

## Research Article

# Knowledge and practices regarding fire safety amongst health care workers in tertiary care teaching hospital in Marathwada region of Maharashtra, India

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## ABSTRACT

**Background:** Fire in any occupancy has the potential to cause harm to its occupants and severe damage to property. Fire accident in hospital can lead many injury and death. Knowledge and practices of health care workers about fire safety prevention can save many lives. The objective was to assess the knowledge and practices on fire safety amongst health care workers in tertiary care teaching hospital in Marathwada region in Maharashtra, India.

**Methods:** A cross-sectional study was carried out amongst 202 health care workers in tertiary care teaching hospital in Marathwada region in Maharashtra during the period of January to April 2016. Data was analyzed in the form of percentage, proportion and z-test.

**Results:** Out of 202 participants, majority 61.39% were females, 43.56% were in the age of 18-27 years, 28.21% were GNM, 34.16% were staff nurse, and 85.15% had 1-4 years of work experience. 96.4% had correct knowledge about what to do when there is fire accident, 81.68%, had correctly answered the question about DCP fire extinguishers can be used for A, B, C classes of fire.

**Conclusions:** Majority of health care workers had significant knowledge but still considering the important role of every employee in fire accident there is a importance need to give fire safety training for all health care workers on timely interval.

**Keywords:** Knowledge, Practices, Fire safety, Health care workers

## INTRODUCTION

*"Ounce of prevention is worth a pound of cure."* - Benjamin Franklin

Fire can happen any time any place at home or at your workplace or in a hospital or in public places like theatres, malls etc. Fire risk survey (FRS) revealed that a fire has been rated as the 5<sup>th</sup> highest risk in industry in 2013. India has history of fire incidents, 20,377 fire accidents were reported in the country in 2014, which

caused 19,513 deaths and injuries to 1,889 people. National Crime Records Bureau (NCRB) of the home ministry report showed that the maximum deaths in fire accidents in 2014 were reported from Maharashtra (3892) followed by Madhya Pradesh (2305), Gujarat (2011), Karnataka (1610), Tamil Nadu (1594), UP (1164), Chhattisgarh (1089) and Rajasthan (1034).<sup>1</sup> Fire is a dominant hazard in the workplace. Human factors such as carelessness, negligence and lack of fire safety awareness are some of the leading causes of fire outbreaks. Despite the technological advancement in fire safety, fire remains

the leading cause of lives and property loss at commercial and industrial facilities worldwide and fire could lead to the premature winding up of an organization no matter how big it is.<sup>2</sup>

An effective fire prevention strategy is an essential feature of fire protection. However, it must be kept in mind that regardless of the efficiency of a fire prevention strategy, some fires inevitably occur.<sup>3</sup> Related to fire safety and prevention rules and regulation are made in national and state level like the National Building Code of India, 2005, is the basic model code in India on matters relating to building construction and fire safety.<sup>4</sup> The Maharashtra fire prevention and life safety measures rules 2009, framed under the Maharashtra fire prevention and life safety measures act 2006, is an example to this, and is aimed to improve the status of fire safety measures in Maharashtra.<sup>5</sup>

The successful use of any type of fire equipment depends upon the elements such as equipment, maintenance and training. It is vital that an occupier ensures, its employees are trained for and understand what is required during an outbreak of fire. It was observed that lack of knowledge in the area of fire and inadequate training in emergency drills, delay the fire-fighting operations. Probably adequate fire safety training and periodic emergency drills can make the emergency response more effective.<sup>6</sup>

Hence the present study was carried out to assess the knowledge and practices on fire safety amongst health care workers in tertiary care teaching hospital in Marathwada region i.e. Noor Hospital of Indian Institute of Medical Science & Research Medical College, Badnapur, Jalna, Maharashtra, India.

## METHODS

A cross-sectional study was carried out amongst 202 health care workers in tertiary care teaching hospital in Marathwada region i.e. in Noor Hospital of Indian Institute of Medical Science & Research Medical College, Badnapur, Jalna, Maharashtra, India during the period of January to April 2016. Sample includes housekeeping services staff, male ward attendant, female ward attendant, nurses, and others like ward in-charge, supervisor, OPD attendance and dietician. The total study populations of 202 health care workers were selected by convenience sampling method. A pre-designed, pre-tested questionnaire in Marathi and English were tool for data collection & for illiterate participant, an interview was devised to collect data. Questionnaire consists of two sections; knowledge and practices. Knowledge and practices about fire safety was assessed through 10 questions each with 'Yes' and 'No' options. Demographic details such as age, sex, education, designation and years of service of the respondents were also recorded. All

participants were given a briefing about objective of the study and were assured confidentiality in collection of personal data. Institutional ethical committee approval was obtained for the study.

