LESSONS LEARNED FROM
MASS-FATALITIES MANAGEMENT RESEARCH

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ABSTRACT:

The aim of this paper is to present lessons learned from my quick response research after the natural catastrophes during last ten years around the world. Teahen (2012) defines, "A mass fatalities incident is an event that causes loss of life and human suffering, which cannot be met through usual individual and community resources." A mass-fatalities management (MFM) incident has political, social, psychological, cultural, religious, economical, environmental, ethical, legal, and other implications. Indian National Disaster Management Authority (2010) posits that "Management of the dead is an important concern after a disaster and it is a major social responsibility of the community and the government." The five overlapping components of MFM are explained with multiple case study and cross-cultural analysis. These are human remains (i) recovery, (ii) preservation, (iii) communication to the community, (iv) identification, and (v) disposition. Non recovery of human remains, non-identification, and mass-disposition without following traditional, social, cultural, and religious rituals is violation of human rights of the family members according to the Pan American Health Organization (2004) and may lead to Zeigarnik (1967) effect (a feeling of incomplete closure) and post-traumatic stress disorder (American Psychological Association, 2010) among family members throughout their lives. A model of information seeking in MFM developed as a part of the research is depicted and explained (Gupta, 2013). Number of lessons learned and recommendations are given for improvement of MFM. Lastly, a strong advocacy is made for transplant of organs of unidentified dead from natural disasters.
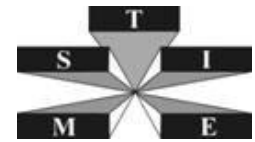
KEYWORDS:
Mass-fatalities management, Model of information flow in mass-fatalities management, Unidentified human remains, Use of unidentified human remains for organ transplant, Zeigarnik effect

1. INTRODUCTION

Disasters causing mass fatality are increasing in intensity and number, and may become even worse in the future (Quarantelli, 1993) because of living in unsafe conditions, urbanization, and moving of people towards coastal areas, apart from other reasons. The number of people died because of natural disasters between 1970 to 2010 was 3.3 million with a mean of 82,500 per year (World Bank and United Nations, 2010). Holzer and Savage (2013) have estimated that 3.5 million people may die because of catastrophic earthquakes between 2001 and 2100.

A mass-fatality incident caused by a disaster has political, social, psychological, cultural, religious, economical, environmental, ethical, legal, and other implications. The performance of governments are judged for example by "the extent to which the cultural and societal sensitivies are applied to respectfully handle the remains can be one factor by which governments are long-after judged by the survivors of disasters" (Gursky, 2012, p. xxiv). In addition, improper MFM may even lead to creation of a new nation. In 1970, there were severe floods in what was then East Pakistan that resulted in the death of an estimated 300,000 people and widespread destruction. There was civil turmoil and large scale refugee migration to India, due to which India was dragged into the conflict between East and West Pakistan, resulting in the liberation of Bangladesh in 1971 (World Bank and United Nations, 2010). This example shows the political repercussions of a mass-fatality disaster. With the interconnected instant worldwide 24X7 live news coverage, mass-fatality incidence are getting prominence.

This paper is based on ten years mass-fatality management research around the world. It starts with the definition of MFM, research methodology, human remains recovery, preservation, communication to the community, identification, and disposition. This is followed by lessons learned and recommendation. At the end, I advocate for transplant of organs of unidentified dead from disasters.
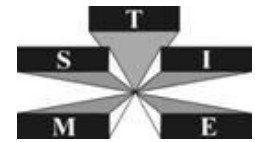
2. MASS-FATALITIES MANAGEMENT

Teahen (2012) defines "A mass fatalities incident is an event that causes loss of life and human suffering, which cannot be met through usual individual and community resources." Indian National Disaster Management Authority (2010) posits that "Management of the dead is an important concern after a disaster and it is a major social responsibility of the community and the government."

MFM involves five overlapping phases of human remains recovery, preservation, communication to the community, identification, and disposition. Non recovery of human remains, non-identification, and mass-disposition without following traditional, social, cultural, and religious rituals is violation of human rights of the family members according to the World Health Organization and Pan American Health Organization (2004) and may lead to Zeigarnik (1967) effect (a feeling of incomplete closure) and post-traumatic stress disorder (American Psychological Association, 2010) among family members throughout their lives. MFM is often conducted in a haphazard, by-chance, and chaotic way, without strategic planning before a disaster (Pan American Health Organization, 2004). According to a senior UN administrator in Haiti, "there was no fatality management" (Gupta, 2013, p. 85).

