

Analysis of fire disaster management practices and perceptions among urban residents of Mangaluru city

Edmond Fernandes¹, Soumya Shetty², Siddharuddha Shivalli³ Vanessa Fernandes⁴

- 1- Member-Health Task Force, DDMA, Government of Karnataka & CEO, CHD Group.
- 2- Consultant, Biostatistician, Bangalore.
- 3- In-charge, Dept of Public Health, Yenepoya University
- 4- MBBS Candidate, Yenepoya Medical College.

Introduction: Globally, fire contributes in many ways towards disability and death. Fire could destroy material things and lead to permanent disfigurement which can have far reaching psycho-social trauma. Poor fire safety education and casual approach towards fire drills adds in concert to the problems of fire safety.

Objectives: To study the perception and practices of general fire safety among the residents of urban dwellings in Mangaluru, Karnataka state in India.

Methodology: A cross sectional study was conducted on residents belonging to selected wards within Mangaluru City Corporation limits. A pre-designed, pre-tested, validated questionnaire was administered to the study participants. The residents were identified through a purposive sampling.

Results: Fire alarm is non-existent among 88% of the respondents and 62.3% have no emergency contact number for immediate reference. Fire safety education remains questionable and 88% of the respondents haven't been visited by a fire officer for fire education. With regard to evacuation knowledge, 76.6% haven't attended a mock drill. Only 61.1% knew the emergency number in case of fire. In the study conducted, n=167.

Conclusion: Fire safety education remains a neglected priority among urban dwellers and fire safety measures in store are also not satisfactory overall. This calls for immediate policy re—thinking of fire safety and disaster management among urban dwellers. The possibility of initiating fire safety education in schools and colleges and conducting mock drills on a regular basis with the help of City Corporation and District Administration remains much needed.

Keywords: Fire Safety, Mangalore City, Disaster Management.

Introduction

Fire outbreaks in residential buildings often tend to spread quickly and triggers panic. Civilians depend on fire brigades to carry out the major firefighting operation to bring the situation under control. Rapid urbanization and industrialization has led to more and more high rise buildings which are mushrooming all around the country and also in Mangaluru city. Salvaging operations often become difficult in the midst of these congested high rises, leading to disproportionate loss of life and economic loss.

The Indian parliament passed the Disaster Management Act in 2005 and subsequent discussions on addressing India's disaster efforts grew then on. But largely the information, education and communication with regard to disaster preparedness has not seen the light of day in many states and districts of India, particularly with regard to fire safety. On paper, there are theoretical plans and frameworks available, but this is to be followed up with concrete drills, and solutions which make civilians aware of the same. Globally, fires are important contributors to death and disability. [1] Often so, epidemiological studies based on population aspects focus on burns and the after effects and survival. [2-7]

Baseline characteristics of how urban residents perceive their outlook towards fire safety and fire management requires deeper attention. Urban residents in India face different kind of problems which are often complicated for government mechanisms to address. Public places lack emergency exits, the literacy levels with regard to fire safety and kitchen safety is deeply inadequate among civilians. Management of fire disasters get complex because of poorly maintained fire detectors and extinguishers, lack of knowledge of do's and don'ts during

fire accidents. These problems work in concert to paralyze rescue operations. Urban development measures with regard to building safety and spacing has created congestion to such an extent that even fire engines cannot enter in many urban high-rises. There is lack of awareness that house fire injury and death remain a major public health issue. There is no concrete guideline for fire safety issued by state departments and if guidelines with fire department exist, the information does not get disseminated to civilians. Targeted campaigns to those at highest risk of fire injury do not exist. Our study aimed at analyzing the level of knowledge and preparedness among the urban residents of Mangaluru City in the state of Karnataka in India. There is paucity of any data related to fire injuries in the region which warrants a study of this nature.

Objectives: To study the perception and practices of general fire safety among the residents of urban dwellings in Mangaluru, Karnataka.

Methodology:

General Setting: The study was conducted in Mangaluru Taluk which belongs to the District of Dakshina Kannada in the state of Karnataka in India. Mangaluru city is located at 12.87°N 74.88°E. It lies between the Arabian sea and Western Ghats. Population of Mangalore in 2011 was 484,785; of which male and female are 240,651 and 244,134 respectively. Average literacy rate of Mangalore city is 94.03 percent of which male and female literacy was 96.49 and 91.63 percent.

Study Design and Sample:

A cross sectional study was conducted on urban residents belonging to selected wards within Mangaluru City Corporation limits of Dakshina Kannada District of Karnataka state in India.

