Ashkenazi et al., J Def Stud Resour Manage 2012, 1:2
http://dx.doi.org/10.4172/2324-9315.1000103

Journal of Defense Studies & Resource Management

Research Article

A SCITECHNOL JOURNAL

The Role of Bystanders in Mass Casualty Events: Lessons from the 2010 Haiti Earthquake

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Abstract

In routine emergencies, official emergency organizations bear the responsibility to manage the event and treat the wounded. The principal role for bystanders is to alert the appropriate emergency organizations. In mass casualty events (MCE), bystanders are the first responders. Research conducted among rescues in the immediate aftermath of the 2010 Haiti earthquake indicates that bystanders can be an effective complement to professional rescue forces and a necessary substitute when professionals lack sufficient surge capacity. Policy makers and planners may be able to save lives and elevate resilience by sharing emergency preparedness responsibility with the general public.

Keywords: Mass casualty event; Bystanders; Emergency response; Disaster response; Haiti

Introduction

In routine emergencies, official emergency organizations bear the overall responsibility to manage the event and are usually the first to treat the wounded. The principal role for bystanders is to alert the appropriate emergency organizations, not direct action. In mass casualty events (MCE), citizen bystanders are in the best position to provide immediate assistance to the injured because of their proximity to the injured and the obstacles for official emergency organizations to reach and treat all of those in need of assistance.

The purpose of this paper is to examine the potential of bystanders as a rescue resource that can complement and supplement professional rescue forces in a non-routine mass casualty event. The response of a population in the aftermath of a recent MCE, the 2010 earthquake in Haiti, is used as a window into the helping behavior of bystanders during overwhelming emergencies.

Background

The Haiti earthquake in brief

On Tuesday, January 12th, 2010, at 16:53 local time, an earthquake measuring 7.0 on the Richter scale destroyed a wide expanse of Haiti. The epicenter was about 25 km south - west of the capital Port- or-Prince [1].

The earthquake led to a functional and physical collapse of the governmental systems, a destruction of hundreds of thousands of public and private buildings, a severe disruption of critical infrastructure including transportation, water, electricity and communications [2]. The Haiti government reported that up to one-third of the 60,000 civil servants were among the more than 162,000 [3] to 220,000 residents killed [4]. There were as many as 300,000 injured [5,6] and more than 1.5 million left homeless [7].

The Haiti earthquake resulted in more deaths per capita than other recent quakes. The earthquake in China in 2008, for example, was of greater magnitude (7.9 vs. 7.0) yet resulted in approximately 88,000 deaths while the event in Haiti killed as many as 220,000. This means that 1 in 15 affected died in Haiti while 1 in 595 died in China [8].

The primary explanation for the high rate of deaths, injuries and damage to property was the widespread collapse of buildings. This is a result of poor urban construction standards that would be unacceptable in the rest of the Western world [9]. One can therefore infer that had the earthquake hit during nighttime sleeping hours, the numbers of dead and injured would have been far higher as has been seen in other earthquakes [10].

The earthquake was accompanied by 59 relatively high intensity aftershocks – registering 4.5 or greater including one at 6.0 [11]. These aftershocks resulted in additional collapses of poorly built buildings, trapping and injuring yet more residents who had remained in their neighborhoods attempting to save buried family members and to recover property.

The disaster in Haiti was characterized by a functional collapse in the capacity of the government to manage the response to the event. It took several weeks for President Preval to begin to reassert his authority and restore his government [12]. Thus primary disaster response and management was by default transferred to the residents themselves. While governments in general momentarily falter in the immediate aftermath of a disaster, the case in Haiti provides the opportunity to assess what occurs in the extreme, when government authority, activity, and professional response disappears almost completely. In this case, survivor-bystanders filled the void: of their own volition, they reached trapped victims and provided rudimentary treatment to save lives. This article focuses not on the government's meager response nor on the international response, which was generous though too late to have a significant impact on the immediate needs of those who were trapped. This article focuses on those who saved the most lives, the bystanders, on the premise that lessons learned in a very primitive culture could inform emergency response in a more sophisticated environment during large scale mega-disaster.

