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A REVIEW ON PREVENTION OF SELECTED COMMUNICABLE DISEASES

Vimal Prasad Patidar*
Shashikala Dhanshukhlal Dadarwala College of Nursing, Dahod, Gujarat-389151

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Abstract:
Natural disasters have killed millions of people in recent decades, impacted the lives of over one billion people, and resulted in large economic compensations. In catastrophes, the principal causes of communicable disease can be divided into four categories: Infections caused by tainted food and water, respiratory infections, vector and insect-borne diseases, and infections caused by wounds and traumas are among the most common. In this scenario, diarrheal illness and acute respiratory infections are the most common causes of morbidity and mortality. The goal of this systematic review protocol is to guide the identification, appraisal, and synthesis of the best available evidence on the prevention and assessment of the following priority infectious diseases: diarrhoea, hepatitis A and E, leptospirosis, vector-borne diseases, and wound and injury infections.

Key words: *Communicable disease, Prevention, Review*

Corresponding Author
Vimal Prasad Patidar,
Shashikala Dhanshukhlal Dadarwala College of Nursing, Dahod, Gujarat-389151
vimalpatidar08@gmail.com

QR code

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INTRODUCTION:

Disasters can be seen as sudden and terrible events causing great damage, loss or destruction. Disasters have been defined as ecologic troubles or severe and highmagnitude emergencies resulting in deaths, injuries, illnesses, and profound damages that cannot be successfully managed using ordinary procedures or resources and require external support.[1] Disasters include earthquakes, floods, volcanic eruptions, tsunamis, drought and landslides. These disasters may begin acutely or insidiously with dramatic health, social, and economic sequels. [2]

In recent decades, millions of people have been killed by natural disasters, adversely influenced the lives of more than one billion people, and caused significant economic compensations. Due to the latest report of International Federation of Red Cross and Red Crescent Society in the last decade (1999-2008), over 7100 disasters happened in the world that caused 1,243,480 deaths and over one billion US dollars damage. In 2005, 246 (42%) out of 650 severe natural hazard events recorded globally occurred in Asia killing over 97,000 (90% of the global total of 110,000 individuals) and affecting more than 150 million people. In 2006, 174 disasters affected 28 million people in Asia and the Pacific. [3]

In 2008, from top 10 countries with the highest amount of disaster-related deaths in the world, 9 of them were in Asia. In fact, it is estimated the average $39.5 billion physical losses from disasters throughout Asia annually. Terrific earthquake in Marmara region in Turkey that caused more than 17,000 deaths in 1999 or the devastating flood in Central Europe occurred in 2002, resulted in economic damages estimated more than $15 billion are only some examples. [4]

The Bam earthquake was the most catastrophic event in the last decade in Iran. On 26 December 2003, a tragic earthquake measured 5.6 on the Richter scale, struck the ancient and agricultural city of Bam in the south-east of Iran. In this devastating event more than 30,000 people were killed, around 80 percent of the houses in the area were ruined and more than 100,000 became homeless. [5]

Natural and complex disasters such as earthquakes dramatically increase the mortality and morbidity resulting from communicable diseases. Although the epidemics of infectious diseases after the natural disaster are rare, 63% of the morbidity among Nicaraguan refugees in Costa Rica in 1989 was due to acute respiratory infections. In 1993, acute respiratory infections caused 30% of deaths in dwellers of Kabul, Afghanistan and 23% of deaths in unsettled people. In addition, after the earthquakes in El Salvador in 2001, 30% of infections were upper respiratory infections. The top five causes of death in emergencies and disasters include diarrhea, acute respiratory infection, measles, malnutrition and, in endemic zones, malaria. With appropriate intervention, high morbidity and mortality resulting from communicable diseases can be avoided to a great deal. [6]

Communicable disease after disaster

The major causes of communicable disease in disasters can be categorized into four areas: Infections due to contaminated food and water, respiratory infections, vector and insectborne diseases, and infections due to wounds and injuries. The most common causes of morbidity and mortality in this situation are diarrheal disease and acute respiratory infections. [7]

Waterborne diseases

Diarrheal disease: Diarrheal disease outbreaks can arise subsequent to drinkingwater contamination, and have been reported after flooding and related movement. Vibrio cholera (O1 Ogawa and O1 Inaba) and enterotoxigenic Escherichia coli are the major causes of this type. [8]

Hepatitis A and E: Hepatitis A and E have also fecal-oral transmission, especially in poor water sanitation. [9]

