

The Pattern of Injuries or Medical Emergencies During High- Rise Evacuation Drill

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ABSTRACT

BACKGROUND: Since the World Trade Centre attacks on September 11, 2001, there is an increased awareness towards the importance of safety systems in high-rise buildings. From a medical perspective, evacuation and treatment of the victims in this situation is very challenging especially in dealing with multiple injuries. It is important to know the pattern of common injuries that may occur during high-rise evacuation drill for better emergency preparedness.

METHODS: This is a descriptive study looking at the incidence of injuries during high rise evacuation drills. Participants that

required medical attention during drills were included in the study.

RESULTS: There were 11 real patients treated in the medical station during drills. Of the total number of victims, 3 (27.3%) suffered from vasovagal attack, 3 (27.3%) asthmatic attack and 3 (27.3%) ankle sprain. Only 1 (9.05%) had severe hypertension and acute coronary syndrome respectively.

CONCLUSION: With this finding, it is important for standby medical team during high rise evacuation drills to anticipate the type of injuries and help them to prepare resuscitation equipment accordingly.

Keywords: High-rise Building; Common Injuries; Evacuation Drills

INTRODUCTION

The Fire and Rescue Department of Malaysia (FRDM) reported that from 2005 to 2007, fire has caused total loss of more than MYR 2.4 billion and claimed 221 lives and injured 268 people. In 2011, from a total of 27,149 fire cases recorded, 5,248 (19%) involved building fires, in fact fire incidence has gradually increased since 2007 [1]. Among the types of building, residential buildings have a high incidence of fires break outs. Residential buildings include high-rise accommodation buildings such as flat buildings, condominiums and apartment buildings [2]. A high-rise building is defined as a building greater than 75 feet (25 m) in height; the building height is measured from the lowest level of fire department vehicle access to the floor of the highest storey [5]. Safety procedures are generally poor in most complexes. Besides the compulsory insurance coverage, most complexes do not have any other safety measures. Less than

10% of the Residents Associations (RA) in high-rise complexes report that the management conducts safety measure and awareness, such as fire drills for the residents [3]. In comparison, Singapore has a clear guideline on safety measure in high-rise buildings such as organizing fire drills for the residents by the property managers [4].

It is best to avoid injury during the drills if the organizer & participant properly follow the guidelines. However, in certain circumstances the injuries might happen due to several factors such as human, environmental or technical factors. Not much literature reports the common injuries during drill; in fact most of the data has come from web entries' & news. The types of drills also determine the type of injuries [6].

The PETRONAS Twin Towers in Kuala Lumpur, Malaysia, are composed of two 88-storey towers with a height of 451.9 meters, which is among the tallest building in the world [7]. Evacuation of both towers involves moving

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about 20,000 people. An evacuation drill was organized to involve only one of the towers involving about 8,000 people. We anticipated a high risk of injuries or deterioration of health conditions during such a large scale of the drill. The objective of this case study is to determine the pattern of injuries or medical emergencies during drills.

METHODS AND MATERIALS

It was a descriptive study looking at the incidence of injuries during high rise evacuation drills. Participants that required medical attention during drills were included in the study. The inclusion criteria were people inside the building at the drill time irrespective of their age, gender and disease status. This study/drill took two hours. The data were analyzed using descriptive statistic SPSS version 20.0. Since this exercise or training is part of the Malaysia Quality Assurance (MQA) Organization requirement, the training was approved by the Federal Government and Fire & Rescue Department of Malaysia. Hospital Kuala Lumpur (HKL) took part in this mega evacuation drill providing medical care for patients. A safe evacuation plan was laid out. Lift evacuation for floors above the sky bridge was incorporated into the evacuation plans. The medical team was co-ordinated under National Security Council's Directive 20 in which, a Ministry of Health hospital nearest to the incident site assumed the role of the lead agency for medical management of patients. Under the same directive, the Police would assume the role of the On-Scene Commander whilst the Fire and Rescue takes the role of Forward Field Commander [8]

As part of the strategic response plan, a static medical base station was established at the KLCC Mosque and a forward Medical Base Station was set up in front of the tower (Figure 1). Two teams provided forward field triage in front of the exit of the towers (Figure 2). A motorcycle surveillance team circled the evacuation route to capture any emergencies during the process. Two medical bicycle squads were deployed in the assembly area to scout for any medical emergencies near the assembly area (Figure 3). The total evacuation time in the drill was reported to be 32 minutes, utilizing a combination of stairs and elevators. Communication, coordination, control and co-operation, were the essence of a successful evacuation of this scale. The forward field triage, motorcycle and bicycle surveillance worked well

in this drill as patients could be detected faster and managed effectively.

RESULTS

During the drill, the medical team treated eleven real patients. The diagnoses were in the form of vasovagal attack, asthmatic attack, sprained ankle, severe hypertension and acute coronary syndrome (Table 1). Another 26 high risk patients were observed at the Medical Base Station. Three ambulances, two Red Crescent and one fire and rescue ambulance were utilized to transport patients.