3. METHODOLOGY

This paper is based on MFM quick response research (QRR) after 2004 tsunami in India and Sri Lanka, 2009 cyclone Aila in Bangladesh and India, 2008 earthquake in China, 2010 earthquake in Haiti, 2013 Rana Plaza collapse at Savar in Bangladesh, 2013 heavy rains-cloud burst-landslides-floods in Uttarakhand of India, and 2015 earthquake in Nepal (Gupta, 2005a, 2005b, 2006a, 2006b, 2008, 2009, 2010a, 2010b, 2010c, 2013; Gupta & Sadiq, 2010; McEntire, Sadiq, & Gupta, 2012; Arthur Oyola-Yemaiel & Kailash Gupta, 2005; Artur Oyola-Yemaiel & Kailash Gupta, 2005; Oyola-Yemaiel & Gupta, 2006). The research was funded by US National Science Foundation, Natural Hazards Centre of the University of Colorado at Boulder, Federal Emergency Management Authority, ActionAid, Government of Rajasthan, North Dakota State University, Tata Institute of Social Sciences at Mumbai, University of North Texas, Center for Disaster Mitigation and Management of Malaviya National Institute of Technology at Jaipur in India, and TIEMS – India Chapter.

Michaels (2003) defines QRR "by the information collection phase occurring during or immediately after a damaging event" (p. 41). Over 700 QRR field studies have been documented by the Disaster Research Center (2015) of the University of Delaware and 252 QRR reports by the Natural Hazards Center (2015) of the University of Colorado at Boulder (NHC), two of which are quick response reports number 216 (Gupta, 2009) and 219 (Gupta & Sadiq, 2010) by the author. Another aspect of methodology is that this paper is based on multiple case studies conducted after different disasters. According to Creswell (2009), "Case studies are a strategy of inquiry in which the researcher explores in depth a program, event, activity, process, or one or more individuals" (p. 13). A case study can help develop "general theoretical statements about regularities in the observed phenomena" and "to generate findings of relevance beyond the individual cases" (Fidel, 1992, p. 37). During the course of 10 years MFM research, I had interviewed hundreds of people in different countries and have done field observations. The research participants included, family members of the deceased, survivors of the catastrophe (Quarantelli, 2006), urban search and rescue personnel, police and military officials, physicians, fire-fighters, administrators, disaster eye-witness, UN and other humanitarian responders, and unattached individual volunteers. The research is mostly qualitative, the aim of which is to understand experiences and perspectives of diverse individuals (Locke, Spirduso, & Silverman, 2007). This paper is based on multiple case studies and does cross-cultural analysis.

4. RECOVERY OF HUMAN REMAINS

The research internationally has revealed that most of the lives are saved by the family members, neighbors, and people who happen to be at the incident site. The official first responders, traditionally considered as fire, police, and medical people, take time to reach the disaster sites and are generally less aware of the places people get trapped, compared to the local residents. After disasters, search and rescue of living persons is one of the most important tasks of the responders. Countries send their search and rescue teams to foreign countries principally to help citizens of their countries who are in that country at the time of disaster involving mass-fatalities. This was observed in Thailand after the 2004 Indian Ocean tsunami and after the 2010 Haiti earthquake. In Haiti, more than 60 urban search and rescue teams from 30 nations with more than 1,800 rescuers recovered 132 persons alive. The number of persons "rescued alive" is not the same as the number of lives saved. The nationality of the persons recovered is unknown and no date were collected on short-term survival.

In Nepal 2015 earthquake, "76 international Urban Search and Rescue teams were registered from 31 countries, encompassing 1,872 personnel and 118 dogs" (OCHA, 2015). The Indian National Disaster Response Force (NDRF) teams were able to reach Kathmandu on the day of earthquake April 25 itself. NDRF had 13 teams with 582 personnel and as of April 30, they were able to rescue 11 live people and recover 120 deceased. NDRF rescued 11 people in first 12 hours according to the Director General of NDRF (O. P. Singh, personal communication, April 29, 2015). All the search and rescue teams put together would have rescued a few more live people. The cost incurred by international community in search and rescue operations and the effectiveness of international search and rescue teams is questionable.
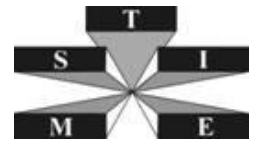
The number of dead person due to Nepal earthquake is 8,898 as of August 7, 2015 (Nepal Earthquake Assesment Unit, 2015). The list of 8,377 dead people from Nepal earthquake is available from the website http://www.nepalpolice.gov.np/images/crisis-detail-2072-01-18/list-of-death-toll-2072-02-11.pdf at the time of this writing (August 20, 2015).

