-related immune decline is primarily attributed to thymic involution, a process involving the shrinkage of the thymus gland responsible for T-cell production. As thymic function decreases, the production of naïve T cells declines, weakening the body's ability to recognize and combat new pathogens. Additionally, reductions in natural killer (NK) cell activity, neutrophil phagocytic function, and cytokine production further impair both innate and adaptive immune responses. Declines in the quantity and function of T and B lymphocytes ultimately reduce antibody production and immune defense capabilities [20].

Sex

Sex has a significant influence on the occurrence of contact dermatitis. Research by Maratus et al. reported a p-value of 0.000, indicating a significant association between sex and contact dermatitis symptoms. This difference may be attributed to physiological variations between male and female skin [18]. Female skin is generally thinner, drier, and hormonally distinct, which affects its resistance to irritants and allergens. In contrast, male skin contains higher androgen levels, making it thicker and more prone to sweating, thereby influencing chemical resistance differently. A study by Ismanur Faridza et al. on seborrheic dermatitis at RSUD Dr. H. Abdul Moeloek, Bandar Lampung, found that males had a higher risk of seborrheic dermatitis than females (p = 0.008), attributed to androgen-driven increases in sebum production [25]. Occupational studies have also identified female sex as a risk factor for irritant contact dermatitis, along with prolonged contact duration and improper PPE use [19].

Duration of Contact

Duration of contact is a critical factor influencing contact dermatitis occurrence. Prolonged skin exposure to irritants or allergens increases the likelihood of skin barrier damage and inflammatory processes. Repeated and prolonged exposure leads to chronic irritation, triggering inflammatory responses manifested as erythema, itching, and skin thickening. Several studies support the significant role of contact duration in dermatitis incidence. Maratus

et al. reported that scavengers with contact durations exceeding eight hours per day were more vulnerable to skin complaints due to continuous waste exposure [24]. Another study by Ni Putu et al. demonstrated a significant association between length of employment and skin disorder complaints among scavengers at Temesi Landfill ($p = 0.043$) [2]. These findings emphasize that contact dermatitis prevention depends not only on the type of substances encountered but also on exposure duration and frequency. Interventions such as reducing exposure duration, consistent PPE use, and proper skin hygiene management are essential to mitigate dermatitis risk [34]. Prolonged chemical exposure intensifies skin irritation and inflammation, increasing contact dermatitis risk [30]; therefore, minimizing contact duration and using PPE are crucial preventive strategies [33].

Length of Employment

Length of employment is frequently examined in relation to contact dermatitis incidence, particularly among workers exposed to chemical substances or irritants over extended periods. Length of employment reflects cumulative exposure duration to hazardous work environments. Daningrum et al. reported that more than 50% of respondents had long employment durations, with analysis indicating a significant association with skin disease complaints among scavengers (Daningrum et al., 2022). Srisantyorini and Cahyaningsih (2019) also stated that longer employment duration increases cumulative exposure to occupational hazards [28]. Generally, longer employment in irritant-exposed environments increases the risk of contact dermatitis due to repeated skin barrier damage and chronic inflammation. However, findings regarding employment duration are not always consistent. Some studies suggest increased risk with longer employment, particularly in jobs involving frequent contact with irritants or hazardous chemicals. Therefore, integrating risk management strategies with PPE use and regulated work duration is essential to minimize exposure [22].

Knowledge

Knowledge is closely related to the occurrence and prevention of skin diseases, particularly contact dermatitis. Several studies indicate that adequate knowledge about contact dermatitis can reduce both incidence and recurrence. Behavior grounded in knowledge tends to be more sustainable than behavior without an informational basis [29]. Research conducted in Pantai Raja Village showed that individuals with poor knowledge had a 2.8-fold higher risk of developing contact dermatitis than those with good knowledge ($p = 0.000$). Adequate knowledge promotes timely action to manage symptoms and prevent disease exacerbation [9]. A study at Puuwatu Landfill revealed that scavengers with sufficient knowledge of contact dermatitis demonstrated greater awareness of preventive measures, such as PPE use and personal hygiene. Nevertheless, despite existing knowledge, practical implementation remained suboptimal, resulting in persistent symptoms such as itching, erythema, and skin irritation ($p < 0.05$) [7]. Overall, good knowledge is essential in shaping protective behaviors, including maintaining skin hygiene, using protective equipment, and avoiding causative agents.

Personal Hygiene

Personal hygiene plays a crucial role in preventing and reducing the risk of skin disease complaints, including contact dermatitis. Personal hygiene encompasses comprehensive body care practices such as washing the hands, feet, nails, hair, and especially maintaining skin cleanliness using running water and soap. A study conducted by Zamlid *et al.* reported a p-value of 0.005 ($p < 0.05$), indicating a significant association between personal hygiene and skin disease symptoms among scavengers at the Mancani landfill site in Palopo City. In that study, among 40 respondents, 6 respondents (33.3%) with good personal hygiene experienced skin disease symptoms, whereas 18 respondents (81.8%) with poor personal hygiene reported skin disease symptoms [35].

