

## Case Report

# Health Impacts of the 2023 Flood in Pakistan: A Comprehensive Case Study on Skin-related Ailments and Waterborne Diseases

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## Abstract

The devastating flood that struck Pakistan in 2023 had profound ramifications for public health, leading to a surge in waterborne illnesses and skin-related ailments among the affected populace. This thorough case study delves into the post-flood health consequences, with a specific focus on the emergence of skin rashes, allergies, burns, and heat strokes as formidable challenges. The report underscores the urgent necessity for swift, well-coordinated medical interventions during disasters to effectively alleviate the repercussions on vulnerable communities. The following recommendations could be used to prevent future disaster situation. Effective management of post-flood scenarios demands meticulous risk assessment and mitigation strategies [2]. Vital to this process is the cultivation of community resilience, achieved through strengthening local capacities, fostering awareness, and promoting community engagement [6]. Integrated water management strategies are imperative to thwart waterborne diseases in the aftermath of floods, encompassing enhanced sanitation infrastructure, secure water supply, and health education [7]. Climate change adaptation must be seamlessly integrated into disaster response plans to tackle the escalating frequency and intensity of floods [10].

Leveraging medical relief and telemedicine, including mobile clinics, can bridge gaps in healthcare access during disasters [9]. These innovations facilitate remote medical consultations and essential healthcare delivery. Recognizing the toll floods take on mental well-being, access to psychosocial support services is paramount [8]. Cross-border collaboration heightens disaster response and recovery [3]. Resource and expertise sharing enhances healthcare interventions in the aftermath of trans-boundary floods. Early warning systems are pivotal in preventing casualties and mitigating health impacts [5]. To ensure equitable outcomes, disaster management must prioritize vulnerable groups such as the elderly and children, tailoring interventions to their distinct needs [1].

## Introduction

The year 2023 witnessed one of Pakistan's most devastating floods, primarily attributed to relentless torrential rains and the ensuing overflow of rivers and water bodies. Initial concerns naturally centered on massive displacement, property loss, and extensive infrastructure damage. However, the aftermath of the flood unveiled a multifaceted spectrum of health issues, prominently featuring skin-related ailments and waterborne diseases. The health impacts of natural disasters, particularly floods, have been extensively studied across the globe [7].

In the wake of the catastrophic flood that struck Pakistan in 2023, a multitude of studies have emerged that shed light on the profound health consequences faced by the affected population. Research on the aftermath of flooding events has consistently highlighted the increased risk of waterborne diseases in flood-affected areas [7]. Contaminated water sources, coupled with compromised sanitation infrastructure, create a breeding ground for diseases such as cholera, diarrhea, and gastroenteritis [7]. These findings resonate with the situation

observed in the 2023 flood in Pakistan, where swift proliferation of waterborne diseases placed an additional burden on an already beleaguered population. In parallel, the impact of floods on skin-related ailments has garnered significant attention. Prolonged exposure to floodwaters and the absence of proper hygiene facilities exacerbate the risk of skin rashes, allergies, and infections [2].

The emergence of fungal and bacterial skin infections due to damp conditions aligns with previous research in disaster settings [1,2,6]. The high humidity and compromised living conditions in the aftermath of the 2023 flood was a recipe for the surge in skin issues, corroborating the broader literature on the subject. Literature exploring the intersection of floods, insects, and health reveals a consistent trend [8,9]. Similarly, stagnant water in flooded areas becomes a fertile ground for mosquito breeding, leading to an increased risk of mosquito-borne diseases such as malaria [6].

Furthermore, mosquito bites can trigger skin allergies and exacerbate existing skin conditions [6]. The experience of the 2023 flood aligns with these findings, where the absence of proper shelter and stagnant water contributed to an elevated mosquito-borne disease risk. Studies examining the impact of floods on vulnerable populations, including the elderly and children, underscore the disproportionate health challenges they face [1,2,5,6]. The 2023 flood in Pakistan highlighted the exacerbated vulnerability of these demographics to heat-related illnesses due to the lack of cooling facilities and the psychological stress of displacement.

### Literature Review

Overall, the literature review underscores the consistency between the health impacts observed in the 2023 flood in Pakistan and the broader trends identified in global research on floods and public health. The emergence of waterborne diseases, skin-related issues, and the amplified risk to vulnerable populations has been a consistent theme in disaster situations [6]. As disaster management strategies evolve, this convergence of findings emphasizes the need for tailored interventions that prioritize both physical safety and public health in the aftermath of floods and other natural disasters [3,8,9]. As Pakistan endeavors to rebuild and strengthen its disaster resilience strategies, these findings from the 2023 flood provide a valuable opportunity to fine-tune disaster preparedness plans, emphasizing proactive healthcare interventions and efficient coordination to mitigate the health repercussions on vulnerable communities.

### Case Presentation

Within the affected population, an overwhelming number of cases concerning skin rashes, allergies, burn, and heat strokes surfaced. The floodwaters, contaminated with a noxious blend of sewage, industrial effluents, and various pollutants, provided an ideal breeding ground for disease transmission and skin irritations. The scarcity of clean water sources and proper sanitation facilities further exacerbated the dire circumstances.

### Skin Rashes and Allergies

Direct exposure to the contaminated floodwaters, coupled with prolonged contact with soaked clothing, precipitated an unprecedented spike in skin rashes and allergies. Patients manifested symptoms including erythema, pruritus, and dermal inflammation, frequently accompanied by vesicles and exudative lesions. The heightened humidity in the post-flood environment

created optimal conditions for the proliferation of fungal and bacterial infections, exacerbating the challenges at hand.