The entire study was done between June 2015 to September 2015. The participants residing at Milagres, Bendoor and Pandeshwar ward limits of Mangaluru City Corporation jurisdiction were given the questionnaire.(n=167). Among the 60 wards coming under City Corporation, only three wards were selected due to operational feasibility and time constraints. Purposive sampling was used to gather information from those willing to participate in the study.

Study Tools: A pre-designed, pre-tested, validated, structured questionnaire was administered to the participants to elicit information relating to their perceptions on fire safety and the safety measures already existing at the place of residence.

Ethical Approval:

Ethical approval was taken from the Institutional ethics committee. Participants were explained the objective of the study and detailed participant information sheet was provided to them. Participation was voluntary and written informed consent was obtained from the participants.

Confidentiality: Data was entered in a designed format based on the information gathered by one to one interview by using the questionnaire. Confidentiality was maintained by keeping data collection forms securely in a lockable cabinet and the electronic data file was kept in a password protected computer. Data sets were maintained securely. Prior informed consent was taken before the questionnaire was administered. Confidentiality of the residential building names was maintained as permission from the Apartment Owners Association was not obtained and the residents were dealt with on a one to one basis.

Statistical Analysis:

Data was analysed using statistical package for social sciences {SPSS} for windows, version 22 IBM Corporation. Descriptive statistics was summarized in percentages and proportions.

Results:

The participants were assessed with regard to their general fire safety practices. We found that 62.3% of the homes did not have any emergency contact number for ready reference and 88% of the houses did not even have a fire alarm system so that they could be alerted.

Among the participants, 71.3% have not had mock drills in their locality and 57.5% of the buildings were not insured against fire accidents. The fire department officers have never visited the homes for fire safety education in 88% of the cases.

We found that 73.7% of the participants were aware of the main fuse area or circuit box location but 59.3% of them did not know how to respond to fire alarm. Mock drills appeared to be rare for India's urban settings with 76.6% of the participants to have never attended mock drill. It was found that 62.9% of the buildings do not even have a fire action display notice stuck in and around their locality. The survey found that 58.7% of the homes did not have an emergency plan in case fire broke out and they did not know what to do. When surveyed for the common causes of fire, 32.9% felt that fire occurred while cooking in the kitchen whereas 54.5% thought it was due to electrical appliances mostly.

Discussion:

Fire disaster management works in two stages anywhere around the world. The first stage is when civilians take responsibility and decide on what needs to be done to speed up rescue operations in order to turn off the fire and the second stage is when the fire department gets alerted and fire-fighters and paramedics rush to the spot. These two stages knowingly and unknowingly get influenced because of actions taken during no fire times. Much of human survival depends on the behaviour during these stages. [8,9]

In the present study we found that 88% of the houses do not have a fire alarm and 62.3% of the houses did not have any emergency contact number posted on their walls for immediate reference. In a study by Haddix A 2001, it was understood that using smoke detectors was a cost effective strategy to decrease mortality and morbidity.[10] This could serve as a reference point to encourage households to install fire alarms or smoke detectors within their houses. The effort from the regional fire departments will need to be strengthened further to develop community participation and resilience.

Fire department officers had not visited 88% of the houses for the purpose of fire safety education and 57.5% of the buildings were not insured against fire accidents. Lightning conductor did not exist in 59.9% of the houses and the buildings and 71.3% of the participants have never had any mock drill in their locality.

According to the National Crime Records Bureau (NCRB 2014), in the year 2014, there were 20,377 fire accident cases reported in India of which 19,513 deaths occurred and 1889 persons were injured. Interestingly the cause-wise analysis report found that 18.3% of the total reported incidents, occurred in residential buildings.

It was also found that 12,446 among the total casualties were females. Karnataka state had 1610 deaths with Maharashtra state having the highest casualties which was 3892.[11]

In the present study, we found that 59.3% did not know how to respond to fire alarms and 62.9% of the buildings in Mangaluru City did not have fire action display notice which was placed on the corridor and the surrounding locality. Likewise in a study done by Valentine W et al 2016, it was found that signs of fire action which could provide information to the workers and building occupants were not available and they said fire drills were not undertaken as such and lack of space did not encourage them to mark assembly points in case of a fire outbreak. [12]

In our study we found that, in case a fire broke out 58.7% did not have an emergency plan and 68.9% did not have any duplicate emergency plan in any other location. Likewise, fire safety measures in residential areas remains of great concern to all stakeholders working towards achieving disaster risk reduction and creating resilience. Sufficient body of evidence exist to suggest that more than 75 % of deaths from fires and burns emerges out of residential fires. (US Fire Dept, 1990, Karter MJ Jr 1994, Levine MS et al 1977, Birky MM et al 1979). [13-16]