The earthquake experience

The main cause of earthquake-related mortality is trauma followed by crush syndrome, both resulting from collapsing buildings [13]. The causes of death can be divided into three general categories depending on injury severity [14]:

Immediate or near-immediate death - Injuries that cause instant or almost immediate death, such as massive crushing of the head or chest. The physical damage is so severe that in mass casualty events, these victims cannot be saved.

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Received: October 12, 2012 **Accepted:** October 25, 2012 **Published:** October 29, 2012

Avoidable Death – Moderate injuries that without treatment cause death within hours such as continuous bleeding from an open wound. Saving the lives of these victims is possible through early detection, first aid, and rapid evacuation to a medical facility. It should be emphasized that most injured patients in this category are saved from the rubble by themselves, family members, neighbors, and other bystanders. Few are saved by professional search-and-rescue forces. This has been the case in our experience and it is supported by the literature [15-19].

"Unnecessary" Death – Victims who are trapped in a confined space under rubble, suffering from slight injury or no injury at all. These victims are awaiting someone to find them, and if not detected on time, die from dehydration, heatstroke, frostbite, inhalation of smoke, dust or hazardous materials, or heedless removal of rubble by bulldozers. In practice, this is the largest population that can be most easily saved after an earthquake.

Thus in the aftermath of an earthquake, many trapped victims may not be pulled out of the rubble, and gradually die an 'unnecessary' death according to Angus et al and Ashkenazi. Their findings indicate that the main reason is the sluggish arrival of search and rescue forces. Domestic and international rescue forces reach the disaster area too late, do not always use advanced technology to locate the trapped victims who are still alive, and miss the narrow window of opportunity to save those victims.

Methods

Defining bystanders

Bystanders are defined here as those individuals in immediate proximity to a mass casualty event (MCE) who are neither fatalities nor so severely injured that they would be incapable of providing aid to others. Their level of first aid training should be assumed to be no greater or less than that of the general population. They are not likely to have specialized equipment for lifesaving but, as a result of being at the scene during the MCE, are the only individuals in a position to provide immediate assistance. They may be of any age, gender, or ethnicity. They are a group united only by time, space, and the common experience of the traumatic event. Their cause is survival.

Recruitment and data collection

Survivors of the earthquake in the municipality of Jacmel who had been trapped in rubble and then extracted were interviewed over five days beginning approximately 27 hours after the initial shock. It was decided to utilize a brief five question closed-end-question survey that would determine the respondent's age and gender as well as basic information about his or her experience during the earthquake as this instrument could be administered in the chaotic conditions typically encountered in the aftermath of an MCE. Responses were collected manually and analyzed using a standard computer spreadsheet program. Severity of injuries was determined observationally by a physician. Injuries were classified in three categories:

a. Category 1: mild injury (No risk to body or life. No need of hospitalization)

b. Category 2: moderate injury (Risk to body part such as limb, eye, etc, including fractures, small amputations and limited crash injuries)

c. Category 3: Severe injury (Risk to life. Needing urgent hospital treatment)

The responses to the questions that were specific to earthquakes are not discussed in detail here. The discussion is limited to those that may indicate behavior that may be able to be generalized across a spectrum of MCEs.

Results

A total of 619 randomly encountered individuals who self-identified as having been trapped under rubble and rescued agreed to participate in the survey. Of the respondents, 52.18 were male (n=323) and 47.82 were female (n=296). This sample is .91 ratio of males to females which is somewhat greater than the ratio of .98 found in the general population (M=.95, SD=.056). Seventy-nine percent of participants (n=503) were aged 15-64 (Table 1). The percentage of the general Haitian population in this age bracket is 60.1 percent [20].

By definition, casualties are common in an MCE. Eighty-eight percent (N=544) had no injuries or minor injuries making bystander rescue possible without the need for advanced or specialized medical equipment or experience (Table 2).

