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Original Research Article

Knowledge attitude assessment regarding fire safety among healthcare workers in tertiary care teaching hospitals in the eastern region of India

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ABSTRACT

Background: Fire in any occupancy has the potential to cause harm to its occupants and severe property damage. Fire accidents in hospitals can lead to many injuries and death. Knowledge and practices of healthcare workers about fire safety prevention can save many lives. The objective was to assess the knowledge and attitude level on fire safety among healthcare workers in tertiary care teaching hospitals in the eastern region of India.
Methods: In this cross-sectional study, 500 pre-tested questionnaires from four distinct sets were delivered to five categories of healthcare workers to prevent bias, and 424 responses were gathered as a fully voluntary activity, with a 84.4% response rate. Each questionnaire contains two sections that assess respondents' knowledge and attitudes. MS Excel was used to analyze the data, along with simple statistical tests.
Results: The analysis of healthcare professionals' knowledge and attitude towards fire safety revealed an average total score of 5.75±1.66, with a knowledge score of 2.59±1.22 and an attitude score of 3.16±0.92. Among healthcare workers, doctors had the highest knowledge score (3±1.25) while others had the lowest (2.22±1.13). The doctor had the highest attitude level (3.33±0.67), while the security group had the lowest. The doctor group scored the highest (6.33±1.56), while the security group scored the lowest (5.34±1.69).
Conclusions: The majority of healthcare workers in the study setup had significant knowledge but still considering the important role of every employee in fire accidents there is an important need to give fire safety training for all healthcare workers in timely intervals.

Keywords: Knowledge, Attitude, Fire safety, Health care workers risk assessment, Practices, Training need assessment

INTRODUCTION

Fire though a small word carries a very devastating impact in terms of damage, be it human life or property and gives severe financial and psychological effects.[1] Fire safety is an essential component and mandatory statutory requirement in any public building infrastructure including hospitals.[2] Knowledge and a positive attitude regarding fire safety are essential for all healthcare workers. Fire in a hospital setting is a common phenomenon, and the dangers are real, widespread, and ever-present, there are several reviews and literature available on fire safety.[3-5] It is customary to teach fire safety education or reinforce general fire safety practices to all health workers.[6] It was mentioned that a low level of education regarding fire safety was identified as a risk factor more burn injury.[7] The study by Jane Flowers recommended a way to improve knowledge of fire safety by providing multiple educational opportunities.[8] A fire incident at a tertiary care institute in North India caused panic among staff and patients. The fire department and security department quickly responded with fire control and smoke evacuation. Despite minor emergency services for six staff, none of the patients were affected. Smoke management techniques like compartmentalization, pressurization, dilution, ventilation, buoyancy, and

airflow were implemented. Training programs and mock drills help stakeholders safeguard patients and employees.[9] Another study on operation theatre fires also suggested that the staff knowledge of fire safety could be assessed by written tests and an appropriate fire safety program including evacuation drills and hands-on use should be developed based on the written test results.[10] The training sessions not only give very positive experiences but also improve knowledge, behavior, and confidence and establish a system with better equipped.[11] In 2013, India reported 20,377 fire accidents, causing 19,513 deaths and injuries, with Maharashtra leading the list. Despite technological advancements, fire remains the leading cause of property loss worldwide. Effective fire prevention strategies are crucial for fire protection, but some fires still occur. National and state-level rules, like the National Building Code of India, 2005, regulate building construction and fire safety.[12] The knowledge and attitude are the fundamental for any awareness program of any kind.

Objective

The primary objective of this study was to assess the knowledge, and attitude of the healthcare worker regarding fire safety in the current setup.

METHODS

This was a cross-sectional survey-based study using a pre-tested questionnaire among the healthcare workers of the study setting to assess their knowledge and attitude level regarding fire safety. A questionnaire was developed to assess the knowledge, and attitude of the healthcare worker regarding fire safety, with a review of the literature and existing National Act, policies. Four sets of questionnaires were developed, and validated by the subject experts first. A pilot study with 30 participants was done for its reliability, validity, and practicability test. The necessary alteration was made. A scoring system was developed for comparison and analysis purposes. Different sets of questionnaires were used randomly to reduce bias. There are two different sections in the questionnaire to assess knowledge and attitude towards fire safety.

All healthcare workers were subjected to the pre-tested questionnaire to assess their knowledge and attitude. The sample was based on five different categories doctors, nurses, security, housekeeping (HK), and others using random stratified sampling techniques. The study setting has approximately 900 Doctors (including faculty, senior resident. junior resident), 1550 nurses, 654 securities, 745 housekeeping, and 700 other staff, total 4603. Using Taro Yamini's formula, with a 95% confidence interval and a 5% margin of error, the sample size required to be 368 distributed proportionally among five categories. With the random quota sampling technique, the randomly different set of questionnaires was distributed manually. The study was carried from November, 2023 to February, 2024. We distributed 500 questionnaires and collected 424 responses with a response rate of 84.8%. The scores were calculated and plotted using Microsoft Excel to identify the knowledge attitude level. Simple Statistical analyses like mean, percentage, and standard deviation were used for analysis using Microsoft Excel. The study was a non-intervention assessment study. No human intervention was involved in this study and Implied consent and anonymity were maintained as per Helsinki's declaration. The study was approved by the institutional ethics committee.

