

Guidelines on Floods and health for health professionals

Background:

Over the recent weeks, heavy precipitation events have been observed across the country resulting in flash floods, river floods, contamination of drinking water supplies and sewage system failure landslides and mudslides. This has initiated devastating floods, which has affected large geographical areas. Pakistan has received 60% of total normal monsoon rainfall in just three weeks since the start of the monsoon season. Heavy rains have resulted in urban and flash floods, landslides, and Glacial Lake Outburst Floods across Pakistan, particularly affecting Baluchistan, Khyber Pakhtunkhwa, and Sindh Provinces. The monsoon season continues to affect several provinces of Pakistan, causing floods, landslides, and severe weather-related incidents, resulting in an increasing scale of humanitarian impact. According to the National Disaster Management Authority (NDMA), as of 1 August, 478 people have died across seven provinces, most of them in Baluchistan (136 fatalities). 536 others have been injured, and more than 36,400 houses were damaged, while more than 24,000 livestock have been lost and more than 950 km of roads damaged.

Health Effects:

Floods affect human health through many pathways, and health professionals can take numerous measures to protect the health of affected populations. Health effects occur directly through contact with flood waters or indirectly from damage to infrastructure, ecosystems, food and water supplies or social support systems. They can be immediate or can appear days, weeks or months after the floods have receded.

Effects on health include; drowning, injuries from contact with debris and submerged objects in flood water; falling into hidden manholes; trying to move possessions during floods; building collapse and damage; electrocution; diarrhoeal, vector, Snake bites, , rodent-borne diseases; respiratory, skin and eye infections; chemical poisoning contamination, including carbon monoxide poisoning from generators used for pumping and dehumidifying; stress, and short and longer-term mental health disorders, including the impacts of displacement; negative health effects linked with overcrowding.

Effects can occur through damage to health care infrastructure, leading to loss of access to essential care, loss of access to and failure to obtain continuing health care, water shortages and contamination due to loss of water treatment works and sewage treatment plants, damage to water and sanitation infrastructure, damage to or destruction of property and vital community facilities, damage to crops, disruption of food supplies, disruption of livelihoods and income and population displacement.

Hospital preparedness:

During floods, hospitals and other health care services can face damage to infrastructure (for example, power and water supply interruptions, damage to vital equipment, disruption of internal and external communication systems, blocked transport systems and flooded ambulance access) that disrupts normal health services

activities. They may also experience an increased influx of patients; this may include patients that require particular specialized care. Flooding may require health care services to expand beyond normal capacity to meet community demand.

Health department must ensure the following:

- A well-functioning command-and-control system;
- Strategies for clear, accurate and timely communication;
- Planned Public Health measures to prevent and control communicable disease and flood related injuries
- Well-developed safety and security procedures;
- Amass-casualty triage protocol;
- Surge capacity – defined as the ability of a health service to expand beyond normal capacity to meet increased demand for clinical care;
- Availability of essential health services with the activation of a hospital emergency response plan;
- Systems for effective human resource management;
- A plan to ensure continuity of the hospital supply and delivery chain;
- Availability of essential medicine stock and IV fluids; and
- Post-disaster recovery planning procedures.

Dead bodies:

Dead or decayed human bodies originating from natural disasters and accidents do not generally represent a health hazard. Only when communicable disease has been the cause of the fatalities does the situation present a health risk. The following tasks should be undertaken when handling dead bodies:

Protect the handlers of dead bodies. Basic hygiene is essential:

- Use of gloves, personal protective clothes and equipment;
- Washing of hands with a disinfectant soap and water after handling dead bodies, and avoiding wiping face or mouth with hands;
- Regularly cleaning and disinfecting of all equipment, clothes and vehicles used in transportation and storage of dead bodies;
- Collect dead bodies as soon as possible, but it is not necessary or advisable to hurry their disposal because the bodies are required for identification purposes.
- Support body identification to reduce the psychological effects on survivors.
- Bodies should be placed in polythene body bags or in other locally available materials.
- Waterproof labels with unique reference numbers should be used.
- Identify the bodies quickly. Personal belongings should be kept with bodies for identification purposes,
- Ensure temporary storage of dead bodies. In warm climates a body will begin to decompose within 12–48 hours. Keep the body refrigerated between 2°C and 4°C; where possible, a refrigerated container should be used for transportation of bodies.
- Temporary burial is an alternative option in case of a lack of electricity and/or lack of refrigerated storage facilities, or where no other method is available.

- The psychological trauma of losing loved ones and witnessing death on a large scale is the greatest concern. Anyone involved in handling dead bodies should be aware of the stress and trauma of family members, and should provide support to the greatest extent possible.