## Operational definitions

Health-care-workers were defined as: workers includes housekeeping services staff, male ward attendants, female ward attendants, nurses, and others like ward in-charge, supervisors, OPD attendance, and dieticians.

## Statistical analysis

Results were analyzed statistically using percentage, proportion, and z-test. When z- value was more than 1.96, the p value will be less than 0.05 and observed difference was consider to be statistically significant.

## RESULTS

The demographic characteristic of the study is shown in Table 1. Out of 202 participants 124 (61.39%) were females and 78 (38.61%) were males. The majority of the respondents 88 (43.56) were in the age of 18-27 years, followed by 77 (38.12%) in the age of 28-37 years, 29 (14.36%) in the age of 38-47 years and 8 (3.96%) in the age of 48-57 years. The mean age was 30.09±7.82 years. Majority of respondent 57 (28.21%) were GNM followed by 51 (25.24%) had secondary and higher secondary education, 37 (18.31%) had primary education, 23 (11.38%) had ANM, graduation and post graduation, 11 (5.44%) had illiterate. The majority of the respondents 69 (34.16 %) were staff nurse followed by 51 (25.25%) were female attendant, 46 (22.77%) male attendant, 27 (13.37%) were from housekeeping services, 9 (4.46%) from others like OPD Attendant, OT in-charge, dietician, ward supervisor. Majority of respondents 172 (85.15%) had 1-4 years of work experience.

Response of health care workers regarding their knowledge towards fire safety is tabulated in Table 2 which reveals that, 96.4% had correct knowledge about what to do when there is fire accident, 81.68% had correctly answered the question about DCP fire extinguishers can be used for A, B, C class of fire. 21.29% health care workers do not know that water and foam fire extinguisher is not useful for K type of fire; even 71.29% and 79.21% could not given correct answer about types of fire extinguisher and five types of fire exist.

Table 3 shows that 87.13% had correct knowledge about where is evacuation map displayed. 77.72% health care workers had knowledge about one type of firefighting equipment available in institution and only 27.72% knew fire emergency number.

**Table 1: Socio-demographic characteristics of the study population.**

Characteristics	Number (n=202)	Percentage
<b>Age (in years)</b>		
18-27	88	43.56
28-37	77	38.12
38-47	29	14.36
48-57	8	3.96
Mean age (30.09±7.82)		
<b>Gender</b>		
Male	78	38.61
Female	124	61.39
<b>Education</b>		
Illiterate	11	5.44
Primary	37	18.31
Secondary & Higher Secondary	51	25.24
ANM	23	11.38
GNM	57	28.21
Graduate and post graduate	23	11.38
<b>Designation</b>		
Housekeeping services staff	27	13.37
Ward attendant	46	22.77
Female ward attendant	51	25.25
Staff Nurse	69	34.16
Others (OPD Attendant, OT in-charge, dietician, ward supervisor)	09	4.46
<b>Work experience</b>		
<1 years	4	1.98
1-4 years	172	85.15
5-8 years	18	8.91
>9 years	8	3.96

**Table 2: Knowledge about fire safety amongst the study population.**

Knowledge about fire safety	Yes No. (%)	No No. (%)	Z- value (p-value)
The very first thing you will do when you discover fire at your workplace is to activate Fire Alarm and dial emergency fire service number. (Yes)*	194 (96.4%)	08 (3.96%)	18.5077 p =0.0000
The important cause of death in fire accident is smoke and suffocation. (Yes)*	188 (93.07%)	14 (6.93%)	17.3136 p =0.0000
Instead of elevator (Lift) staircase is the best means of escape out while there is fire accident in high rise building. (Yes)*	185 (91.58%)	17 (8.42%)	16.7166 p =0.0000
According to National Fire Protection Association, there are five types of fire exist. (Yes)*	42 (20.79%)	160 (79.21%)	11.7414 p =0.0000
Water and foam fire extinguisher are useful to extinguish K type of fire. (No)*	43 (21.29%)	159 (78.71%)	11.5424 p =0.0000
Which are the types of fire extinguishers that are exist (water , foam, CO <sub>2</sub> , Dry chemical powder, wet chemical, clean agent- halotron™)	58 (28.71%)	144 (71.29%)	8.5573 p =0.0000
DCP fire extinguishers can be used for A, B, C class of fire. (Yes)*	165 (81.68%)	37 (18.32%)	12.7365 p =0.0000
Foam contain fire extinguisher can be used for electric fire. (No)*	87 (43.07%)	115 (56.93%)	2.7861 p=0.0052
Awareness of exit routes in work place is important for every employee to escape form fire. (Yes)*	103 (50.99%)	99 (49.01%)	0.398 p= 0.6891
B class of fire cause by electric equipments. (No)*	45 (22.28%)	157 (77.72%)	11.1444 p =0.0000