RESULTS

500 questionnaires were distributed among five categories of healthcare workers and 424 responses were collected as a purely voluntary activity. The response rate was highest among security and lowest among other staff with a total of 84.4%. The different categories of workers' responses and sets of the questionnaire were found highest in set 1 (25.9%) and lowest in set 3 (24.5%) but almost in an equally distributed manner to reduce bias. (Table 1 and Figure 1).

Regarding the work experiences in the study setting, it was found that the highest (5.06±2.05) was among other groups of workers and the lowest (1.14±0.81) among doctors. The overall experience of the workers was (3.46±1.94) (Table 1).

Table 1: Demographic profile of questionnaire and respondents.

	Sets of questionnaires				Response rate of questionnaire			Experience (years)	
	1	2	3	4	Total received	Total distributed	Response rate (%)	Mean	SD
Doctor	13	12	11	14	50	70	71.4	1.14	0.81
Nurse	32	30	32	30	124	140	88.6	3.05	2.38
Security	27	31	32	28	118	120	98.3	3.33	1.96
HK	30	25	23	24	102	110	92.7	4.71	2.49
Others	8	7	6	9	30	60	50	5.06	2.05
Total/average	110	105	104	105	424	500	84.4	3.46	1.94

Table 2: Knowledge, attitude and total score of workers.

	Knowledge score (max score 5)		Attitude score (max score 5)		Total score (max score 10)	
	Avg.	SD	Avg.	SD	Avg.	SD
Doctor	3	1.25	3.33	0.67	6.33	1.56
Nurse	2.92	1.18	3.11	0.79	6.03	1.37
Security	2.31	1.21	3.03	1	5.34	1.69
Housekeeping	2.49	1.31	3.13	1.33	5.61	2.2
Others	2.22	1.13	3.22	0.79	5.44	1.46
Average/mean	2.59	1.22	3.16	0.92	5.75	1.66

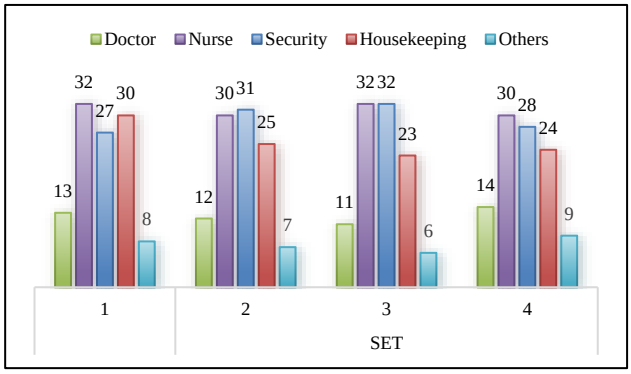

Figure 1: Distribution of sets of questionnaires among worker groups.

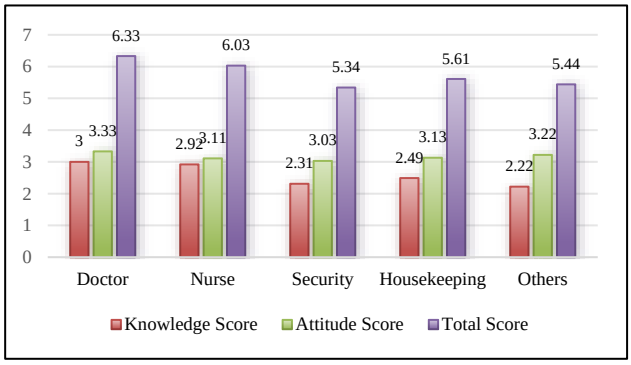

Figure 2: Knowledge, attitude and total score among workers graphical.

While analyzing the knowledge and attitude level scores among different healthcare workers on fire safety, it was found that the average total score of all workers was 5.75±1.66, which included a knowledge score of 2.59±1.22 and an attitude score of 3.16±0.92. Among the different groups of healthcare workers, it was found that knowledge doctors had having highest score (3±1.25) and others had the lowest score (2.22±1.13). In attitude level highest was a doctor (3.33±0.67) and the lowest was the security group. Overall, the highest score was secured by the doctor group (6.33±1.56) and the lowest was the security group (5.34±1.69) (Table 2 and Figure 2).

When analyzing the data, there was a negative correlation was found between experience and, knowledge, attitude, and total score (Figure 3).