FINDER technology was used first time after 2015 Nepal Earthquake and this helped in rescuing four live persons trapped in collapse structures. FINDER locates people by sending out a micro-wave signal through the rubble. The changes in the reflections of those signals that reverberate back to the device or observed. The changes may be caused by the tiny movement a person may make. The FINDER could pin point a person's heart beat buried 20 feet of solid concrete or 30 feet of rubble. FINDER is a portable 10 kg radar detector of the size of an average suitcase. The technology is developed by NASA.

Generally, after the search and rescue operation of the living and taking care of them, search for human remains starts. In the June 2013 Uttarakhand catastrophe in India, 4,021 people were reported missing and presumed dead, while 169 were dead according to Uttarakhand state government records (Satendra et al., 2014). After the tsunami human remains were recovered by people who were fishing, largely from smashed boats. Large number of human remains were also recovered from a church in Nagapattinam district of Tamil Nadu in India. In Haiti, after the 2010 earthquake, recovery of human remains was largely done by local people. Many human remains were not recovered and were comingled with debris that kept lying. I saw a full body human remain in a building on the main road of Port-au-Prince, capital of Haiti after three weeks of the earthquake. One year after the Uttarakhand catastrophe, Rajasthan state editor of the largest circulated Hindi daily newspaper Pant (2014) found human remains littering around the religious places.

5. PRESERVATION OF HUMAN REMAINS

Humanitarianism requires, that human remains need to be preserved for identification and respectful disposition. However, preservation facilities are mostly limited and after a mass-fatality disaster, more often than not, human remains are mass buried, particularly in developing countries. An extreme example is that of Haiti in which according to the government of Haiti, 316,000 people died (Brown & Delva, 2011). The Haitian government was totally overwhelmed and ordered National Equipment Corporation (NEC), a government public works department, to disposition human remains. NEC used earth moving equipment to recover human remains, made no effort to

preserve them, and mass buried in Titanyen. Titanyen is about 24 km northeast from the Port-au-Prince, without nearby human habitation, slightly away from a hill, where trenches were dug and human remains mass buried.

Generally efforts are made to preserve human remains of foreigners after a mass-fatality disaster. This was observed after the tsunami in Sri Lanka and Thailand, and after the Haiti earthquake. Sometimes efforts are made to preserve human remains for a limited period for identification. However, if it is not possible to identify the human remains, then they are dispositioned. This was observed after the Kolkata Park Street building fire in 2009. The administration waited for a month after the 1995 Chicago heat wave for family member to claim human remains. However, when they did not come, the administration disposed them (Klinenberg, 2002).

To preserve human remains cold storage facilities are required in the morgue. There are limitations how much cold storage morgue facilities the local administration could keep. The Forensic Department of the Institute of Medical Sciences, Thribhuvan University, Kathmandu had a morgue capacity of 20. After the earthquake all unidentified human remains from Nepal were brought there, but there was not enough capacity in the morgue. The human remains were kept in the compound of the Forensic Department. Even there was not enough ice to delay decomposition of human remains. Even the New York city did not had morgue facilities for 1,000 at the time of 9/11 (Wachtendorf, 2004). After the tsunami, a private company from Norway flew a large size cold storage tent for preservation of human remains in Thailand. Human remains could also be preserved in shallow graves.

6. COMMUNICATION ABOUT HUMAN REMAINS

Local community is informed by the administrator or a representative of the administrator to come for identification of human remains. Local affected community also contacts the administration to find out about the human remains of their family members. This is achieved by various methods. After the tsunami in India and Sri Lanka and earthquake in Nepal, photographs of the deceased persons were displayed by the administrators for the local community to identify the human remains of their family members. Human remains were lined up in a school at Savar, near Dhaka after the 2013 Rana Plaza collapse in Bangladesh. Human remains were kept in open spaces in hospitals in Sri Lanka after the 2004 tsunami and in Nepal after the 2015 earthquake for people to identify the human remains. In Sri Lanka a doctor used *namaz* public-address system of the mosque, announcing the community that human remains are there in the hospital and asked people to come to the hospital for identification of the human remains.