Other studies have also demonstrated a significant relationship between personal hygiene and skin diseases at the Telaga Punggur landfill site in Batam. This association was attributed to the fact that most scavengers at the site paid insufficient attention to personal hygiene practices, including skin, hand, foot, and nail hygiene. Examples of inadequate practices included washing hands without soap, having long and unclean fingernails and toenails, and irregular nail trimming [11].

Occupational skin disorders may arise from various factors, including physical factors (air pressure, weather conditions, radiation, heat, humidity, and ultraviolet radiation), chemical factors (acidic and alkaline compounds, organic and inorganic substances), biological factors (bacteria, viruses, fungi, worms, insects, and mites), as well as plant-related factors (sap, pollen, leaves, roots, branches, tubers, wood, fruits, and vegetables). Another study showed a significant association between personal hygiene and the incidence of contact dermatitis, with a p-value of 0.004 and an Odds Ratio (OR) of 8.5, indicating that poor personal hygiene (>50%) substantially increases the risk of contact dermatitis [16]. This high OR value suggests that personal hygiene plays a major role in both preventing and increasing the risk of contact dermatitis. Poor personal hygiene allows irritant or allergenic substances to remain on the skin for longer periods, facilitating irritation and inflammation that lead to contact dermatitis. The purpose of personal hygiene is to improve health status, maintain personal cleanliness, and prevent disease [23].

A study by Sherly (2023) also reported a significant association between personal hygiene practices and skin disorders among waste collection workers in Bener Meriah Regency, with a p-value of 0.003 [32]. Poor personal hygiene may result from various factors, including lack of knowledge, negative attitudes, and low educational attainment. Another study involving 74 respondents found that 45 waste collection workers (60.8%) in Gorontalo City reported skin disorder complaints, while 29 respondents (39.2%) reported no such complaints [15]. Maintaining personal cleanliness—such as regularly cleaning the hands, nails, feet, and skin—supported by a clean and healthy environment, can have a positive impact on skin health. Conversely, poor hygiene practices and unsanitary environments may serve as sources of various diseases, including skin diseases. Although these skin conditions are generally mild, inadequate and improper treatment may exacerbate skin disorders [23]. These findings are consistent with various studies indicating that good personal hygiene plays an important role in preventing skin diseases, whereas poor hygiene increases the risk of problematic skin conditions.

Use of Personal Protective Equipment

The use of Personal Protective Equipment (PPE) plays a significant role in preventing skin complaints such as contact dermatitis, particularly among scavengers who are frequently exposed to irritant and allergenic substances in the workplace. PPE such as gloves, aprons, boots, and protective eyewear can protect the skin from direct contact with hazardous substances, thereby reducing the risk of skin inflammation and irritation. A study among scavengers in Denpasar reported that more than 60% of respondents did not use complete PPE and had poor personal hygiene, resulting in 65.7% of them experiencing contact dermatitis. A significant association was found between PPE use and the incidence of contact dermatitis ($p < 0.001$), indicating that proper PPE use can reduce the risk of bacterial infection and skin diseases caused by exposure to hazardous materials [6].

Furthermore, a study conducted at the Kendari City landfill site reported that scavengers who did not use complete PPE had a higher risk of experiencing skin health complaints, including dermatitis. Among 48 scavengers with poor PPE use, 75% experienced skin disorders, whereas only 33.3% of those who used PPE properly reported skin complaints [27].

History of Skin Disease

A history of skin disease has an important association with the occurrence of skin complaints or disorders among scavengers. Scavengers with a previous history of skin disease tend to be more susceptible to recurrent skin complaints or worsening of existing skin conditions. This is because previously affected skin generally has reduced resistance and increased sensitivity to irritant and allergenic exposures commonly found in the scavenger work environment. A study conducted by Melva reported a p-value of 0.037 ($p < \alpha = 0.05$), indicating a significant association between a history of skin disease and the incidence of skin disorders among scavengers around the Medan Polonia temporary waste disposal site [(23)]. A history of skin disease, particularly contact dermatitis, is a significant factor influencing the occurrence of skin diseases among scavengers. Contact dermatitis is an inflammatory skin condition that occurs due to direct contact with irritant or allergenic substances such as waste materials, detergents, pesticides, and other chemical agents commonly found at landfill sites.

CONCLUSIONS AND RECOMMENDATIONS

Based on the literature review, three risk factors are most consistently associated with the incidence of contact dermatitis among scavengers, namely poor personal hygiene, inadequate use of personal protective equipment (PPE), and longer duration of contact and length of employment in work environments with high levels of irritant exposure. Therefore, preventive efforts for dermatitis among scavengers should focus on these dominant risk factors by implementing structured educational programs to improve personal hygiene practices, including regular cleaning of the skin, hands, feet, and nails using soap and running water after work, changing contaminated work clothing, and avoiding prolonged periods of unclean skin; ensuring the availability and proper use of appropriate PPE such as gloves, boots, and long-sleeved protective clothing through consistent supervision, education, and replacement of damaged equipment by landfill management and relevant authorities; and regulating daily working hours with adequate rest periods to reduce continuous exposure to irritant substances, for example by limiting prolonged work in high-risk waste zones and encouraging scavengers to clean themselves during work breaks.

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