The fact that fire can kill within minutes, lead to permanent disfigurement and injuries and destroy everything beyond proportion can cause moments of psychological paralysis initially which leads to suspension of logical thought. [17]. In the present study, the residents lacking awareness will compound the logical thought process further. An international comparative analysis of injury mortality data documented that fires and burns remains the third leading

cause of injury mortality among children aged 1-14 years in the eight of the eleven countries studied. [18]

In our study, we found that only 51.5% of the buildings and houses had emergency escape routes and about 73.7% knew the location of the main fuse box. About 32.9% of the participants felt that the most common cause of household fires was because of cooking and 54.5% felt it was due to electrical appliances. In a study by Ndiritu S et al 2006, it was found that most burns injuries happened at home and cooking and bathing were the processes during which the burns occurred. [19]

Conclusion

Household level intervention is required to strengthen fire disaster management in a fast developing city like Mangaluru. District Disaster Management Authority (DDMAs) must prioritize installing fire alarms at every locality along with consultation of Fire department and Municipal bodies. All owners of residential apartment must undergo fire safety awareness and mock drills once a year at least in-order to optimize fire disaster preparedness among and within communities.

References:

- 1] Krug E, ed. Injury: a leading cause of the global burden of disease. Geneva: World Health Organisation, 1999.
- 2] Chapman JC, Sarhadi NS, Watson ACH. Declining incidence of paediatric burns in Scotland: a review of 1114 children with burns treated as inpatients and outpatients in a regional centre. *Burns* 1994; 20:106–10.
- 3] Sarhadi NS, Murray GD, Reid WH. Trends in burn admissions in Scotland during 1970–92. *Burns* 1995; 21:612–5.

4] Wilkinson E. The epidemiology of burns in secondary care, in a population of 2.6 million people. *Burns* 1998; 24:139– 43.

5] Waller AE, Marshall SW, Langley JD. Adult thermal injuries in New Zealand resulting in death and hospitalization. *Burns* 1998; 24:245–51.

6] Sellar C, Ferguson JA, Goldacre MJ. Occurrence and repetition of hospital admissions for accidents in preschool children. *BMJ* 1991; 302:16–9.

7] Smith T. Accidents, poisoning and violence as a cause of hospital admissions in children. *Health Bull (Edinb)* 1991; 49:237–44.

8] D.A. Purser, M. Bensilum. Quantification of behaviour for engineering design standards and escape time calculations, *Safety Science* 38 (2001) 157–182.

9] T.T. Pires, An approach for modeling human cognitive behavior in evacuation models, *Fire Safety Journal* 40 (2005) 177–189.

10] Haddix A, Mallonne S, Waxweiler R, et al. Cost effectiveness analysis of a smoke alarm giveaway program in Oklahoma City, Oklahoma: *Inj Prev* 2001;7:276–81.

11] National Crime Records Bureau. Accidental deaths and suicides in India. Ministry of Home Affairs, Government of India. 2014.

12] Valentine W, Mburu C, Karanja P. A Study of Fire Safety within Kariobangi Light Industries. *International journal of innovative research & development*. 2016; Vol 5, Issue 14, 27-35.

13] Fire in the United States 1983-1987. 7th ed. Emmitsburg, Md.: U.S. Fire Administration, 1990.

14]Karter MJ Jr. Fire loss in the United States during 1993. Natl Fire Protection Assoc J 1994;88:57-65.

15] Levine MS, Radford EP. Fire victims: medical outcomes and demographic characteristics. Am J Public Health 1977;67:1077-80.

16] Birky MM, Halpin BM, Caplan YH, et al. Fire fatality study. Fire Materials 1979;3:211-7.

17] Masselis M, Ferrara MM, Gunn SWA. Fire disaster and burn disaster: planning and

management. *Annals of Burns and Fire Disasters* 1999; 12(2).

18]Warda L, Tenenbein M, Mofatt MEB. House fire injury prevention update. part I. A review of risk factors for fatal and non-fatal house fire injury. *Injury Prevention* 1999; 5(): 145-150.

19]Ndiritu S, Ngumi ZWW, Nyaim O. Burns. The Epidemiological pattern, risk and safety awareness at Kenyatta National Hospital, Nairobi. *East African Medical Journal*. 2006; Vol 83. No 8, 455-460.



CHD
GROUP