After the Haiti earthquake, social media was widely used by the Haiti diaspora to help find human remains. In this Facebook, Twitter, and other social media websites were helpful. Google created a people finder website to facilitate people putting information about missing people and search facility to locate missing people since Haiti earthquake and has used in subsequent catastrophes. After the Uttarakhand catastrophe in June 2013 in India, initially some photographs of human remains recovered were put up on the website by the Government of Uttarakhand. However, subsequently those photographs were removed from the website. The list of missing persons were put up by the Uttarakhand and other state governments on their websites.

7. IDENTIFICATION OF HUMAN REMAINS

Identification of human remains is important for handing over the human remains to the surviving family members to perform last rites, getting compensation from the government, insurance claims, estate inheritance rights, remarriage of living spouse, and other reasons. In case the human remains are not identified, it leaves Zeigarnik effect on the surviving family members. Even after 31 years of ending the Vietnam War, family members were reported to be searching for the human remains of their family members (Phua, 2006). In the western industrialized rich countries all efforts are made to identify the human remains of disaster victims. The human remains are preserved in cold storages and different technologies are used for identification of the human remains, including photographs, dental records, x-rays, forensic methods, and DNA profiling.
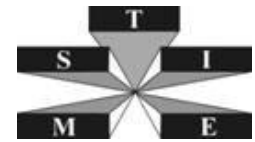
In Asian poor countries, human remains are preserved for limited periods for identification and in case they are not identified they are disposed of. In India, Sri Lanka, and Nepal simple methods were used to identify the human remains, like clothing, tattoos, photographs, identification by family members or neighbors, jewelry, or other similar methods. After the tsunami, about 45 countries sent their teams to Thailand to identify the human remains of their citizens. Initially, there were conflicts among different country teams and also with local administration. However, subsequently initial problems were sorted out and smooth process was established (Scanlon, 2006). Different teams used disaster victim identification protocol of the International Criminal Police Organization (Gupta, 2011; INTERPOL, 2009).

After the Haiti earthquake, because of the large number of deaths (360,000) and the speed at which the deaths occurred, the government was completely overwhelmed and made no effort to identify the human remains, except of the foreigners and some efforts by the individuals.

It was stated earlier that in the June 2013 Uttarakhand catastrophe 4,021 people were reported missing and presumed dead. Leela was one of the missing person. A death certificate was issued and her family was paid compensation by the government. Vijendra Singh, her husband, was not convinced about her death and kept searching for Leela. On January 27, 2015, Vijendra found Leela alive begging in the streets of Uttarkashi in Uttarakhand. There have been reported cases of wrong identification of even foreigners whose remains were sent to a European country from Thailand after the 2004 tsunami, but was found to be wrongly identified.

Identification of human remains when disposition is urgently needed is a problem. It is recommended to improve record keeping for unidentified human remains. Tracking methods or computer programs that could be utilized for this need to be developed. Digital photographs need to be taken immediately before human remains become deformed (blacken) to provide photographic evidence for those seeking information about the deceased.

8. DISPOSITION OF HUMAN REMAINS

Gupta (2013) recorded a model regarding decision tree in the process of recovery and disposing of human remains by authorities (Figure 1). The disposition of human remains poses serious problems for the authorities. The human remains may be found or missing. The human remains may be intact body or fragments. The human remains may be positively identified and may not be identified. If the human remains are positively identified and there are claimant family members, the human remains may be given to them. However, if there are no claimants or human remains are not identified, the authorities have to decide how long to preserve the remains and what type of religious rituals, if any, to be performed at the time of disposition.