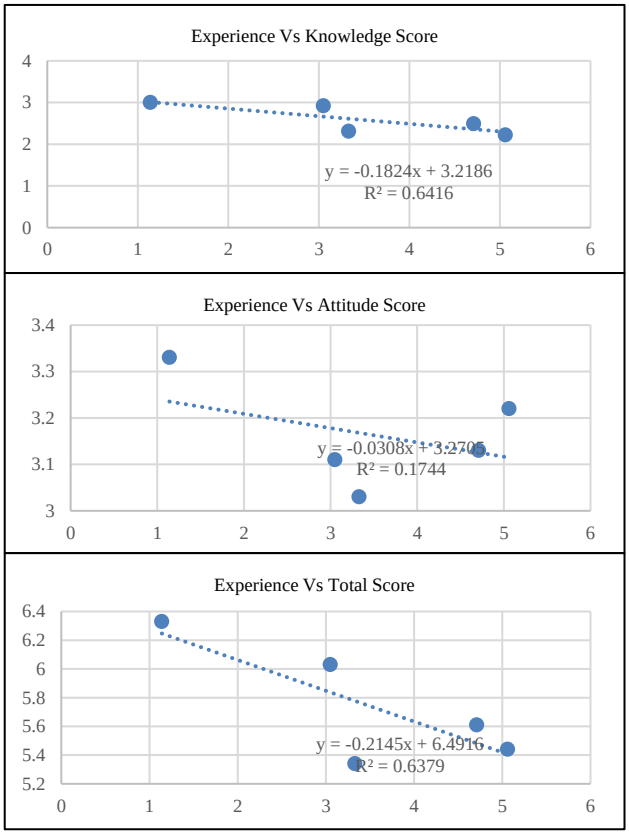

Figure 3: Correlation between experience versus knowledge, attitude, and total score.

DISCUSSION

The study found that most of the healthcare workers had correct knowledge about fire safety, except for the types of fire extinguishers, and some minor issues, and scored more than 50% in knowledge (51.8%), attitude (63.2%), and total (57.5%). However, still they couldn't provide/score 42.5% correct answers about fire extinguisher types fire safety, what to do in case of a fire accident, etc. Although regular training was conducted. Over half of the staff knew how to use a fire extinguisher, and were aware of its assembly location. However, 44.9% didn't know how to use a fire extinguisher during a fire outbreak. Additionally, 12.28% of healthcare workers didn't know emergency telephone numbers for reporting a fire outbreak. 93.07% of respondents knew that smoke

and suffocation were important causes of death in fire accidents, and 77.72% correctly mentioned that B-class fires are caused by electric equipment, not electric ones. A study by Musigapong et al showed that elementary students had fair knowledge, attitudes, and practices, with an average KAP (knowledge, attitude and practice) level.[13] A study analyzed 4484 fire-related hospital emergency evacuation studies, identifying five key themes: incident characteristics, response measures, preparedness, residents, and building, with improved preparedness reducing evacuation time.[14] Another study examines fire safety knowledge and preparedness measures in a Nigerian healthcare facility, finding unsatisfactory levels. It suggests regular training programs and other measures for improved safety and preparedness for workers and patients.[15] Further, a study in China found an average annual fire probability of 0.017, with a total effective coverage rate of 11.82%-25.74%, suggesting the need for medical staff fire volunteers and highlighting challenges like high-rise buildings, traffic congestion, and fire safety management. Effective fire service coverage ranges from 11.82% to 25.74%. Improving fire safety involves staff training, awareness raising, volunteer recruitment, electrical fire monitoring systems, and international collaboration.[16] A survey of 273 Korean university students found gender, nationality, and equipment types significantly impact their knowledge of fire safety, necessitating future safety education and management plans.[17] In 2011, AMRI Hospitals in Kolkata burned down, causing 93 deaths due to inadequate safety measures and a lack of firefighters, raising concerns about healthcare safety in India. India's private sector regulation is fraught with controversy, with health activists advocating for increased oversight. Slow legislative implementation and lobbying by medical professionals impede progress, leading to safety concerns. Training of all healthcare workers regarding fire safety is a must.

Future scope

Training and development are a continuous process. The ultimate future aim is to develop a universal assessment questionnaire tool for fire safety knowledge, and attitude assessment. A training module or rather a unique small educational training video for training in a hospital for its employees/staff/patients on fire safety. Also, the training needs assessment and compact training may be proposed.

The limitation of this study, it was a cross-sectional study only. Training is a continuous process. No comparison or impact of training was not included here. Stratified sampling based on group is another limitation in terms of bias.

CONCLUSION

Healthcare professionals in this current setup, are having proficient knowledge and a good attitude in fire safety procedures, but regular training, maintenance of fire safety equipment, and IEC (Information, Education and Communication) materials are needed to enhance safety measures.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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