

To Study the Different Types of Fire Incidents that Occurred at a Large Tertiary Care Institute of North India: A Retrospective Study

Nowheen Zaffer¹, Sajad Hussain Bhat², Farooq A Jan³, Abdul Hakeem⁴

¹Senior Resident, Hospital Administration, SKIMS, Soura, Srinagar, J&K, India.

²Resident, Medical Officer Hospital Administration, SKIMS, Soura, Srinagar, J&K, India.

³Professor, Hospital Administration, SKIMS, Soura, Srinagar, J&K, India.

⁴Assistant Professor, Hospital Administration, AIIMS, New Delhi, India.

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ABSTRACT

Background: Hospital fires can be devastating in terms of loss of life, injuries to patients/staff, and loss of property/equipment, more so because hospitals house a large number of vulnerable people (old/sick/ disabled/ pregnant/ children, immune compromised, on life support, and incapable of moving). An uncontrolled fire is dangerous especially in the healthcare establishments as they frequently cater to the sick who often require assistance. **Methods:** We studied the various aspects of fire incidents that occurred in a large tertiary care institute of north India over a period of two years from 30th Sep 2018 to 1st Oct 2020. **Results:** A total of 15 major fire incidents were reported during the defined period of study. The most common cause of fire was due to electrical short circuit 0000000%. Functional firefighting extinguishers were used in 60%(9 incidents) to control the fire. Majority of the incidences i.e 66.6%(N=10) were outside patient care areas while 33.33%(N=5) incidences took place within the hospital premises. 53.3% (n=8) incidences occurred during evening hours while 13% (n=2) occurred during night and 33.3%(n=5) incidences occurred during day hours. **Conclusion:** The most common cause of fire accidents is electrical short circuit. Storage of flammable materials like half burnt garbage's from incinerators and periodic cleaning of ducts/shafts apart from fire drills is the need of hour so as to prevent any mishap and damage to property.

Keywords: Fire, Fire Incidences, Fire Extinguishers.

INTRODUCTION

Fire can occur to anyone, at any time, and at anywhere including health-care facilities. Hospital fires can be devastating in terms of loss of life, injuries to patients/staff, and loss of property/equipment, more so because hospitals house a large number of vulnerable people (old/sick/disabled/pregnant/children, immune compromised, on life support, and incapable of moving).^[1]

The Pan American Health Organization (PAHO) and the World Health Organization (WHO) have defined a 'safe hospital' as one that "will not collapse in disasters, killing patients and staff; can continue to function and provide its services as a critical community facility when it is most needed; and organized, with contingency plans in place and health workforce trained to keep the network operational".^[2] People losing lives at the altar of cure, is a saddening tragedy leading to several health, economic, and social ramifications. In the recent past, several fire incidents have been reported all over the country, to name a few, at AIIMS – New Delhi, Sal Hospital –

Ahmedabad, SMS Hospital – Jaipur, SSG Hospital – Vadodara (2019), Esic Kamgar Hospital – Mumbai, Kakinada Government General Hospital (2018) – Andhra Pradesh, RML Hospital – Farrukhabad, BRD medical college – gorakhpur (2017), Some of them involved considerable loss of human life (RML Hospital Farrukhabad and BRD Medical College, Gorakhpur) and therefore drew wide media attention.^[3,4]

There were numerous serious historical fire accidents in the hospitals. In these fire accidents, numerous people were killed and injured and valuable property was damaged. Most research, agreed that there are special considerations for fire safety in hospital buildings compared to other buildings. Considerations include the patient incapable of self-evacuating, flammable matter and chemicals. These are the few examples of incidences of fire out break throughout world.^[5]

Internal threats account for most instances of fires, for example, the accidental fire in a corporation-run public hospital of Ahmedabad (2010), where patients were trapped on the top floor. As the building was centrally air conditioned, there was no channel for the smoke to come out. It was tough even for firefighters to smash the glass windows to let the fumes out. According to some patients, there were no announcements on the public address system and also the staff abandoned them.^[6]

Name & Address of Corresponding Author

Dr Sajad Hussain Bhat
Resident,
Medical Officer Hospital Administration,
SKIMS, Soura Srinagar,
J&K, India.