Disposition of human remains have to be done with due respect, according to the tradition, cultural, religious beliefs, and by performing rituals. Generally, defense forces of different countries perform special ceremonies for disposition of human remains of their personnel, known as guard of honor. In the response operations to the Uttarakhand catastrophe a helicopter crashed killing 12 persons of NDRF, Indian Tibet Border Police, Indian Air Force, and other organizations. A special guard of honor ceremony was organized at Dehradun helipad in the presence of Home Minister of India, Chief Minister of Uttarakhand, and senior officials of the armed forces, which the author watched. After the ceremony the human remains of these people were flown by special helicopters and airplanes for disposition by their families. Does the recovered human remains of the civilians from the Uttarakhand catastrophe do not deserve respectful disposition? This is a question that needs to be pondered.

An extreme case of disrespectful disposition of human remains was observed by me after the 2010 earthquake in Haiti. The human remains were dispositioned by earthmoving equipment in long trenches and buried comingled with debris. Pan American Health Organization (2004) and World Health Organization recommend against the mass burial of human remains, since it violets the human rights of the family members of the survivors. In addition, cremation of unidentified human remains needs to be avoided, because it closes the possibility of identification of human remains forever. However, this recommendation was not practicable in mass-fatality situations in developing countries and not implemented after the tsunami in India, Sri Lanka, and Thailand.
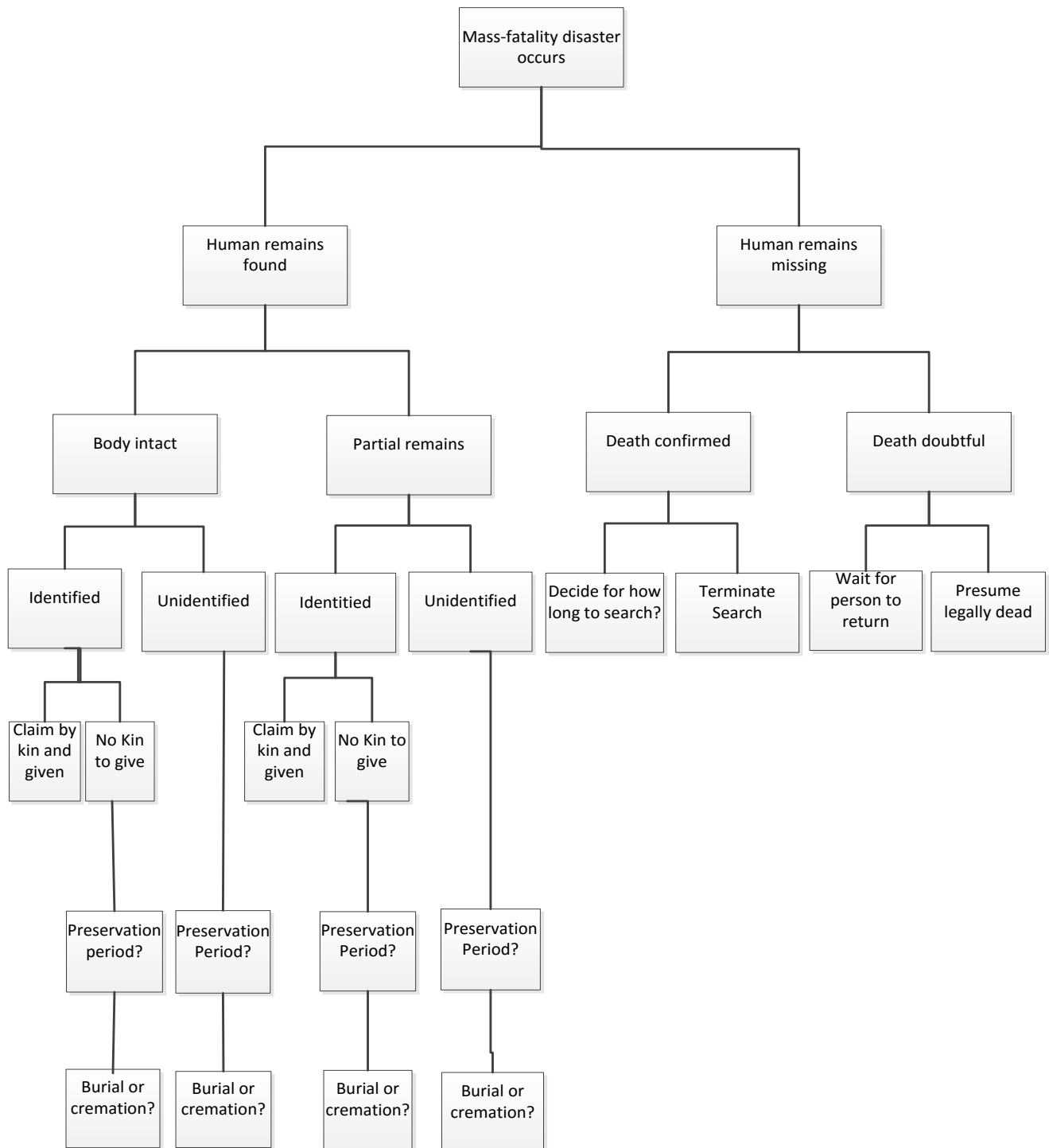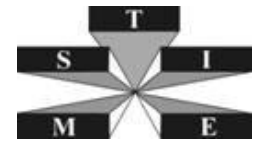
Figure 1. Decision tree in the process of finding and disposing of human remains by authorities.