Venomous snake bites:

Snake bites during floods are common. Bites by venomous snakes can cause severe consequences. Victims of snake bites may suffer any or all of the following:

- Local envenoming, confined to the part of the body that has been bitten – these effects may be debilitating, sometimes permanently;
- Systemic envenoming, involving organs and tissues away from the part of the body that has been bitten – these effects may be life-threatening and debilitating, sometimes permanently;
- Effects of anxiety prompted by the frightening experience of being bitten and by exaggerated beliefs about the potency and speed of action of snake venoms – these symptoms can be misleading for medical personnel;
- Effects of first aid and other pre-hospital treatments that may cause misleading clinical features – these may be debilitating and, rarely, even life-threatening.

The stages in the management of snake bites.

- Apply first aid: Reassures the victim, who may be very anxious, immobilize the whole of the patient's body by lying him/her down in a comfortable and safe position and, especially, immobilize the bitten limb with a splint or sling – any movement or muscular contraction increases absorption of venom into the bloodstream and lymphatics, consider pressure immobilization or a pressure pad if the necessary equipment and skills are available, unless an elapid bite can be excluded, avoid any interference with the bite wound (incisions, rubbing, vigorous cleaning, massage or application of herbs or chemicals) as this may introduce infection, increase absorption of the venom and increase local bleeding, release tight bands, bandages and ligatures – ideally, these should not be released until the patient is under medical care in hospital, resuscitation facilities are available and antivenom treatment has been started.
- Transport the patient to hospital for rapid clinical assessment and resuscitation.
- Perform detailed clinical assessment and species diagnosis. Perform investigations and laboratory tests.
- Administer antsnake venom treatment and observe the response to antivenom. Decide whether further dose(s) of antsnake venom are needed. Snake antivenoms are the only effective treatment to prevent or reverse most of the venomous effects of snake bites.
- Administer supportive/ancillary treatment.
- Treat the bitten part of the body.

Vaccination during flood events:

- Vaccination efforts should always be supplemented by health education and improved sanitation.
- **Hepatitis A and/or B vaccination** is recommended for selected high-risk individuals such as public utility workers – those involved in cleaning operations, sewage, waste or drinking-water management. Hepatitis A vaccine is generally not recommended to prevent outbreaks in the disaster

area, although in certain circumstances it can be used to control outbreaks (for example, in small self-contained communities, when vaccination is started early in the course of the outbreak, and when high coverage of multiple-age cohorts is achieved).

- **Tetanus toxoid** with or without tetanus immunoglobulin, as appropriate, is recommended for those whose vaccinations are not up to date, and should accompany wound treatment.
- Tetanus boosters may be indicated for previously vaccinated people who sustain open wounds or for other injured people, depending on their tetanus immunization history (if available).
- Mass tetanus vaccination programs to prevent disease are not indicated.
- **Typhoid vaccination:** Current typhoid vaccines are not recommended for mass campaigns to prevent typhoid disease. Typhoid vaccination in conjunction with other preventive measures may be useful to control typhoid outbreaks, depending on local circumstances.
- **Other Vaccination:** Unimmunized or under immunized individuals are at risk of acquiring vaccine-preventable diseases, particularly in crowded circumstances. Attention should be given to ensure high coverage against measles and poliomyelitis.

Food safety during or after flood events:

Food can become contaminated at any point before its consumption, including during preparation if not properly handled, prepared and stored. Food safety is particularly important for infants, pregnant women and elderly people, who are most susceptible to foodborne disease. Food safety concerns include:

- Increased risk of outbreaks of foodborne disease, including diarrhoea, dysentery, hepatitis A and typhoid fever;
- Increased likelihood of using contaminated water for food handling and preparation;
- Population displacement forcing people to have fewer food choices and use riskier food handling practices;
- Contaminated fruit and vegetables;
- Poor sanitation, including lack of safe water and toilet facilities;
- Impairment of the cold chain and proper heat-treatment of foods because of problems with the electricity supply.

Key behaviors surrounding safe food handling, preparation, hygiene and sanitation are the most important measures to protect individuals and families. Avoid communicable disease outbreaks by advising people to follow the five keys to safer food:

1. Keep hands and utensils clean
2. Separate raw and cooked food
3. Cook food thoroughly
4. Keep food at a safe temperature or prepare fresh foods
5. Choose to use safe water and raw materials.

Water Safety:

Establish mechanisms to monitor water quality at communities and health care facilities. Ensuring safe drinking water availability is very important in hospitals. The following recommended minimum quantities of water per person in each setting type:

- Outpatients: 5 liters/consultation
- Inpatients: 40–60 liters/patient/day
- Operating theatre or maternity unit: 100 liters/intervention
- Isolation wards: 300–400 liters/patient/day.

Organize the emergency water supply and technical options for sources, treatment, disinfection, storage and distribution. Emergency water supplies can consist of packaged water, tanker water, direct use of alternative water sources or on-site production of drinking-water. If circumstances allow, separate emergency supplies (including both materials and human resources) are encouraged for health care facilities and the general public. Prevent access of unauthorized people to the emergency water supply and storage system.

