

A REVIEW OF THE LITERATURE ON FLOOD-RELATED SKIN DISEASES

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DOI: 10.5958/2249-7137.2021.02566.0

ABSTRACT

Flooding is one of the most frequent natural catastrophes, affecting people all over the globe. The catastrophes' consequences have become huge issues for the public health system as a whole. Skin disorders caused by flooding are one of these effects, with cutaneous symptoms and/or indicators of systemic illnesses. A comprehensive literature evaluation of research articles on floods and skin disorders was performed. The goal of this study was to offer dermatologists and general practitioners with a thorough overview of flood-related skin disorders and treatment options. Furthermore, we divided these flood-related illnesses into four categories: skin conditions illnesses, skin infections, traumatic skin conditions, and other odds and ends skin diseases, in order to implement early interventions as well as educate, prevent, but also effectively treat those skin diseases in just such a catastrophic situation, resulting in better therapeutic efficacy as well as the preventative measures of further complications.

KEYWORDS: Disease, Infection, flood-related, Skin ,

1. INTRODUCTION

Flooding is characterized as an overflow of moisture expansion caused by hydro meteorological as well as geophysical disasters including the floods in Bangladesh in 2004, Hurricane Katrina in the United States in 2005, the earthquake in Haiti (2010), the wonderful eastern Japan earth quake (2011), as well as floods in Thailand (2011). Flash floods also puts healthcare systems at risk, such as access to critical health services, local health service capacity, evacuation needs, as well as clinic settlement, necessitating an emergency disaster response to provide patients with immediate wound healing, antibiotics, pain control, tetanus toxoid, and effective management of flood-related skin diseases[1]. Flood-related skin disorders are one kind of problem, manifesting as cutaneous and/or systemic symptoms as a result of prolonged contact to polluted water and unsanitary circumstances during floods[2]. The authors divided these conditions into four categories: (I) inflammatory skin diseases (such as allergic contact dermatitis); (ii) skin infections (such as bacteria and fungi infections); (iii) traumatic skin illnesses; and (iv) other various and sundry skin diseases (such as insect bite reaction as well as psycho-emotion aggravated primary skin disease)[3].

Inflammatory Skin Disorders are conditions that cause the skin to become inflamed. Contact dermatitis that is irritant The entry of chemicals or irritants across the permeability barrier causes moderate damage to keratinocytes and the production of inflammatory mediators in the acute

phase of irritant contact dermatitis[4]. Prolonged submersion in flooded water has been one of the risk variables for keratinocyte destruction, which leads to inflammation as well as irritation without triggering the immune system. Depending on the quantity of irritants and the length of exposure, symptoms may appear anywhere from minutes to days[5]. Flooding typically causes irritation on the hand and foot. Erythematous patches matching to the region of exposure are often seen in clinical presentations. Warming, stinging, and discomfort are all symptoms of irritating contact dermatitis[6]. These signs and symptoms are more common than pruritus. Irritant contact dermatitis is typically the first symptom, followed by developed secondary infection through bacteria or fungus, secondary skin diseases due to a skin barrier deficiency, persistent irritation, and trauma at times[7].

1.1. Infection

Specific illnesses in endemic regions (e.g.dengue leptospirosis, melioidosis, hemorrhagic fever in Southern Asia, or malaria in Africa, South America, and Asia), the organic course (e.g. flood from seawater as well as unclean water), and indeed the severity of the disaster are all associated factors in flood-related disasters and infection. In most cases, public health policy is responsible for the management and mitigation of these consequences[8]. Treatments and laboratory studies, such as infectious organism culture, are often restricted and unavailable in such a disaster. Soft tissue, ophthalmic, respiratory, gastrointestinal, and vector-borne infections from pathogen inoculations, overcrowding of the survivor relocation, removal of water sources, modification of vector breeding, as well as zoonotic reservoir diseases are among the illnesses caused by the flood. Skin infection caused by a fungus as a result, prolonged contact with flood water raises the risk of a common fungal skin infection[9]. The most frequent part of the body to be immersed in polluted water is the foot. The interdigital form of tinea pedis, which manifests as erythematous skin maceration with itching between the interdigital web gaps of the foot, is a frequent occurrence. Vesicles and pustules of the vesicular and moccasin types may appear as isolated dry scaly, erythematous hyperkeratotic papules on the plantar surface and lateral parts of the foot[10].