9. MODEL OF SEEKING INFORMATION IN MASS-FATALITIES MANAGEMENT

"Information alone can save lives," asserts the International Federation of Red Cross and Red Crescent Societies (2005, p. 9). The theoretical significance of my research is that it sought to illumine information-seeking practices, as discussed in the works of J. David Johnson and others (Johnson, 1997; Johnson, Donohue, Atkin, & Johnson, 1995) by developing a new model of information flow in MFM (Figure 2). The model parsimoniously depicts
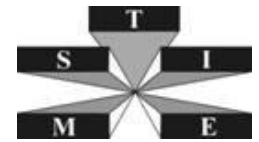
information flow systems. The context of the model is a catastrophe and the situation involves mass fatalities. The context and the situation make it an abnormal situation. The abnormal situation constitutes external factors. The internal factors are the antecedents. "The Antecedents provide the underlying imperatives to seek information" asserts Johnson et al. (1995).
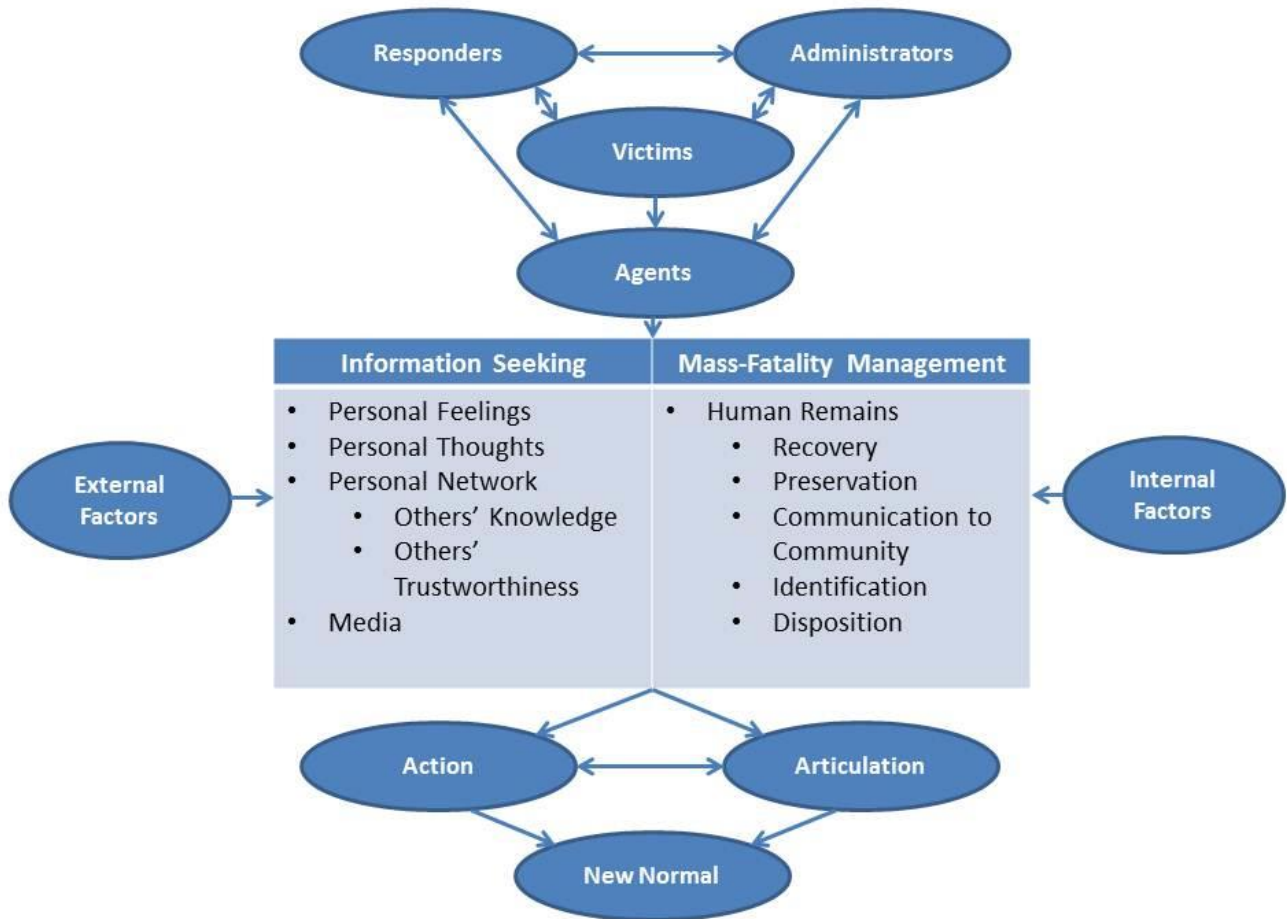