### Burns

Burn injuries emerged as a significant concern due to the prevalent use of open flames for cooking, often without adequate safety precautions. Many families, uprooted from their homes, found refuge in makeshift shelters, often relying on campfires for sustenance. This precarious situation resulted in accidental burn injuries, particularly among vulnerable groups such as children and adults. The combination of contaminated water sources and inadequate medical care escalated the risk of infections in burn wounds.

### Heat Strokes

The aftermath of the flood ushered in soaring temperatures and heightened humidity, increasing vulnerability to heat-related ailments, particularly heat strokes. The lack of access to cooling facilities, coupled with the stress of displacement, disproportionately exposed vulnerable demographics such as the elderly and young children to heat-related health adversities.

### Waterborne Diseases

In the aftermath of the flood, a swift proliferation of waterborne diseases ensued, encompassing conditions like cholera, diarrhea, and gastroenteritis. Water source contamination played a pivotal role in the dissemination of these diseases. The dearth of access to potable water and subpar sanitation facilities significantly exacerbated the spread of waterborne diseases, adversely affecting a substantial segment of flood survivors. Additional Impacts: Amid the chaos and lack of shelter in the open, many individuals experienced adverse skin reactions due to prolonged exposure to the elements. The combination of damp conditions and lack of proper hygiene exacerbated skin problems, compounding the challenges faced by the affected population. Mosquito-Borne Ailments and Skin Allergies: The absence of adequate shelter and stagnant water created conducive conditions for mosquito breeding, leading to an increase in mosquito-borne diseases such as malaria. Additionally, mosquito bites often triggered skin allergies, aggravating the already compromised health conditions of the flood survivors. Eye and Facial Skin Reactions: Numerous cases were reported where individuals experienced swollen eye skin and facial skin allergies. These reactions were attributed to various factors, including exposure to contaminated floodwaters, poor hygiene conditions, and increased allergen exposure in the post-flood environment.

### Discussion

The catastrophic flood of 2023 in Pakistan underscored the dire need for comprehensive disaster preparedness and response frameworks that encompass not only physical safety but also the broader realm of public health. Swift medical intervention, combined with the rapid distribution of clean water resources and sanitation amenities, holds paramount significance in effectively managing the health aftermath of such calamities.

Here are few proposed recommendations that could be used to prevent future challenges related to the flood.

### Risk Assessment and Mitigation Strategies

The importance of risk assessment and effective mitigation strategies in the aftermath of catastrophic floods cannot be overstated [2]. Comprehensive evaluations of potential hazards

and vulnerabilities are crucial to developing targeted interventions that address both immediate and long-term health impacts.

### Community Resilience Building

Building community resilience is paramount to effectively cope with and recover from flood-induced health challenges [6]. Strengthening local capacities, raising awareness, and fostering community participation can enhance adaptive strategies and minimize health vulnerabilities.

### Integrated Water Management

Implementing integrated water management approaches is essential for preventing waterborne diseases in post-flood scenarios [7]. Strategies that combine improved sanitation infrastructure, safe water supply, and health education can significantly reduce disease transmission.

### Climate Change Adaptation

Climate change adaptation strategies must be woven into disaster response plans to address the escalating frequency and intensity of floods [10]. Integrating climate resilience measures can enhance the effectiveness of disaster preparedness and public health interventions.

### Medical Relief and Telemedicine

The utilization of telemedicine and mobile clinics can bridge the gap in access to medical care during disaster situations [9]. These innovative approaches can provide remote medical consultations and deliver essential healthcare services to affected populations.

### Psychosocial Support and Mental Health

Floods not only pose physical health risks but also take a toll on mental well-being [8]. Ensuring access to psychosocial support services is imperative to address the emotional trauma and stress experienced by survivors.

### Cross-Border Collaboration

Collaborative efforts across borders can strengthen disaster response and recovery efforts [3]. Sharing resources, expertise, and best practices can lead to more effective healthcare interventions in the wake of transboundary floods.

**Early Warning Systems:** The establishment and maintenance of early warning systems are crucial to prevent casualties and mitigate health impacts [5]. Timely alerts allow communities to take preventive measures and evacuate vulnerable areas.

### Innovative Sanitation Solutions

Innovative sanitation solutions, such as mobile toilets and sanitation kits, can help curb the spread of waterborne diseases [4]. These solutions are particularly vital when conventional infrastructure is compromised. Health Equity and Vulnerable Populations: Prioritizing the health needs of vulnerable populations, such as the elderly and children, is a fundamental aspect of disaster management [1]. Tailoring interventions to the unique requirements of these groups can prevent disproportionate health impacts.

**Conclusion:** The cataclysmic flood of 2023 in Pakistan left an indelible imprint on public health, extending far beyond the immediate physical ramifications. The surge in skin rashes, aller-

gies, burns, heat strokes, and waterborne diseases underscored the pressing need for a meticulously orchestrated disaster response strategy that places equal importance on both physical well-being and public health. The insights gleaned from this calamity must serve as a guiding template for future disaster management endeavors, accentuating the indispensability of proactive healthcare interventions in the wake of natural catastrophes. As Pakistan endeavors to recover and rebuild, the lessons derived from this experience will undoubtedly shape and inform future disaster resilience efforts, reinforcing the nation's readiness to face similar challenges in the years to come.

### Author Statements

#### Conflict of Interest

There is no conflict of interest among the all authors. Every author has equal contribution in this work. We are thankful to the local communities, Dr Shamsheer Jadoon, Dr. Raisa Gul and Lubna Ghazal for their kind support and guidelines in the entire journey.

#### Consent Form

It is observational report; it doesn't required consent form.

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