(\*correct answer)

**Table 3: Practices about fire safety amongst the study population (n=202).**

Fire safety practices parameters	Yes No. (%)	No No. (%)	Z- value (p-value)
Evacuation map is displayed in your organization	176 (87.13%)	26 (12.87%)	14.9256 p =0.0000
Have you received fire safety training in your workplace	109 (53.96%)	93 (46.04%)	1.5921 p =0.1118
Have you received practical training on the use of fire extinguisher	99 (49.01%)	103 (50.99%)	0.398 p= 0.6891
If there is fire outbreak, have you know how to use a fire extinguisher	109 (53.96%)	93 (46.04%)	1.5921 p =0.1118
Have you know your institution has a fire emergency procedure	149 (73.76%)	53 (26.24%)	9.5524 p =0.0000
Your institution has at least one type of firefighting equipment	157 (77.72%)	45 (22.28%)	11.1444 p =0.0000
You have a fire alarm in your work place	29 (14.36%)	173 (85.64%)	14.3285 p =0.0000
You have fire hose in your work place	116 (47.43%)	86 (42.57%)	2.9851 p =0.0027
You have fire/smoke detector(s) in your workplace	09 (04.46%)	193 (95.54%)	18.3087 p =0.0000
There is fire emergency number for you to call in case of fire accident	56 (27.72%)	146 (72.28%)	8.9553 p =0.0000

## DISCUSSION

In the present study, 96.4% had correct knowledge about what to do in case of fire accident except 71.29% cannot give correct answer about types of fire extinguishers. Similar findings were observed in study conducted by Ogbonna Chiom I et al showed that workers had good knowledge about fire safety, except on the types of extinguishers.<sup>7</sup>

In our study, 53.96% received a training of fire safety, 96.4% health care worker knew that what action to be taken in case of fire accident and DCP fire extinguisher can be used for A, B, C, type of fire, 95.54% and 85.64% noted that smoke detector, fire alarm is missing on workplace. These findings contrast with study findings by Emma M. Muindi which showed that majority (86.5%) of the respondents expressed the need for a basic training on fire safety preparedness, 84% of the respondents had never been trained on fire safety preparedness, knowledge of staff on fire safety preparedness was low.<sup>8</sup>

Only 48.2% of the respondents had adequate knowledge on fire safety preparedness. Most (83.3%) documentary items were missing across the institutions (i.e. fire safety preparedness policy document, copies with staff responsibility on fire management, evacuation plan, evacuation priority list, annual fire audit reports and fire drill reports).

In this study, more than half (53.96%) of the staff knew that how to use a fire extinguisher and 77.72% were aware about location of fire extinguisher. These findings

contrast with the study done by Ronoh RK et al on knowledge level five years back in secondary schools in Turkana district in Kenya, in which most teachers did not know how to use fire extinguisher effectively.<sup>9</sup>

Majority (83.3%) of the respondents were aware of the location of the closest fire extinguisher from their workrooms. However 44.9% of the respondents did not know how to use a fire extinguisher in case of a fire outbreak. Therefore, availability of firefighting equipment did not correspond to the staff knowledge on their use.

In our study, 72.28% health care workers did not know the emergency telephone numbers in case of fire outbreak, a similar finding was observed in a study done by Ronoh RK et al, a large number (72%) of the respondents did not know the emergency telephone numbers to dial in order to report a fire outbreak.<sup>9</sup>

The present study revealed that 93.07% respondents knew that important cause of death in fire accident was smoke and suffocation, and 77.72% had correctly mentioned that B class of fire does not cause by electric equipments, it is C class of fire cause by electric equipments.

A study conducted by Pirutchada Musigapong et al showed that most elementary students with knowledge, attitudes and practices level were fair as equal 361 (57.8%), 405 (64.8%) and 356 (57%) respectively.<sup>10</sup> The KAP level of students indicated that the students have average knowledge, attitudes and practices.

## CONCLUSION

Majority of health care workers had significantly high knowledge regarding fire safety preparedness; even though there is need to conduct regular classes for fire safety preparedness. Institution should make arrangement of fire safety equipment's like smoke detector, fire alarm and create awareness after availability of those equipment's.

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