Dead Bodies and Their Disposal in Emergencies

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The recent floods and landslides in Uttarakhand and the flood of Jammu and Kashmir have been a rude reminder for India of its historical disasters. Jammu and Kashmir is battling one of the worst floods in six decades. The flood situation has worsened as more areas have submerged in the waters leaving a trail of death and destruction. The toll in the devastating floods has reached 160 with more than 3500 villages affected and 450 submerged. Thousands of families are still stranded and awaiting help in their homes across the valley. South Kashmir districts are the worst hit by the catastrophe with many areas still cut off. Over 30 per cent of capital Srinagar city is under flood waters and over 10 lakh population affected in Jammu division. Here are the ten worst natural disasters that have affected millions of lives in the country since the 17th century. The great famine of 1876-78, statistically, was the worst ever disaster in the Indian history. The famine took a toll on millions of lives in south India, affecting at least 5.8 crore people for a period of two years. Covering a total area of 670,000 square km, the famine caused distress to people mainly in south, south western India and later spread to the then central provinces (now Madhya Pradesh, Chhattisgarh and Maharashtra states) and also united provinces (now Uttar Pradesh and Uttarakhand). Historians estimate that at least 3 crore people were killed in the great famine. The world was better connected by the late nineteenth century which saw the disease making its way to India from Hong Kong through Bombay (now Mumbai). The country then saw another natural disaster under the British era as about 1.2 crore succumbed to the plague pandemic over a period of three decades. The state of Bengal was struck by a major catastrophe in the 18th century as a famine caused deaths of about 1 crore people (approximately one- third of the then state's population) in the state. Bengal, a territory under the British East India Company, comprised of modern West Bengal, Bangladesh, and parts of Assam, Orissa, Bihar and Jharkhand. The famine caused distress in the territory between 1769 and 1773. In 1943, a massive famine struck the state of Bengal, India's rice-belt, killing at least 40 lakh people

On January 9, 1943, a devastating cyclone hit the rice fields in the state, killing thousands. The subsequent outbreak of Helminthosporium oryzae fungus took further toll on the rice cultivation. Again, 20 lakh Indians died in the Deccan famine of 1632-33. One of the most severe famines to have affected the country in the Mughal era, the famine, according to the historians, was caused by the result of the three successive staple crop failures which led to starvation and diseases that were incurable then. The natural disaster that struck Calcutta on October 7, 1737 left 3 lakh people dead. The nature of the disaster and the number of dead in the city has been debated since then. Though popular belief in Europe at that time was that the tragedy happened due to an earthquake, Thomas Joshua Moore, the then duties collector of the city for the East India Company claimed that only 3,000 of the city's people were killed by a storm and flood. The great famine of 1876-78, statistically, was the worst ever disaster in the Indian history. The famine took a toll on millions of lives in south India, affecting at least 5.8 crore people for a period of two years. Covering a total area of 670,000 square km, the famine caused distress to people mainly in south, south western India and later spread to the then central provinces (now Madhya Pradesh, Chhattisgarh and Maharashtra states) and also united provinces (now Uttar Pradesh and Uttarakhand). Historians estimate that at least 3 crore people were killed in the great famine. The powerful earthquake, measuring 7.9 on the Richter scale hit the Gujarat state on January 26, 2001 killing at least 30,000 people. According to statistics, 6,356 houses in Bhuj alone - the epicenter of the quake - were destroyed by the disaster. Further, destructive Tsunami in the Indian Ocean in 2004, triggered by a powerful earthquake

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- measuring 9.0 on the Richter scale - caught the attention of the world as it killed more than 10,000 people in India alone. Perhaps the most powerful Tsunami in history, the disaster severely affected 150,000 people in 11 countries. Experts say that the Tsunami was so powerful that its impact can be equated to the energy of 23,000 Hiroshima-type atomic bombs. The Latur earthquake in 1993 was one of the most devastating ones in modern India. Measuring 6.4 on Richter scale, the disaster killed more than 20,000 people. The Latur district was brutally hit by three aftershocks on the same day which damaged more than 2 lakh houses in 13 neighboring districts. Nearly 1, 27,000 families were affected by the tragedy in Maharashtra.

Disaster…death…and dead bodies go hand in hand; they are all emergency situations and produce serious aftermaths. People and scientists do not have a definite answer for facing the situations and handling the dead bodies. There are a lot of myths and fear about dead bodies too. The greatest myth that the dead bodies cause a major risk of disease or epidemic is not true. In fact, infective diseases or epidemics have never been reported after the disaster (WHO, 2001). Dealing with the dead is one of the most difficult aspects of a disaster response. This is not so much due to health- related risks, which tend to be negligible, but due to the psychological, social and political impact of the trauma. This article outlines the health implications of dealing with mass fatalities and priority actions that need to be considered when planning for the collection and disposal of the dead.

Contrary to common belief, no medical evidence has been established to suggest that large numbers of dead bodies, in whatever areas they are scattered, themselves, cause diseases or epidemics. The only situation where there is a health risk is when communicable disease has been the cause of the death such as plague disaster. The priority task for dealing with dead bodies is to identify them and hand them over to their relatives, which by itself is a stupendous as well as difficult task. Much of the information given in here is drawn on Morgan et al. (2006).[3] Beyond injury, the primary health concern for survivors of a disaster is the psychological trauma of the loss of loved ones and of witnessing death on a large scale. For this reason, it is important to proceed with the collection of dead bodies as soon as possible, but it is not necessary to hurry about their disposal.