Leptospirosis: Leptospirosis is a bacterial zoonosis transmitted through contact of mucous membranes and skin with water, moist vegetation, or dirt contaminated with rodent urine. [10]

Diseases associated with crowding: Acute respiratory infections (ARI) as the main cause of morbidity and mortality among unsettled people are seen predominantly in children less than 5 years old. Furthermore, meningitis and measles are transmitted from person to person, especially in crowded circumstances. [11]

Vector-borne diseases: Malaria, cutaneous leishmaniasis and rabies are transmitted by vectors. In 1991, an earthquake in Costa Rica's Atlantic region was accompanied with1a high increase in malaria cases. Furthermore, intermittent flooding associated with El Niño–Southern Oscillation has been correlated with malaria epidemics in Peru. [12]

Infections due to wounds and injuries: The potentially significant threats to persons suffering a wound are tetanus, staphylococci and streptococci. [13]

This review article tries to provide the best recommendations for planning and preparing to *prevent communicable disease after disaster in two phases: before disaster and after disaster.*

Strategies for prevention of communicable disease

Before Disaster

The first phase of disaster policy making is to clarify our needs. For primary prevention, the most important risk factors of communicable diseases should be determined. The most significant risk factors in disasters are population movement and displacement. Additionally, overpopulation, economic and environmental devastation, poverty, lack of sanitary water, poor waste management, lack of shelter, malnutrition as a consequence of food shortages, and poor access to health care cause a dramatic increase in the rates of communicable diseases after disaster. [14]

Furthermore the breakdown or overwhelming of public health organizations and deficiency of health services obstruct prevention and control programs. With emphasizing on these risk factors, preparing and policy making before disasters are a critical need. The response to the disaster is a multifaceted operation requiring persistent review and modification of preparedness missions at the local, nationwide, and global level. [15]

The Aim of this phase is to decrease vulnerability to communicable diseases through reducing causalities and exposure to risk factors that provide passive protection during disaster. It needs some national regulations that reduce hazard exposure through constructing evidence-based guidelines for protecting individuals. Emergency response plans before disasters should include training in identifying and management of specific potentially threatening diseases; preparing needed equipment, supplies and materials, making local backups of supplies and tools for diagnosis and treatment, and environmental health measures for disease outbreaks.

Furthermore, reinforcement of health surveillance systems and practicing guidelines for managing information on specific diseases; increasing the awareness of potentially affected population about communicable diseases and the prerequisites for quick referral to a health facility are critical. Prepositioning of emergency supplies is one mechanism of increasing preparedness for natural disasters. Additionally, in countries with potential threat of disasters, providing fully operational field hospitals providing effective and efficient health care services to the damaged people in the probable forthcoming disasters, seems critical; this plan has an important role to reduce mortality and morbidity of communicable diseases. Such strategies are significantly facilitated by continuing support of government, academic and private organizations in terms of assigning programs designed to offer up-to-date education and training. [16]

Post disaster Phase

In this phase, the emergency response for controlling communicable disease includes: Emergency medical care, provision of shelter and site planning, water and sanitation, safe food preparation, nutrition, case management, medical supplies and vector control. Moreover, health education and providing the health of humanitarian workers is a critical point.

- Select and plan sites

providing appropriate shelters and site planning at the start of an emergency can decrease the incidence of communicable disease especially diarrheal diseases, acute respiratory infections, meningitis, tuberculosis, measles and vector-borne diseases. Shelters should have sufficient space according to the needs of victims. Furthermore, access to the water, fuel, and transport, solid waste management, and safety of food stores are essential. The new methods of GIS (Geographic Information System) application is useful for finding the proper place for shelter settlement. [17]

• Ensure adequate water and sanitation facilities.

As mentioned before, water borne diseases are a main cause of communicable disease after disaster. Ensuring constant delivery of safe drinking-water is the major preventive measure to be applied after a natural disaster.