Store water safely in order to prevent it becoming (re-)contaminated or a breeding place for mosquitoes. Containers for transportation and storage of drinking-water should be cleaned and preferably disinfected before they are put into operation. Water of insufficient or uncertain microbial quality must be boiled if it is intended for drinking or food preparation. Water can be made safe by bringing it to a rolling boil (for example, in a kettle or pot on a cooker). After boiling, the water should be allowed to cool down on its own without the addition of ice. If it is not possible to boil water, chemical disinfection of clear, non-turbid water is effective for killing bacteria and most viruses, but not for protozoa like *Cryptosporidium*. Options for chemical disinfection include chlorine compounds or iodine.

Hygiene:

Remind public, patients and staff of the importance of hand washing with soap after every toilet use. If the hand-washing facilities have become dysfunctional, provide temporary alternatives (such as a basin, soap and a jug of water and/or hand rub). In an emergency situation, it is particularly important to clean toilets regularly, preferably with detergent and/or disinfectant. Provide gloves for cleaners. Prevent toilets from becoming a breeding place for disease-transmitting organisms (such as mosquitoes, flies and rats) – no puddles or other habitats for mosquitoes and other animals should be present in toilet rooms. Provide emergency lighting to ensure the safe use of toilets during power outages.

Where toilets in health care facilities are dysfunctional or insufficient in number, open defecation in the surroundings of hospitals and communities must be avoided. Construct (additional) temporary latrines in the communities at least 30 metres away from any water source and 10 metres away from any water storage tank or treatment facility. If latrines cannot be built, defecation fields provide an alternative.

Vector-borne diseases during or after flood events:

Risk factors include increasing temperatures during or after floods and remaining standing water. Health effects may be observed many weeks after the flood event. As a result, the following actions are recommended. Ensure sustainable vector control to prevent transmission. Use a combination of top-down and bottom-up approaches that integrate chemical, mechanical and biological vector control methods and personal protection methods, with the active participation of communities and involvement of relevant sectors and agencies. Plans for hospitalization, emergency vector control, advocacy, community mobilization, logistics, and monitoring and evaluation in the case of increased risk or presence of vector-borne diseases are advisable. Strengthen disease diagnosis and case management.

Disease surveillance during and after flood events:

As floods significantly affect public health, robust surveillance is important during and after flooding to identify and control infectious disease outbreaks and other health issues rapidly, to guide local and regional health service delivery, and to add information about possible associations between floods and ill health.

Chemicals hazards management during and after the flood:

Chemical spills resulting from environmental disasters can cause acute and long-term risks for and effects in humans. The main chemical health hazards during a flood include:

- Injuries from chemical explosions;
- Burning or blistering and severe damage to skin, eyes or respiratory tract from release of corrosive chemicals;
- Intoxication and acute poisoning, mostly from inhalation of evaporated highly toxic chemicals such as fuel compounds, solvents, burning products, and so on.

Health care and public health professionals should undertake a number of specific activities:

- Ensure decontamination of people who have been in contact with hazardous chemicals;
- Provide health care services to all affected people, taking into account the possibility of acute poisoning by hazardous chemicals, and bearing in mind that the most vulnerable population groups for chemical hazards are children, the elderly, hospital patients and rescue workers, who may be exposed to high levels of chemicals.
- Conduct a rapid risk assessment of the event and assist in identification of places where hazardous chemicals are stored to facilitate implementation of measures to prevent releases and spills;
- Communicate information about chemical hazards to the public.

Generic post-flood recovery and After a flood: cleaning up:

The health sector has a role in the provision of health advice regarding the clean-up process and any short- and longer-term risks to health from flood contaminants. Specifically, immediately after the flood health professionals need to provide practical advice to people re-entering their homes, clean-up workers and deployed personnel. Thereafter, they can help to track and minimize delayed long-term health outcomes such as mental health issues.

As flood water recedes, health professionals should undertake the following tasks.

- Communicate with emergency services to ensure that people do not return home before it is safe.
- Release warnings and information to the general public about risks and having proper ventilation when using generators and dryers.
- Raise awareness of remaining threats to food and water safety from contamination of supplies and surfaces by flood waters – encourage people to maintain hygienic and sanitary precautions until the clean-up is complete.
- Re-emphasize health messages after a flood event, especially:
 - Good hand hygiene practices
 - Boiling or chlorination of drinking-water

- Safe food preparation techniques
 - Early treatment-seeking behaviour in case of fever
 - Personal protection against vectors and zoonoses
 - Vector control interventions.
- Mould and fungal spores are common and people are constantly exposed to spores. The most important measure in controlling mould is to control moisture levels in the environment. After floods, excess moisture and standing water contribute to the growth of mould in homes and other buildings. When re-entering your flooded home, be aware that mould may be present and could pose a health risk to your family. If you find mould growing in your home, affected areas or items should be treated to remove mould spores as soon as possible. Follow these steps for home cleaning and removal of moulds: clean, dry and disinfect.

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