Body recovery often takes place spontaneously by groups from the surviving community, volunteers, and search and rescue teams. Recovery teams should wear protective equipment such as gloves and boots. They should also be encouraged to wash their hands with soap after handling dead bodies. Vaccination of workers against tetanus must be done and first aid and medical treatment must be available in case of injury. Priority should be given to the living individuals, specially the kids and women. Search and rescue should be continued, with health care resources (e.g. ambulances and hospital beds). The handling of large numbers of dead bodies can have a serious psychological impact on members of the recovery team as well as the survived family members. Thus they should be reassured.

Bodies should be recovered as quickly as possible, but without interrupting other activities aimed at helping survivors. Rapid recovery aids identification and reduces the psychological effects on survivors. Bodies should be placed in body bags. If these are not available, plastic sheets, shrouds, or other locally- available materials should be used. Separate body parts such as arms or legs should be treated as individual bodies and they should not be tried to match severed parts at disaster site. Personal belongings should be kept with the body so that it can aid identification and may have legal and psychological implications for survivors. All the bodies should be given a unique reference number, which should be copied on to waterproof labels and should be attached to both the body and its container. Labels should be carefully saved until the body has been collected by relatives, or legal/ political issues are solved.

In warm climates, a body will begin to decompose within 12 to 48 hours. If possible, the body should be kept under refrigeration between 2-4^{o}C, at least till the bodies are identified. A refrigerated transport container should be used for transport with a capacity of 50 bodies. Where this is not possible, temporary burial is the next- best option- a trench 1.5m deep, at least 200m away from any water source and at least 2m above the water table has been suggested by WHO (2013). The bodies should be kept in a single layer leaving 0.4m space between each layer. They should be marked as regards the position of each body at ground level with their unique identification number. As bodies decompose quickly, especially in warm climates, they should be identified as soon as possible. The role of media is vital at these points, since they should not create havoc about the facts but rather flash the dead ones to be identified by their relatives. Photographic record of the body should be preserved. Clothing should be left on the body

and it should be stored with all belongings. An identification form should be completed. Emotional stress by relatives, politicians and the media MUST be minimized. Cross- checking of identification by using personal belongings or special identifying marks must always be ensured as a double check. Bodies that are severely disfigured or have decomposed may have to be identified by DNA testing or referral to dental records. Bodies should only be released to relatives once a formal identification has been made. A formal handover document (such as a death certificate) should be provided. A record of the people collecting the bodies must be kept religiously.

Only in rare cases can the mass disposal of unidentified dead bodies be justified. It is a basic human right for a deceased person to be identified, issued with a death certificate and disposed of in accordance with local customs. Failure to do so causes distress to relatives and can lead to long-term mental health problems. All identified bodies should be released to relatives for final disposal. Long- term storage will be required for bodies that are unclaimed. Burial is the preferred method as other methods destroy the evidence for future identification. Bodies should be buried 1.5 to 3.0m deep in marked graves following local customs and traditions. Communal graves should only be used in the case of an extreme disaster. The minimum distance from water sources. Remember, a body must be buried with its unique reference number attached to it and to the container. A sympathetic and caring approach is necessary towards the relatives of the dead ones. Honest and accurate information should be given to the relatives about the circumstances of death or missing. Each body or body part *must* have a unique reference number. The following is recommended by WHO, 2013-

PLACE + RECOVERY TEAM/ PERSON + BODY COUNT;

For example:

Name XXY - Team A–001 or:

Name XYZ- Bhopal–Team 30-531-1976."

PLACE: All bodies must be assigned a unique reference number indicating place of recovery/ the place where the body was taken for identification/ storage.

RECOVERY TEAM/ PERSON: Person or team numbering the body.

BODY COUNT: A sequential count of bodies at each site (e.g. 001 or 531 indicate the body being number one or 531 as recovered).

Details about where and when the body was found and the person /organization who found it should also be recorded on the Dead Bodies Identification Form.[3] Table 1 shows the minimum distances to water sources and dead bodies buried depending on the number of dead bodies.

Number of bodies	Distance from water source
4 or less	200m
5 to 60	250m
60 or more	350m
120 bodies per $100m^2$	350m

Note: The bottom of grave should be at least 2.0m above the groundwater table.

Table 1.Minimum distances to water sources (As per WHO)

Emergencies causing mass fatalities, due to infective diseases, are relatively rare, but when they occur extreme care must be taken in handling the dead bodies, because of the risk of cross infection. Table 2 lists the diseases for which infection from dead bodies is possible and their preventive measures. The measures required to prevent infection vary according to each disease. As a general rule, mortuary staff should wear protective gloves, masks, boots etc. The mortuaries should be kept cool, well ventilated, and clean, and bodies should be sealed in water-tight body bags and relatives must be prevented from touching them. During an emergency, family members can become separated; they should be counted as ‘Missing persons’ but alive unless there is evidence to suggest otherwise.

Disease		Use PPE[1]	Use body bag	Allow viewing	Allow embalming
Cholera		Yes	Yes	Yes	Yes[2]
Viral Hemorrhagic Fever [3]	Hanta virus	No	No	Yes	Yes
	Ebola / Marburg	Yes	Yes	Yes	No
	Crimian- Congo Hemorrhagic fever	Yes	Yes	Yes	Yes with Full PPE
	Lassa fever / arena Viruses	Yes	Yes	Yes	Yes with Full PPE
	Rift Valley fever	No	No	Yes	Yes with Full PPE
	Dengue	No	No	Yes	Yes
Influenza		Yes	No	Yes (with mask /goggles)	Yes

Note: (1) Personal Protective Equipment such as goggles/ visor/ face shield, apron, gloves, medical mask, boots, coverall/ gown.

(2) Disinfect the body e.g. with 0.5% chlorine solution

(3) Blood- borne transmission: tissues, vomit, blood are infective

Table 2.Preventative measures to reduce the risk of infection from dead bodies

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