According to WHO guidelines, Chlorine is broadly obtainable, low-cost, easily used and effective against almost all waterborne pathogens. The sphere project proposes the following minimum standards for the water supply in disasters: (1) sufficient access to safe water, (2) water quality should be maintained based on international guidelines, and (3) water consumption facilities and goods should be safe. People should have sufficient facilities and provisions to collect, save and use adequate quantities of water for drinking, cooking and personal hygiene, and to certify that drinking water remains safe until consumption. [18]

Additionally, personal hygiene is an important issue in health promotion during disasters. Personal hygiene habits will influence the general health status of the population. The importance of soap and hand

washing as a protection against fecal-oral disease should be emphasized in educational programs. Soap and water should be provided to all disaster victims and rescue personnel. [19]

• Ensure safety of food:
Food safety is crucial for disease prevention in natural disasters. The World Health Organization recommends five keys for ensuring the safety of food supplements following a disaster event;
Key 1: Preserve clean - (prevents the growth and spread of hazardous microorganisms)
Key 2: Separate cooked and raw food (microorganisms transfer prevention)
Key 3: Cook thoroughly (kills dangerous microorganisms)
Key 4: Preserve food at harmless temperatures (microorganisms growth prevention)
Key 5: Consuming safe water and raw materials (contamination prevention) [20]
• Control vectors

Natural disasters can influence transmission of vector-borne disease. The crowding of infected and vulnerable hosts, a debilitated public health infrastructure and disruptions of ongoing control processes are entirely risk factors for transmission of vector-borne disease. Major diseases frequently spread by vectors are malaria, dengue, Japanese encephalitis, yellow fever, typhus, and trypanosomiasis. For prevention, vector control interventions based on the local context and epidemiology of diseases are essential. Examples of some useful interventions are indoor residual spraying for malaria, insecticide-treated nets, and traps for tsetse flies as the vectors of trypanosomiasis. [21]

• Implement vaccination campaigns (e.g. measles)
Campaigns for measles immunization are one of the most cost-effective interventions in public health. Mass measles immunization, as well as vitamin A supplementation is an immediate health priority after natural disasters in regions with poor coverage levels. Mass immunization should be fulfilled as soon as possible in areas with baseline coverage rates below 90% among individuals under 15 years old.

Furthermore, immediate provision of Tetanus Diphtheria (TD) vaccine and tetanus antitoxin to persons injured during the earthquake and those undergoing emergency surgeries, is essential.

• Provide essential clinical services
Access to the primary care services is critical to prevention, early diagnosis and treatment of a variety of diseases, as well as providing secondary and tertiary care. Effective diagnosis and treatment of communicable diseases, prevents excess mortality and morbidity. [22]

Furthermore, standardized guidelines for diagnosis and treatment of the most common infectious diseases are needed. The Interagency Emergency Health Kit 2006 (IEHK 2006) which is designed by world health organization to meet the initial primary health care needs of a displaced population is useful in disaster scene. It can be set in immediate aftermath of a natural disaster or during an emergency and includes essential medicines, medical facilities and also clinical protocols needed in the context of emergency situations. [23]

• Provide basic laboratory facilities
Establishing a clinical laboratory is not a priority during the initial phase of most disasters. The diagnosis of most common communicable diseases can usually be done by clinical diagnosis. Laboratory testing is remained useful for confirming during a supposed epidemic event for which mass immunization may be indicated (e.g. meningococcal meningitis) or where culture and antibiotic sensitivity testing is effective in clinical decisions (e.g. dysentery). [24]

Case management
A high standard of care and treatment interventions is crucial in reducing mortality from communicable diseases. Inadequate community outreach, underuse of oral rehydration treatment, a slow rate of rehydration, use of inappropriate intravenous fluids, and inadequate experience of health workers in management of severe cases were some of the factors causing high mortality rates during the 1994 cholera outbreak in Goma, Democratic Republic of the Congo. The highest reported case fatality rate for a single day was 48%. [25] Heightened provision of qualified or local health care workers or both has been associated with reduced crude mortality rates and under-5 mortality rates.

The use of standard treatment protocols in health facilities with agreed upon first-line drugs is also crucial to ensure effective diagnosis and treatment. For acute respiratory infections, empirical treatment with antibiotics is commonly used in complex emergencies based on WHO and national protocols, individual nongovernmental organisation guidelines, and occasionally integrated management of childhood illness guidelines. These guidelines need standardisation and adaptation for adults, especially adults with HIV/AIDS, as there are additional

pathogens causing acute respiratory infections in these individuals, and the management of the pathogens needs to be more aggressive to prevent complications. In malaria management, the first priority is the prevention of mortality through early diagnosis and effective treatment. However, increased resistance of P falciparum to older antimalarials such as chloroquine and sulfadoxine-pyrimethamine means these drugs have lost effectiveness in most countries. WHO recommends a change in protocol to artemesinin-based combination treatments in countries where resistance levels to older antimalarials have reached 15%; these treatments are recommended by WHO for vulnerable populations affected by complex emergencies because they are highly efficacious, safe, and offer good patient compliance.

