

RESEARCH ARTICLE

DESCRIPTIVE ANALYSIS OF FIRE INCIDENTS IN A LARGE TERTIARY CARE HOSPITAL OF NORTH INDIA

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Abstract

..... **Back-Ground:** Hospital fires can be detrimental not only to the lives of patients or the staff but also to the hospital's image and reputation. Final Special initiatives should be in hand to control any major/minor fire incident.

Methods: This study was done to know about the causes of the fire that took place in our hospital and control measures taken there-of byResults: A total of 42 cases were reported for a period of four years September 2018 to May 2023.No major from damage wasdone.Effective control measures are in place to handle any such exigency.

Conclusion: Effective fire safety measures must be in place to prevent any damage or loss to the hospital since there cannot be any escape route, otherwise.

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Introduction:-

Healthcare institutions are vulnerable to disruption from events such as earthquakes, fires and floods. ¹Disasters can be natural or man-made.Damagethat is incurred can endanger he lives of patients in the hospital.Among all hazards, subjected to the safety issues, fires are one of the most important potential hazards which should be given due notice⁴. Fire in the hospitals is generally man-made disaster². Hospitals use many electrical equipments, medical gases and inflammable liquids often together at the single point of use. Patients are highly vulnerable to thesehazard. Besides, safety issues fires also have ethical and legal issues, since any damage caused by fire incidents invites not only legal actions but also costs a lot to pay for damages, blood money (restitution), costs of personnel disability due to injuries and reproviding damaged equipment ⁵. It is said that at least 40% of the occupants should be trained enough for conducting proper evacuation and in the operation of systems and equipment and other fire safety provisions in the building 3 .

The present study was conducted with the aim of doing a descriptive analysis of various fire incidents that were reported at our institute. This study was done for a period of four years from 30th September 2018 to 1stMay 2023.

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The studyelaborated on various control measures adopted to contain these incidents in order to minimisethe damage to life and property of the hospital.

Objectives:-

To do a descriptive analysis of fire incidents that took place at a tertiary care institute of North India.
To do a descriptive analysis of awareness programs held, trainingsgiven for fire safety in the same hospital.

Methodology:-

A retrospective review of records of incident reports of various fire incidents was performed viz-a-viz site of incident, cause, timingand action taken to combat these incidents.

For second objective record from security and emergency department of our hospital was studied in detailto gather information about the number and cadre of staff trained to control any fire incident that may happen.

Results:-

A total of 42 incidents were reported during the study period mentioned above.Out of which eight were reported in 2019, seven in 2020, 12 in 2021, eight in 2022 and seven in 2023.



Mostly, the cause of the fire was due to electric overload in 35.7% cases followed by 19.04% incidents of short circuit, 10% of cookingmishaps followed by rest of the causes as seen in the pie chart.



About 40% of the incidents took place in the patient care areas followed by service areas ,residential and outside areas.

Site of fire



It could be seen that 40% of cases occurred in early morning hours. This may be due to increase work load and power usage during the start of the day.

TIMING OF FIRE

Fire Incidents w.r.t Duty Shifts



In 50% of cases clean agent was used to control the fire followed by rest of the extinguishers.No major damage to life and property was reported.

Type of Extinguisher used Vs Number of Incidents



Also anumber of trainings were given to staff posted in various areas of the hospital. These staff memberswere well trained to combat any fire exigency.

Trainings of Departments

S.no	Name of Department	Number trained
1	Security & Fire	54 regular & 127 outsourced
2	Nephrology	17 (1 doctor and rest technical& nursing)
2	Dietetics & Therapeutics	20 (after the incident in pvt Canteen
3	Medical Gas plant & manifold	8
4	Anaesthesiology& Critical Care	20 (3 doctors, 12 nurses, 3Nursing aides & one store-keeper.
5	Microbiology	10 (1 doctor, rest technical and other staff)
6	Cl Biochemistry	30 (7 doctors and rest technical staff, 2 casual L)
7	Cardiology	
8	Surgical Observation during COVID- 19	5 Nursing staff, nursing aides , 1 doctor
9	SICU & MICU	5 doctors, 9 nursing & other staff
10	Operation Theatres	5 doctors, nurses & technical staff

Discussion:-

Factors such as increase in patientnumbers, demands for more hospital beds and expansion of hospital divisions, all make the original hospital configuration inadequate and alterations must be done to meet he present and future needs of the hospital. In general public perceives hospitals as highly secure facilities but he number of medical fire disasters across the globe shows otherwise.⁸

Internal threats in the hospital accounts for most of the fires in India like accidental fire in corporate -run-public hospital in Ahmedabad (2010) where the 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 for the fire-fighters to smash the windows to letthe fumes out. It was observed that regular fire drills were not conducted and several fire extinguishers were past expirydate.⁹ Fire incident at AMRI hospital in 2011 was a watershed moment for fire safety in hospitals⁶. It had become infamous due to 94 casualties which was the largest number reported from any hospital fire in India.

While doing the descriptive analysis of fire incidents at our institute various aspects were studied in detail with regards to the type of incident, whetherit was a major or a minor incident, site of the incident, timing, triggeringfactors, causes of the fire and various measures taken to control the fire.

Since the out-break of covid-19 pandemic, many fire incidents were reported around the world. Many incidents were directly related to be due to rapid increase in ventilator use in hospitals¹⁴. Majorly our studied showed electricityoverload and short circuitto be the main cause of fire which is incompliance with many more studies like that of Sharma R et al¹⁰. The electricity load on the day of commissioning the hospital almost doubles from the time the facility is designed which increases to 25% anually. No hospital correctly, estimates this. The situation is worse in government hospitals^{.11}As against to this, Pan American And WHO report(PAHO) in 2018 suggested cooking equipment failure(52%) to be the main cause of hospital fires.