1.2. Infection with several microbes:

Maceration of an epidermis on the inter - digital web of a foot is a sign of both fungal infection and chronic irritating dermatitis of the foot with subsequent bacterial colonization. Despite the Gram-negative bacilli, *Corynebacterium* spp. but also *Staphylococcal* spp. were discovered in 87.5 percent, 25 percent, and 25 percent of the interdigital webs of 16 cases of foot maceration from flooding in Thailand, found only 12.5 percent positive spore germination (*Trichopteranmucooides* and non-spore forming hyaline fungi)[11]. Because of the sluggish development of the fungus, the authors addressed how the growth of Gram-negative bacilli bacteria might possibly overwhelm the positive fungal culture impact, and how the length of specimen collection following the start of flooding could also influence the culture findings. Combinations of topical antiinflammation, antibacterial, and antifungal treatments are the best topical medicines for these mixed organisms.

1.3. Tinea pedis vs. tinea corporis are two different types of tinea:

Tinea pedis was the most prevalent superficial fungal skin disease in post-earthquake settings, according to a prior research. On the contrary, owing to submersion during the tsunami, high

humidity weather, and unsanitary conditions, Lee et al. found that tineacorporis was more frequent than tineapedis. Tineacorporis as a subsequent ailment, on the other hand, should be acknowledged[12].

1.4. Infection of the skin caused by bacteria:

The most frequent primary skin problem is traumatic wounds, which are often followed by subsequent bacterial infection. Increased redness, swelling that quickly develops to vesicles, as well as hemorrhagic bullae are the first signs of wound infections. Cellulitis, gangrene, necrotizing fasciitis, pyomyositis, or septicemia are all possible complications[13]. Streptococcal pyogenes and Staphylococcus aureus are the most common organisms that cause secondary bacterial infections[14]. Aeromonas spp. is one of the pathogens of concern in polluted water. Pseudomonas spp., rapid-growing mycobacteria, and Burkholderiapseudo mallei (melioidosis) are rare pathogens that may be detected in infected wounds from groundwater combinations[15].

One of the most treatment options for infected wounds is wound dressing. In instances of infected or filthy wounds with a high risk of infection, prophylactic antibiotics are often given. Antibiotic regimens that are tailored to specific hosts are intended to cover suspected pathogens. Antitoxin, toxoid, and/or immunoglobulin against tetanus are also essential, especially in instances of inadequate vaccination or poor immunization coverage rates. Wound care, as well as systemic signs and symptoms of disease, should be closely followed[16], [17].

1.5. Skin Diseases Caused by Trauma:

Traumatic skin illnesses are common during and after the restoration of working time after a catastrophe, which is unsurprising. The frequency of this syndrome varies depending on the severity of natural disasters and the start and length of investigations, ranging from 2.9 percent in floods⁷ to 29 percent in tsunami survivors⁸. Males were three times as likely than females to have a sex preference. Cuts, lacerations, punctures, and penetration wounds are the most common dermatological lesions. The hands and feet are the most often afflicted parts of the body[18], [19].

1.6. Miscellaneous:

1.6.1. Reaction to an insect bite:

The reproduction of mosquitoes and the quantity of insects fleeing from floodwater, such as ants, fire ants, and centipedes, rises when polluted water sits still. Insect bite responses are becoming more common, especially in areas where there has been a protracted flood.

1.6.2. Mosquitoes:

Mosquitoes are not only carriers of systemically transmitted illnesses like dengue hemorrhagic fever as well as malaria, but they also wreak havoc on flood victims' quality of life. Carbon dioxide generation, odor, and estrogen around human skin are all elements that attract mosquitos. The immune reaction to mosquito bites is caused by sensitized immunity to the saliva protein of the mosquito[20].

Vesicles, bullae, ecchymosis, and a cellulitis-like local inflammatory response are some of the other mosquito bite manifestations (Skeeter syndrome). In the case of a strong allergic response, hemorrhagic bullae, necrosis, as well as ulcer healing with persistent scarring may occur.

Mosquito bite reactions were often more severe in those with underlying illnesses such as hematological malignancies. The clinical characteristics of mosquito allergy patients in Thailand showed that erythematous papules (68.6%) and acute wheal were the most frequent cutaneous manifestations (67.1 percent). The leg is the most frequent site of involvement[21], [22].