While reporting an incident in bikaner's PBM hospital fire, faulty electric wiring caused a fire outbreak at PBM hospital, bikaner in january 2013, injuring three

infants and damaging property. The wires could not carry the load due to which the mishap occurred.^[7]

Table 1: Fire Accident in Hospital Building Hospital name

	Death and injuries	Date
Norman State Hospital , Norman, Oklahoma	38 deaths	13 April 1918
Cleveland Clinic	125 deaths	15 May 1929
St. Anthony's Hospital, Effingham	74 deaths	5 April 1949
Mercy Hospital, St. Elizabeth's Ward, Davenport, Iowa	41 deaths	7 January 1950
GórnaGrupa Mental Hospital , North-West Poland	55 deaths and 26 wounded	Night 31 October -
Saavedra Psychiatric Hospital, Buenos Aires, Argentina	79 deaths and 247 wounded.	26 April1985
Liaoyang City Central Hospital, Liaoyang, Jilin, China	39 deaths	12 December 2005
Drug Treatment Hospital No. 17, Moscow	46 deaths	9 December 2006
AMRI Hospital Kolkata, West Bengal, India	95 deaths	9 December 2011
Bei-Men Branch Of The Sinying Hospital, Taiwan City	At least 12 deaths and 60 wounded	23 October 2012
Psychiatric Hospital, Luka, Novgorod Region, Russia	37 deaths	13 September 2013
Four-Storey Orthopedic Hospital, Fukuoka, Southern Japan	10 deaths	11 October 2013

Cuttack's shishu bhawan hospital fire: On november 2015, a fire broke out at Shishu Bhawan Hospital In Cuttack that gutted machines worth RS 11 lakh, and left one child severely injured. The hospital was already in the news for months over the deaths of several infants due to negligence of doctors.^[8]

In December 9, 2011 a massive fire broke out at annex building of AMRI Hospital Dhakuria, Kolkata in the early hours of the morning 94 people, 90 of them patients, had died of asphyxiation when inflammable material, stored illegally in an underground car park of one of the wards, caught fire and spread to the upper floors through air conditioner ducts.^[9] What makes a hospital fire worst is that the victims are often restricted in movement, thereby slowing down the evacuation process. The nature of medical equipment, supplies and machinery, is also more often than not combustible. This, in turn, makes training the staff to deal with such disasters extremely crucial. An article in a healthcare journal states that if a small blaze broke out next to an MRI machine, firefighters wouldn't be able to use a traditional red metal extinguisher because powerful magnetism might yank it right out of their hands. Similarly, in many hospitals, more often than not the fire increases and smoke spreads because technicians unknowingly punch holes through firewalls to run new wires in hidden areas.^[10]

MATERIALS AND METHODS

There were numerous serious historical fire accidents in the hospitals all over the world. A retrospective study was done with review of hospital records of fire incident that occurred in a large tertiary care institute of north India over a period of two years from 30th Sep 2018 to 1st Oct 2020. The records were obtained from the fire and emergency department of hospital. The department had maintained a thorough record of all the fire incidents that had occurred during previous two years. The findings were entered into a predesigned proforma. The proforma contained information about the date

of fire incident, nature of fire incident, place of fire incident, timing of fire incident, methods to control it, whether there was any loss of life in the incident etc. the results were tabulated to study the various fire incidents that occurred in the hospital.

RESULTS

In our hospital there is an effective firefighting system in place. The fire extinguishers are placed at strategically important locations. Fire exits have been kept for evacuation at the time of fire incidents. Moreover, a post of fire service department is dedicated for this hospital only with dedicated manpower and equipment. The hospital security and fire department is the first to respond to any untoward incident in the hospital.