Figure 2. Model of Seeking Information in Mass Fatalities

Antecedents consist of background and personal relevance. Belief is an agent's confidence to make a difference in the situation. Urgency and importance of the conditions make them salient. The agents are the victims, responders, and administrators who are seeking information. In information seeking the agents' feelings, thoughts, personal network, and media play a role. MFM is difficult without information seeking. This requires action and articulation that may result in a new normal. Based on the study this theoretical model appears to indicate connection between seeking information in managing mass fatalities to guide agents in alleviating suffering. "Theory building has been operationally defined as 'the process of modeling real-world phenomena" (Torraco, 1997, p. 127). Therefore, the model developed is theory building.

10. LESSONS LEARNED AND RECOMMENDATIONS

We have learned following lessons from MFM QRR around the world after major disasters: (i) need for MFM preparedness training (ii) need for strong government administration, (iii) need for international cooperation for effective response to MFM, (iv) develop plans for human remains recovery, (v) develop plans for preservation, (vi) develop plans for identification, (vii) develop plans for disposition, (viii) use of newer technologies in MFM,
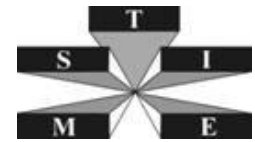
e.g., social media, drone, FINDER, and (ix) develop policy for MFM.

My research raises several questions and recommends for research on: (i) seeking information in managing mass fatalities; (ii) government response to MFM; (iii) preservation of unidentified human remains; (iv) disposition of human remains in adverse conditions; (v) disposition of unidentified human remains; (vi) training in MFM; and (vii) testing of the model of information flow in MFM in the aftermath of disasters.

11. ADVOCACY FOR TRANSPLANT OF ORGANS OF UNIDENTIFIED DEAD FROM DISASTERS

One of the important lessons learned from MFM research around the world is advocacy for transplant of organs of unidentified dead from disasters. Mohan Foundation (http://www.mohanfoundation.org/) is promoting organ donation since 1997. This is a very laudable effort. I want to push the envelope by advocacy on the use of natural disaster unidentified dead cadavers for legal therapeutic use of the patients.

I know this is a highly controversial, emotional, ethical, religious, cultural, legal, medical, forensic, and social issue. A physician of the US Centers for Disease Control and Prevention in an interview in Haiti after the 2010 earthquake told me, "It is a preposterous issue for debate. The thought of this issue may be dreadful." Yet the issue need to be debated, because if accepted, it has the potential of wiping out the long waiting period of patients for organ transplants and could provide lease of life to hundreds of thousands of patients in course of time. Is it possible to use organs of disaster unidentified dead for the survivors of the disaster or other patients? Will it be socially acceptable to use organs of legally unidentified dead that have medical and economic value for the patients and for the advancement of medical science?