In the area surveyed, almost all of the respondents reported that they either rescued themselves (28%) or were rescued by bystanders (71%). Only two (.5%) reported being rescued by professional rescue forces (Table 3).

Discussion

Bystanders as a viable rescue force

In Haiti, it is officially reported that just 211 people were rescued but that counts only those rescues recorded by formal authorities [21]. As demonstrated above, many more were rescued by average Haitians. The number of people in our survey population who reported being assisted by bystanders is more than twice the total official number of rescues recorded in the entire country. Our report is limited in that it was not possible to interview all survivors. If this

Table 1: Age Distribution.

Age	Frequency	Percent (rounded)
0-14	97	16
15-24	144	23
25-34	147	24
35-44	107	17
45-54	71	11
55-64	34	5
65+	19	3

Table 2: Injury Distribution.

Injury Level	Frequency	Percent (rounded)
None	122	20
Mild	422	68
Moderate	64	10
Severe	9	2
Inconclusive (questionnaire damaged in transit)	2	0

Table 3: Rescue Distribution.

Rescue Method	Frequency	Percent
Self-rescue	171	28
Family, friend, or neighbor	443	71
Professional rescuers	2	.5
Unknown	3	.5

bystander behavior is typical, the nationwide differential between bystander rescues and professional rescues would be significantly greater. This differential should not be taken to reflect poorly on the quality of professional efforts but rather on the limited surge capacity that professional rescue forces have in the face of a major earthquake or other MCE of similar scale.

This evidence of positive bystander action is consistent with our more than 30 years of observing the aftermath of MCEs. However this is the first time that we have had the opportunity to systematically conduct a significant number of interviews of those rescued immediately after the event.

The shortcomings of "The Bystander Effect"

The root of the attitude toward bystanders as non-actors or nuisances may lie in conclusions that arose out of the response to the 1964 murder of Kitty Genovese in New York and the subsequent chronicling of the "bystander apathy effect" by Darley & Latané [22], Latané & Nida [23], and others. Kitty Genovese was murdered on the night of March 13, 1964 in Queens, New York. A *New York Times* report two weeks later asserted that 38 people had witnessed the murder without intervening [24]. This report horrified the nation and led to a book on the case that was reissued as recently as 1999 [25]. The subsequent research by Latané, Darley, and others made the bystander effect and the diffusion of responsibility a generally regarded as a well-established empirical phenomenon in social psychology [26,27]. It is a staple of the teaching of basic social psychology: bystanders are less likely to intervene in an emergency when others are present and able to help; the more people there are, the less likely any one of them is to help. Crowd apathy became accepted as a given even though subsequent research showed that several people made some attempt to intervene to save Genovese including possibly calling the police and that the final, fatal attack occurred in a stairwell that would not have been visible to neighbors [28].

This incongruity does not invalidate the findings of the subsequent controlled experiments of Latané, Darley and others. It does, however, call for a more nuanced view of how their work might apply to the response to an MCE. Further research on social inhibition in the face of an emergency has presented five mitigating factors that are directly relevant to the common MCE experience:

Lack of ambiguity about the need for help [29]. Bystanders are likely to be able to see the damage and injured around them. Bystanders has been shown to be willing to take responsibility and put themselves in physical danger to rescue drowning victims [30];

Ability of bystanders to see each other and communicate [31]. In many situations, bystanders are likely to be able to interact with each other;

When violations of a helping norm are apparent [32]. Bystanders not helping the injured are likely to stand out from those providing aid;

There is perceived similarity among the bystanders [33]. Given the geographic locus of an MCE, bystanders are likely to see themselves as co-survivors, forming a common identity that transcends class, ethnicity, race, or gender. Drury, Cocking, & Reicher [34] researched "collective resilience" in the aftermath of the 2005 London bombings and other emergency incidents. Their conclusion, based on self-categorization theory, is that during such events, a group of strangers can coalesce into unity in the face of a common threat: "me" becomes "us."

When there are multiple victims causing "concentration of responsibility" [35]. The greater the number of casualties, the greater the likelihood of bystanders to give aid.