About 40% of the fires thattook place in our hospital were from the patient care areas. This is quite an alarming situation considering the dependability patients have on the staff and their attendants during hospital stay. This calls for vivid evaluation of the control measures in place and the gaps to be filled in order to waver off an such mishaps in future.

It could be seenthatthe main triggering factors with regards to the two major fire incidents thattook place during this period were mainly due to de-funct and unattended equipment lying in the store, broken window pane in the ward whichlead the fire to spread and non availability of fire detection and alarm system .Further, it could be seen thatthere was highly combustible material in the form of curtains lying just adjacent to the electric wiring in the LAN area. Also, the polished wooden walls added to the damage.

Also one of the incident took place while transferring a patient from neuro ICU to Surgical ICU when a leak occurred in the oxygen cylinder. Fortunately, the fire was extinguished in time to prevent any damage. A similar incident took place in neonatal ICU at Royal University Hospital, Suskatoon where fire broke out near the oxygen port.¹⁵

The study of Yarmohammadian, 2016 stated that in place sound firefighting management based on scientific principles is always the key to prevent fires and its impacts¹². Pickard asserted that fire safety strategy for aspecific building requires management policies and procedures for the strategy to function effectively ¹³. Fire safety strategy should be a continuing process such that fire safety systems are regularly checked and maintained.

There are certain building bylaws which have been laid down for newly constructed structures with the objectives to protect public health. Fire safety can be achieved by strictly implementing these standards for example, type of materials to be used, provision of fire extinguishers, installation of fire and smoke detectors and fire alarms, and provision of emergency fire exits ⁷.

Control Measures:

The various control measures that were taken to combatthese fire incidents mainly included the usage of clean agent(50%) followed bywater, dry powder and CO2.All these incidents were controlled well in time without much damage to the property of the hospital and no casualty was reported.

We have functional hydrant systems and fire pumps at our well established pump house, signage for entry and exit routes are well marked at all the required points. We have a fire safetycommittee which conducts regular rounds of the hospital to ear mark any loop holes. Frequenttrainings and mock drills are conducted to train all the cadres of the staff in house.

Lastly, we also have 24*7 fire station within the hospital premises to cater to any exigency.

Conclusion:-

Fire safety in a hospital plays a vital role in its proper functioning. All the needed safety measures and equipments must be checked regularly and staff must under-go regular mock drills and trainings to handle any fire out-break in the hospital.

Refrences:-

1.WHO, PAHO, ISDR, and World Bank (2008). Hospitals safe from disasters: Reduce Risk, Protect Health Facilities, Save Lives. World Disaster Reduction Campaign

2. Cavallini M, Papagni MF, BaruffaldiPreis FW. (2007). Fire disasters in the twentieth century. Ann Burns Fire Disasters. 20(2):101-3.

3. National Building Code of India Part 4 Fire and Life Safety. Available from:

http://www.ndrfandcd.gov.in/WriteReadData/userfiles/file/F03.pdf.

- 4. Association of perioperative Registered Nurses. (2005). AORN guidance statement: Fire prevention in the operating room. AORN J 81:1067-75.
- 5. Mahdinia M, Yarahmadi R, Jafari M, Kouhpaei A, Khazaei M. (2011). Fire risk assessment and the effect of emergency planning on risk reduction in a hospital. Qom

Univ Med Sci J, 5:71-8. Available from: http://www.journal.muq.ac.in

6.Pal Indragit, GoshYuhin.Fire incident at AMRI Hospital, Kolkata(India): Areal time assessment of fire for urban fire.JBM SSR.2014;3(1):9-13

7.Raman Sharma e al;Fireincidnes in healthcare organisaions:readiness,response and preparedness.Inernaional Journal of ScienificResearch.Vol 8/Issue 8/Augus 2019/printIssn no;2277-8179

8.Huang De-Ching, Chien Shen-Wen et al : A Study for Evacuation of Hospital on fire during construction. Procedia Engineering 11 (2011) 139-146

9.Express News Service.Short Circuit leads to major fire at V S Hospital. The Indian Express:2010Available from :http://Indianexpress/article/Ahmedabad/shortcircuit-leads-to-major-fire-at-v-shospital

10.Sharma R,BakshiH,BanerjeeA.Fire safety hazards:How safe are our hospitals?Indian J Community Med 2020;45;104-5t

11.Hospital Fire. Human made Disaster?India fails to learn from past mistakes.Available from;http//www.firstpost.com/india/hospital fires-human-made-disaster-india-fails-to-learn-lessons-frompastignores-safety-norms-5756481.html.

12. Yarmohammadian MH, Alavi A, Ahmadi F, Fatemi M, Moghadasi M. (2016). An investigation of the status of preparedness and crisis management restrictions in hospitals of Isfahan University of Medical Sciences. Int J Health Syst Disaster Manage. 4(1):58–62.

13.Pickard R. (1994). Fire safety and protection in historic buildings in England and Ireland–Part I, Struct. Surv. 12

27-31

14.Wood MH,HailwoodM,KoutelosK.Reducing the risk of oxygen related firesand explosions in hospitalstreating covid-19 patients.Process Safety and Environments Protection 153(2021)278-288

15.Sankaran K,RolesA,KasianG.Fire in Intensive Care Unit and Strategies for Prevention.Can Med Assoc J 1991;145(4).