Mosquito bites cause a variety of cutaneous responses and clinical manifestations. The immediate response is characterized by a 2–10 mm diameter wheal or flare that peaks within 20 minutes, while the delayed reaction is characterized by indurated erythematous papules that peak at 24–36 hours and progressively fade over days or weeks (Figure 1).



Figure 1:Illustrate the Mosquito bite reaction[23].

1.7 The black and red fire ants:

Solenopsis richteri or *Solenopsis invicta*, belong to the Order Hymenoptera. Thailand is home to the majority of these species. Their length varies between 2 and 6 mm. They dwell in mounds made of dirt and plants, as well as subterranean tunnels. They attack the victims in swarms, and that they are typically attacked several times. Bites, stings, and the release of venom into the surface epidermis are the first two stages in a fire ant assault. The poisonous alkaloid venoms enhance plasma membrane permeability first, then release histamine from mast cells. The immediate-type response manifests as wheals as well as flares ranging in size from 1–2 mm to 10 cm diameter within seconds, while the delayed-type reaction manifests as surface vesicles containing clear fluid and tissue edema over many hours. As a result, 8–10 hours later, the clear fluid becomes murky with pustules and umbilication. These sterile pustules typically form a rosette pattern when they are dispersed or clustered together. Vesiculopustular lesions are frequent and may last anywhere from a few days to a few weeks[24].

Primary Skin Diseases that are aggravated by psycho-emotion Stress may cause psychodermatological illnesses like atopic dermatitis, psoriasis, urticaria, alopecia areata, angioedema, or vitiligo by aggravating the underlying conditions like alopecia areata, atopic dermatitis, urticaria, angioedema, including vitiligo. Stewart as well as Goodman described a case of urticaria that began right after an earthquake. After a tsunami catastrophe, individuals have exacerbated psoriasis, atopic dermatitis, or urticaria. After the earthquake, stress exacerbated atopic dermatitis. In the water avoiding stress test, the mice developed atopic

dermatitis-like skin lesions and then had increased blood immunoglobulin E levels. The exacerbation was presumed to be caused by the inhibitory action of corticotropin-releasing factor.

The etiology of psoriasis exacerbated by psychological stress by altering immune system cellular components that target skin appendages as well as the peripheral corticotropin-releasing hormones proopiomelanocortin axis. The activation of overexpressed type 2 beta corticotropin-releasing hormone (CRH) receptors surrounding the hair follicles seems to be a factor in the development of alopecia areata. CRH or similar peptides may have pro-inflammatory actions, causing local hair root damage. In situ hybridization of CRH receptors using a skin biopsy. Stress has a major effect in worsening vitiligo in both children and adults. Stressful situations were encountered by 57 and 23.8 percent of vitiligo cases and controls, respectively, in youngsters. Furthermore, adult vitiligo patients were exposed to substantially greater stress than the control group (65% vs. 22%, $P = 0.002$, OR 6.81). Poor sanitary circumstances, insufficient systemic to topical treatment compliance, and uncontrolled environmental variables are all contributors in this syndrome[23], [25].

2. DISCUSSION

The clinical symptoms of flood-related skin diseases are diverse. These differences are related to environmental factors (endemic area, natural course, or disaster severity), as well as human traits (medical and dermatological underlying diseases). Skin conditions diseases and infections caused by bacteria and fungus, traumatic skin diseases, vector-borne diseases, including psycho-emotional disorders are all potential sources of serious public health problems. Floods and skin diseases were the subjects of a thorough review of the literature. The researchers wanted to provide dermatologists as well as family physicians a comprehensive review of flood-related skin diseases and treatment choices. In addition, we divided the above flood-related illnesses into 4 groups: skin conditions illnesses, skin infections, traumatic skin diseases, and other miscellaneous autoimmune conditions, in order to implement primary prevention as well as educate, prevent, and instead successfully address those skin problems in just such a disastrous situation, resulting in better efficacy of treatment as well as a better therapeutic outcome.

3. CONCLUSION

Flood-related skin disorders have a wide range of clinical manifestations. Environmental variables (endemic region, natural course, and catastrophe intensity) as well as human characteristics are all linked to these variations (medical and dermatological underlying diseases). Inflammatory skin illnesses and infections caused by bacteria and fungi, traumatic skin diseases, vector-borne diseases, and psycho-emotional disorders are all possible causes of major public health issues. Loss-related psychological health problems should be identified and treated. Most essential, dermatologists and general practitioners should improve their fundamental understanding of these diseases in order to achieve the most effective and best treatment results.

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