Based on these factors, one could reasonably predict that the "bystander effect" as traditionally understood would not be in evidence in the aftermath of the Haiti earthquake or other mass casualty event.

Solnit [36] researched the behavior of bystanders following disasters, from the 1906 San Francisco earthquake through the 2006 Hurricane Katrina. Her work revealed that in the aftermath of each of these incidents, bystanders came together to assist one another, behaved cooperatively, and worked for the common good. This, in fact, is what was witnessed in Haiti. These case examples provide valuable lessons for those who plan and execute emergency responses.

Understanding bystanders: implications for the planning of future MCE responses

In routine emergencies, there are generally few victims. Some bystanders may be active for a short period until professional responders arrive and that is sufficient. In MCEs, there are many victims and bystanders are the first responders and rescue forces by default. The authorities may be either unable to respond at all or not able to respond in time to save lives. Thus bystanders are useful in greater numbers and for a longer duration than in routine emergencies. This phenomenon is common and familiar in almost every major disaster and was reinforced by the disastrous earthquake in Haiti.

An understanding of bystanders and the productive actions they can take is essential to planning an effective response to an MCE. Emergency response planners may do well to scrutinize their assumptions and protocols to see where anticipated behavior is at odds with what experience and research has shown to be most likely to be evident in a mass casualty event.

To suggest that bystanders be incorporated into response plans for an MCE requires that we ask if bystanders will be reliable partners in such a situation. First, understanding bystander reaction to an MCE is fundamental to developing any plan whether one's inclination is to incorporate or ignore them in one's efforts. Short of complete annihilation, bystanders will exist and thus will be a factor to which attention should be paid. Second, this and other research shows that they can be fully capable [37,38].

The acknowledgement of the importance of understanding crowd behavior in emergencies is long standing [39]. Expectations of rioting, looting, and violence are common in planning assumptions and disaster training scenarios [40,41] yet such behavior is infrequent [42]. There may be a temporary panic during and immediately after an earthquake but it will be short-lived. There are also times when bystanders rescue professionals such as after the 1999 earthquake in Ismit, Turkey [43].

Future Research

Would the outcome in the United States and other developed nations mirror that in Haiti? The research presented here does not offer definitive evidence one way or the other. There are many differences between this population and that found in developed nations. The population of Haiti is poor and illiteracy is high. This is a self-reliant population: Their expectations for government intervention were

likely low. Changes in any of these factors may have an impact on how a population responds after an MCE. There is sufficient evidence, however, that the capacity limitations of professional forces may necessitate the participation of bystanders if avoidable deaths are to be prevented in the aftermath of an MCE. Planners and policy makers may be wise to investigate opportunities to educate and equip the general public: to create general expectations and conditions for optimal bystander action including mutual trust and confidence between professional and non-professional responders. Verification of the outcomes presented here in other settings would be a worthy pursuit in future research.

Conclusion

Like many MCEs, the Haitian earthquake lasted seconds, shaking reality and transforming it immediately into chaos. Buildings collapsed with fragments of concrete injuring and killing inhabitants -- and creating confined spaces in which lucky living victims were trapped. If they were not rescued on time, the air pockets were exhausted turning the serendipitous sanctuary into an unintended grave.

Search, rescue, and medical teams were organized rapidly to extract trapped victims and treat the wounded, but they could get everywhere and save everyone at the same time. Time determined who lived and who would die.

There are two conclusions that one should carry forward to inform recovery from future disasters: During the first 24-72 hours, every citizen will be required to take care of him or herself and his or her loved ones, and he or she shall bear full responsibility for being a first responder, and not to expect that official organizations will provide full emergency services. Officials, in turn, must develop a more sophisticated and nuanced understanding of bystander behavior, capabilities, motivation, and expectation so that these true first responders can be incorporated in to plans and, in the face of disaster, effective response. Policy makers may well be advised to consider how best to equip their population to assist and preparedness planners to consider ways to incorporate active bystanders into their plans and protocols.

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