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A Prevention and Control Strategy for Infectious Diseases Following Natural Disasters

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Introduction

Global population expansion, poverty, land scarcity, and urbanisation in many nations have increased the number of people living in disaster-prone locations, amplifying the public health effects of natural catastrophes. Natural catastrophes have increased in frequency and size in recent decades, causing significant economic losses and harming and killing millions of people. Natural disasters such as Hurricane Katrina in the United States in 2005 and the Great Eastern Japan Earthquake and Tsunami in 2011 have demonstrated that even the most industrialized countries are vulnerable to natural disasters. Natural disasters are characterised as natural system disruptions that exceed a community's ability to adapt, needing outside aid. They can be divided into three categories on a worldwide scale: Floods, wave surges, storms, typhoons, hurricanes, and tornadoes are examples of hydro-meteorological disasters; landslides and avalanches are examples of geomorphological disasters; and geophysical catastrophes are examples of geophysical disasters (e.g., earthquakes, tsunamis and volcanic eruptions). Health professionals and the media have frequently exaggerated the risk of infectious disease epidemics in the aftermath of natural catastrophes, causing panic, misunderstanding, and sometimes unneeded public health actions. Fractures, lacerations, blunt trauma, crush injuries, projectile injuries, burn injuries, and drowning are all linked to injuries and deaths during or shortly after natural catastrophes. Most individuals assume that infectious disease transmission and epidemics are likely to occur soon following a natural disaster. However, there is no empirical evidence to back up this claim, especially when the disaster hasn't resulted in significant population displacement. There's also no indication that corpses constitute a major risk of infectious disease transmission and epidemics, particularly when they're the result of natural disasters. As a result, the survivors are more likely to be the cause of acute infections than the bodies that result. Natural disasters can cause the collapse of health facilities and healthcare systems, as well as the disruption of surveillance and health programmes (immunisation and vector control programmes), the limitation or destruction of farming activities (food scarcity/food insecurity), and the interruption of ongoing treatments and the use of non-prescribed medications. Increases in infectious disease transmission and epidemics after natural disasters are linked to the disaster's long-term effects. Displaced populations (internally displaced persons and refugees), environmental changes, increased vector breeding sites, high exposure to and proliferation of disease vectors (rodents, mosquitoes), unplanned and overcrowded shelters, poor water and sanitation conditions, poor nutritional status and poor personal hygiene, low levels of immunity to vaccine-preventable diseases or insufficient vaccination coverage, and limited access to health care are all examples of these after-effects. Changes in human situations, pathogen ecosystems, and the environment all contribute to the occurrence and spread of infectious illnesses (epidemiologic triad). The purpose of an emergency health response system is to prevent and control epidemics as well as to improve the health of disaster victims who are in poor condition.

Hydro-Meteorological Disasters

Flood catastrophes are the most prevalent natural disasters in the world (40%) and have been documented more than any other natural disaster. They happen all across the world and are linked to weather and climate change. Drowning and blunt trauma are the leading causes of immediate injuries and deaths in flood catastrophes. Disease outbreaks as a result of people being displaced into overcrowded camps and cross pollution of water sources with faeces and harmful substances are among the public health impacts of flooding. Flooding is frequently followed by a population of mosquitoes, which leads to an increase in mosquito-borne diseases like malaria. In comparison to flood catastrophes, the public health consequences of tropical cyclones (hurricanes and typhoons) and tornadoes, particularly infectious disease epidemics, have been less well documented.

Geophysical Disasters

Earthquake catastrophes are the second most commonly reported natural disaster (after floods) and the first among geophysical disasters. They have been documented in areas with strong seismic activity, such as Central and South America, and Asia (southeast and central Asia). The magnitude, severity, geographical location (high density population), and level of development of the impacted country all influence the earthquake's impact.

Building collapse and severe injuries are the most common direct causes of death in the aftermath of an earthquake. When seismic catastrophes force a large number of people into unprepared and overcrowded shelters with inadequate access to food and safe water, infectious disease outbreaks may occur. Disease outbreaks could possibly be a result of the earthquake's disruption of water and sanitation systems, as well as the resulting deterioration of sanitary conditions. Tsunamis are frequently linked to earthquakes, although they can also be triggered by severe volcanic eruptions or undersea landslides. Despite being categorised as geophysical disasters, they have a clinical and hazard profile (water-related repercussions) that is comparable to that of tropical cyclones (e.g., typhoons or hurricanes) with flooding as a result. There was no evidence of geomorphologic disasters (such as avalanches and landslides) being linked to infectious disease transmissions and epidemics.

Infectious Diseases & Outbreaks after Natural Disasters

As previously established, epidemics are unrelated to natural disasters. Several synergistic elements, such as huge population displacement, environmental changes, altered population

circumstances, and vulnerability to existing diseases, must be in place and worsened as a result of the disaster's after-effects. In the aftermath of a tragedy, infectious disease epidemics and outbreaks are virtually non-existent. They may occur several days, weeks, or months after catastrophic disasters strike, during the post-impact or recovery phases.

However, it is normal to see the international community, NGOs, volunteers, experts, and the media leave a disaster-affected zone within three months, while basic sanitary facilities and access to basic hygiene may still be lacking or worsen due to the disaster's economic cost. Most natural catastrophes are not related with disease epidemics when compared to complex emergencies, especially when they do not result in large population displacement. Although it is impossible to foresee which diseases would emerge after particular sorts of disasters, the following are examples of disease outbreaks that have been reported following natural disasters.