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A simplified and efficient drug regimen is especially important in complex emergencies. Effective, shortcourse antibiotics need to be identified for pneumonia, shigella dysentery, and sexually transmitted infections, with appropriate education about compliance and treatment. A 3-day regimen of amoxicillin in treating childhood pneumonia is as effective as a 5-day course, which is commonly used in developing countries. [26] A single dose 2-day course of ciprofloxacin could be used for treatment of Shigella dysenteriaetype 1 rather than the twice-daily 5-day course. Although single-dose formulations are available for the treatment of sexually transmitted infections (azithromycin, ceftriaxone sodium, cefixime, ciprofloxacin), the cheaper but longer (7-day) regimens of doxycycline and erythromycin are commonly used. [27]

Implementation of tuberculosis control programmes in complex emergencies is feasible using the WHO tuberculosis control strategy, Directly Observed Therapy, Short-course (DOTS). Guidelines for refugee camps exist and are being revised and expanded to cover complex emergencies. Local community education and a reliable drug supply are essential in any tuberculosis control programme, as is convenient and acceptable dosing such as thrice-weekly combination treatment rather than daily administration. Use of outreach workers from each ethnic group is important for compliance, as is reducing the distance travelled to seek drugs. An income-generation component could be incorporated to encourage people to stay on the programme after resolution of conflict. In the past, tuberculosis programmes in displaced populations were discouraged as their high mobility made treatment completion difficult, and were judged temporary. However, many complex emergencies are chronic and successful tuberculosis programmes using directly observed therapy in displaced people have been reported in northern India, in Cambodian refugees in Thailand, and in Rwandan and Burundian refugees in Tanzania. [28]

The syndromic management of sexually transmitted infections, which is necessary because of poor diagnostic facilities, might further facilitate antibiotic resistance. Additionally, the high rate of asymptomatic gonococcal and chlamydial infection, particularly in women, not only causes complications, but also facilitates the transmission of HIV. A rapid diagnostic test to detect symptomless infection and allow targeted treatment is warranted. At this stage, most countries affected by complex emergencies, although not providing antiretroviral drugs, should at least provide treatment for opportunistic infections in people living with HIV/AIDS. However, as the drugs become more affordable and voluntary testing and counselling becomes more commonplace, antiretroviral treatment will become a component of humanitarian aid. There are closely similar considerations to tuberculosis treatment in such situations, such as compliance and drug resistance.

Surveillance and surveys

Appropriate and effective response to and management of complex emergencies need timely and accurate data obtained from health information systems. Data are obtained to identify and plan for the initial and evolving needs of the affected population and subgroups, to detect epidemics and to prioritise interventions, and to investigate the quality, coverage, and effectiveness of response and programmes. Generally three types of data are obtained: (1) rapid health assessments, consisting of an initial overview of the immediate effect and needs;

(2) surveys, defined as intermittent, focused assessments that gather population-based health data; and (3) surveillance, defined as the ongoing, systematic gathering, analysis, and interpretation of health data. Baseline information and trends over time are essential for interpretation. [29]

The four main areas included in a health information system are: (1) mortality; (2) morbidity; (3) nutritional status; and (4) programme indicators. The magnitude of mortality is often used to determine the stage of an emergency, with a crude mortality rate of 1 death per 10000 people per day defining the acute emergency phase. [30] However, this arbitrary cutoff might not be appropriate in many circumstances (eg, in developed country crises) and thus a doubling of the baseline crude mortality rate is a more appropriate definition if the data are available. Crude mortality rate and under-5 mortality rate are the most commonly reported mortality rates in complex emergencies; however, in developed countries undergoing conflict, other age-specific mortality rates, such as those in elderly people, might be as important. During epidemics, attack rates and case fatality rates need to be calculated. [31]

CONCLUSION:

The reinforcement of health surveillance systems and practicing guidelines for managing information on specific diseases; increasing the awareness of potentially affected population about communicable diseases and the prerequisites for quick referral to a health facility are critical. In this scenario, diarrheal illness and acute respiratory infections are the most common causes of morbidity and mortality. The goal of this systematic review protocol is to guide the identification, appraisal, and synthesis of the best available evidence on the prevention and assessment of the following priority infectious diseases: diarrhoea, hepatitis A and E, leptospirosis, vector-borne diseases, and wound and injury infections.

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