There is a need for cadavers for education and training of health related students and professionals to advance medicine. The Rajasthan Anatomy Act of 1986 in India provided a procedure for handing over unidentified cadavers to anatomy professors of five medical colleges. The Indian Transplantation of Human Organs Act, 1994 regulates organ transplantation. Different organs of the dead could be used for transplanting and for saving the lives of injured or for their medical treatment and betterment of their lives. Yakov Koyfman, a US neurosurgeon, told me in Haiti that bones are preserved for grafting. He added:

> Theoretically, preservation is done of fresh material. There may be some time limit after which body parts may be useless. Bodies are harvested in non-sterilized conditions. Some harvesting of the material could be done for long. It depends upon the situation, temperature, local conditions, and the health condition of the deceased.

> There are legal and ethical issues of harvesting human bodies and parts. All of this is a gruesome matter. I know surgery with illegal parts exist. I cannot imagine how unidentified bodies of mass-fatalities disasters could be used for patients. Bones could be properly preserved for long periods. Would people do this, is a question?

Cheney (2006) and Carney (2010) documented a thriving international illegal trade in cadavers. Investigations reveal that cadavers were illegally sold for about $10,000. For example, a director of the Willed Body Program of the University of California at Los Angles was sentenced to four years in prison for stealing organs and selling to pharmaceutical and medical research companies in 2004 according to Shaikh-Lesko (2013). Therefore, organs of dead, including of natural disasters have economic value, although there are many challenges to be overcome, including social acceptance, medical facilities, legal issues, and others.

Although certain organs of the dead will have shorter period for their utility for the living, but there are other parts, like femur bone and teeth that could be used after long time. Could there be some way to find their utility? To find out, I wrote to Roach (2003) who has written a book *Stiff: The Curious Lives of Human Cadavers*:

> In *Stiff* you wrote, "Cadavers are our superheroes . . . . What a shame to waste . . . not to use them for the betterment of humankind" (p. 10). Do you know of any research anywhere on use of unidentified mass
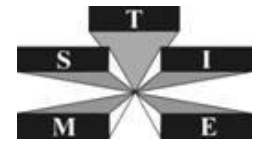
fatality disaster cadavers for humankind? What do you think about the use of mass fatality disaster cadavers for humankind?

She replied to me in writing on February 3, 2013:

> That's an interesting question. I think a disaster scenario is too emotionally charged and media-saturated for this to go smoothly. It would seem, to many people, like adding insult to injury. Especially in a country, like Haiti, that probably does not have much tradition of body donation. Perhaps in Europe it would be perceived as a positive, humanitarian practice, but even then, I think it would be tough.

In some religion, culture, and tradition, "attempt to preserve a corpse is seen as a fundamental error" according to Mullen (2009). Research is required to understand this issue. Research is also required on use of unidentified cadavers of a natural disaster for transplant, to start with in a European nation.

12. CONCLUSION

Mass-fatality management (MFM) is becoming prominent because of globally connected 24x7 live media coverage. MFM incidents have political implications, apart from social, psychological, cultural, religious, financial, and legal. Events like the Haiti earthquake, in which 3,16,000 people died according to Brown and Delva (2011) quoting Haitian prime minister and other mass fatality incidents reveal that research is imperative on MFM. There is a significant need to improve MFM, including unidentified human remains in developing nations and about how international community could augment in this effort.
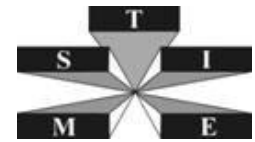
The author is advocating for use of organs of unidentified dead after natural disasters for transplantation. The question is, will it be socially acceptable? May be somebody could start an experiment in Europe. In raising this question, the researcher is following Kelman (2005)'s advice,

> At minimum . . . questions should be asked and debated. Researchers should understand what is and is not acceptable by thinking ahead to set appropriate limits in their field of operations. During a disaster and during research, it is too late.
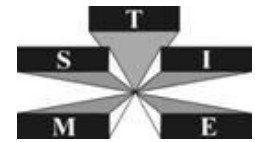
Denzin and Lincoln (2011) assert that qualitative researchers investigate struggles of the people to formulate public issues and then recommend social policy with the aim to bring positive changes in the world. It is hoped that a debate will be started about the use of organs of unidentified dead in the aftermath of natural disasters to bring about specific policy and practice changes.
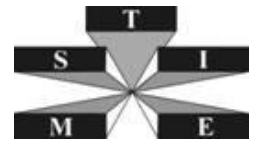
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