Table 1: Patients Sustaining Injuries or Medical Emergencies during Evacuation

No	Diagnosis	No.	Percent
1	Vasovagal attack	3	27.3%
2	Asthmatic attack	3	27.3%
3	Sprained ankle	3	27.3%
4	Severe Hypertension	1	9.05%
5	Acute Coronary Syndrome	1	9.05%
	Total	11	100%

Figure 1: Forward Medical Station Base



Figure 2: Forward Triage Team



Figure 3: Evacuees to Assembly Area

DISCUSSION

Most high rise buildings are constructed with extensive fire safety features; current fire safety procedures typically only involve limited evacuation during minor to moderate fire emergencies. Therefore, full-scale evacuation of high-rise buildings is highly unusual and consequently, little is known about how readily and rapidly high-rise structures can be evacuated fully [9]. An evacuation from these buildings requires detailed planning and conducting periodic fire drill and evacuation drill is important because when confronted with real situations, many people simply do not know what to do or where to start. Building occupants, tenants and residents must take equal responsibility to be familiar with the logistics of evacuation, and have emergency response teams with assigned roles to control fires, smoke and fumes. With knowledge and systematic planning, risks of mass evacuation such as stampede and fire hazards can be minimized. To ensure proper execution of a mock drill exercise, the roles and responsibilities of the concerned staff, as well as the departments like fire services, civil defence, and health department should be precisely defined and the standard operating procedures (SOPs) should be clearly understood by everyone.

When a disaster occurs, the medical aspect accounts only 10% of resources and personnel expenditure [10]. Thus, utilizing and optimizing the medical team is very crucial during the event to save life in real situations. Besides the major benefits of emergency drill, sometimes we encounter real injuries. From the literature review, there were no data to support the common injuries during high rise building evac-

uation during drills. The related event was injury to 20 people during a ship's emergency drill in Finland 2012. Several crew members suffered broken bones, some sprained ankles and some burn injuries from trying to slow their descent during the 14 meter drop into a life raft in Tallinn [11]. Similar finding was also reported during an evacuation drill for Airbus A380 jetliner in Hamburg, 2006. Thirty-three people were injured, one man fractured his leg and some having friction burn from sliding down the escape ramps [12].

If we extrapolate this event to the high rise building evacuation drill, majority of the injuries involves musculoskeletal systems especially ankle sprain and fracture bone. Thus, one of the associate factors is type of footwear. Certain types of footwear played an important role as a barrier in the progression of high-rise building evacuation. Women in high heels or slip-ons and men in new shoes were reported to have caused backups in stairs by moving more slowly and in some cases need to be removed. In other hand, missing or lost shoes became problematic in the lobby area where glass and debris made it hazardous to walk barefoot [5]. It is advisable to all evacuees to wear the proper footwear during drill to avoid injuries.

CONCLUSION

Emergency drill is an important exercise to synchronize multiagency response during disasters. However, the drill itself may bring harm if not properly planned and handled especially to evacuees. With this finding, we hope to provide an overview of common injuries during high-rise evacuation drills and help the organizers to anticipate the injuries and plan accordingly in the future.

REFERENCES

1. Perangkaan Kebakaran Mengikut Jenis Kebakaran Di Malaysia Bagi Tahun 2011 [internet] 2011.[cited 2013, Nov 6] Available from: <http://www.bomba.gov.my/fileupload/statistik/jenis%20kebakaran%202011.jpg>
2. Yahya MY. Escape route design specification analysis for optimum evacuation of 200 people in high-rise building. *Jurnal Alam Bina*, Jilid 13: No.4, 2008.
3. Tiun, L.T. (2003) *Pengurusan Kompleks Kediaman Tinggi: Gambaran & Realiti*, Kuala Lumpur: Utusan Publications
4. Lim, L.Y. (1991) *Maintenance Management in Singapore*, School of Building & Estate Management, National University of Singapore.
5. National Fire Protection Association. *NFPA 101 Life Safety Code 2000*

6. National Transportation Safety Board. Emergency Evacuation of Commercial Airplanes. Safety Study NTSB/SS-00/01. Washington, DC: NTSB, 2000
7. Petronas Towers. [internet] [updated 2013 Nov 5 ; cited 2013 Nov 6] Available from: http://en.wikipedia.org/wiki/Petronas_Towers
8. National Security Council of Malaysia. 1997. Directive No. 20: Policy mechanism of national disaster management and relief. National Security Division, Prime Minister's Department, Malaysia
9. Gershon RRM, Qureshi KA, Rubin MS, Raveis VH. Factors associated with high-rise evacuation: Qualitative results from the World Trade Center. *Prehosp Disast Med* 2007;22(3):165–173.
10. Mattox K. The World Trade Center attack. Disaster preparedness: health care is ready, but is the bureaucracy? *Crit Care*. 2001; 5(6):323-5.
11. 20 injured in ship's emergency drill. [internet] 2012 Nov,12 [cited; 2013 Nov 6] Available from: http://yle.fi/uutiset/20_injured_in_ships_emergency_drill/6380328
12. 33 injured in jet evacuation drill [internet] 2006 March 6 [cited 2013, Nov 6] Available from: http://usatoday30.usatoday.com/news/world/2006-03-26-jet-drill_x.htm