A total of 15 major fire incidents were reported during the defined period of study. Fortunately, there was no loss of life in any of these 15 fire incidents that took place in these two years.

Cause of fire:

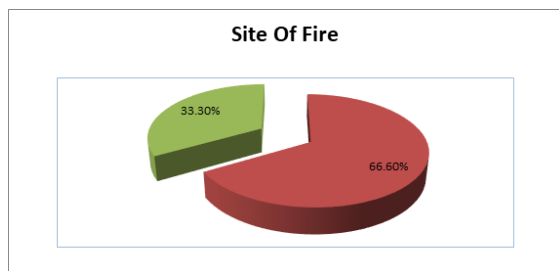
The most common cause of fire was due to electrical short circuit 53.33% (n=8), while blocking the exhaust and defect in battery and cables contributed to 20% (n=3) incidences of fire. Also staff negligence by putting half burnt ash on the garbage outside incinerator along with putting half burnt cigarette bits in the shaft contributed to 13.3% (n=2) incidences, while in 13.3% (n=2) incidences the cause was unknown.

Cause of fire	% incidence
Electric short circuit	53.33% (n=8)
Other electric causes (battery /cable, blocking of exhaust)	20% (n=3)
Staff negligence	13.3% (n=2)
Cause not known	13.3% (n=2)

Site of fire incident:

Regarding the site of incidences, Majority of the incidences i.e 66.6% (N=10) were outside patient

care areas while 33.33% (N=5) incidences took place within the hospital premises.



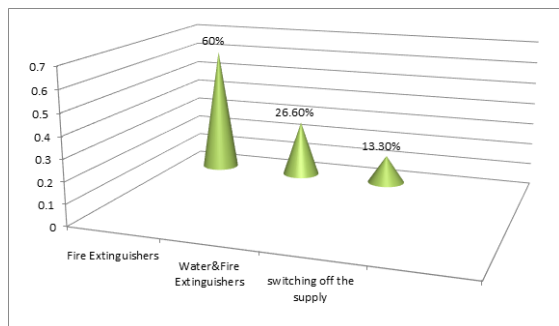
Timing of fire incident:

While analyzing the data it was seen that majority of incidences i.e. 53.3% (n=8) occurred during evening hours while 13% (n=2) occurred during night and 33.3% (n=5) incidences occurred during day hours.

WORK SHIFTS viza viz fire incidences	% Incidences
Evening	53.3% (n=8)
Day	33.3%(n=5)
Night	13% (n=2)

Measures used to control fire:

Functional firefighting extinguishers were used in 60% (n=9) to control the fire. While both water and firefighting extinguishers were used in 26.6% (n= 4) incidences and in 13.3% (n=2) incidences the fire was controlled by simply switching off the main electric supply.



DISCUSSION

Since, independence, India has lost several lives and property worth crores of Indian rupees in fire related incidents. Fire hazards are common threat to establishments and in most of the cases; it had been revealed that fire occurred due to sheer negligence. There have been many instances when the authorities have highlighted risk of fire in buildings. Several appropriate steps must be taken to prevent fire from damaging priceless human lives and hospital properties. Among these fire accidents, it was found that some hospitals equipped with high end protection measures lacked in fire safety management. It has often been found that most of the buildings do not adhere to fire

prevention measures as described under the National Building Code of India for they do not care about getting no-objection certificates from concerned authorities, as it does not entail any major penalty. Further storage of combustible materials near places where risk of fire is high should be kept in check. Also proper fire evacuation training should be provided to the staff and Emergency Signage should have be set up at appropriate locations. Periodic cleaning of ducts/shafts apart from fire drills is the need of hour so as to prevent any mishap and damage to property.

CONCLUSION

The most common cause of fire accidents is electrical short circuit. Storage of flammable materials like half burnt garbage's from incinerators and periodic cleaning of ducts/shafts apart from fire drills is the need of hour so as to prevent any mishap and damage to property.

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