

CONTINUED MEDICAL EDUCATION

Role of Quality Management in Multispecialty Hospitals: A case on Fire Mishaps in Eastern Zone of India

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Citation

Ray SS, Tripathi S, Ota R. Role of Quality Management in Multispecialty Hospitals: A case on Fire Mishaps in Eastern Zone of India. Indian J Comm Health. 2018; 30, 1: 07-17.

Source of Funding: Nil **Conflict of Interest:** None declared

Article Cycle

Received: 03/10/2017; **Revision:** 03/03/2018; **Accepted:** 29/03/2018; **Published:** 31/03/2018

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Abstract

For a long time, healthcare service providers have depended principally on human resources playing out their role accurately to shield patients from unintended negative effects. Many years of research, has demonstrated that most mishaps are brought about by able yet questionable individuals working in useless frameworks. Healthcare associations are presently obtaining systems from different enterprises and utilizing frameworks in order to deal with and enhance the efficiency of the health care services. India to a large extent has been able to incorporate Quality Management tools in its Healthcare sector. This has helped India to attain competitive advantage over other Nations by providing Quality Services at an affordable price with continuous improvement of their Service quality.

Among all the attributes of Service Quality in Healthcare, the most important one is Patient Safety. India has moved ahead in creating a standardized Healthcare service by adopting many Patient Safety Standards by regulators, purchasers, and accreditation groups. Even though we are abiding by lot many standards still there are many issues related to Patient Safety in India. Few cases have been discussed in this paper related to fire issues. The incidents which have been cited in this paper are taken because these are the hospitals which are quite famous among the patients and unfortunately have led to high number of life losses in their mishaps. With the help of Quality Management Model that is Cause and effect; the authors have tried to analyze the cause behind the mishaps and have tried to recommend few quality measures in the multispecialty hospitals.

Keywords

Quality Management, Patient Safety, Multispecialty Hospitals, Cause and Effect Model, Fire Safety, Healthcare

Introduction

Quality Management and its Importance

Quality

Quality is explained as the assumed level of perfection. Quality must be comprehended before it

can be overseen. Like magnificence, quality exists subjective depending on each person's preferences. Quality is a characteristic of a product or a service. The word Quality is of Latin origin *Qualitas* meaning "of what kind". Its meaning varies from person to person. But as per Deming (1982), is a foreseeable label of consistency and reliability at economical

price and satisfy the demands of the market. Juran (2009) explained Quality as suitable for utilization. To put it simply the status of consumer as per defined benchmarks, something which meets the consumer's demand and sustains its purpose.

Quality Management

Parast et al, carried out a relative study of Quality Management implementation among manufacturing companies based in USA and Mexico, which was based on Malcom Baldrige National Quality Award.(1) The outcome of this study showed that there were huge similarities in the factors responsible for their success in Quality Management Implementation. It was found that both Social Responsibility and Quality activities were important factors responsible for the success of Corporate. It was also found that the success was also due to the impact of Quality Management Implementation which was customer centric leading to customer satisfaction.

Importance and its applications

Quality management is a vital element for the accomplishment of any business. Items and administrations are additionally critical parts of value administration. Regardless of what a specific association offers, quality is a fundamental piece of it. Clients expect great items and services and need to realize that their well deserved cash is going toward something that won't just profit them now, however will benefit them for a long term. Services or products of high quality always mean achievement for an organization. Happy and satisfied clients will be the ones who be associated with the brand for a long term and that is the thing that each association takes a stab at toward the day's end. Quality management is a procedure that must get steady consideration keeping in mind the end goal is to be effective. That is the reason there are workers given to controlling, keeping up, and enhancing quality on a continuous premise.

Inclusion of Quality in Healthcare in order to provide safe Healthcare services

As per Patrice Spath, (2) three major groups are associated with Quality Healthcare and they are Consumers, Purchasers and Providers. Quality has been one of the eminent expectations of the consumers in the healthcare sector. It is essential that the Patients need to be treated with apt

healthcare services with best of results. It is mostly expected by the buyers that apt treatment should be supported by clean and consumer friendly premises and doctors who are accessible to the best innovation meant for the treatment. Buyers are people and organizations that compensate through monetary aids against the treatment both directly and indirectly. In the case of Out of Pocket expenditure for healthcare services, purchasers and consumers are the same. Organizations that are associated with purchase of healthcare services incorporate government financed medical coverage programs, private medical coverage arrangements and comprises of organizations that finance the cost of their employees' health care coverage. Buyers perceive quality in the form of Cost viability meaning they need proper value for the expenditure they have made. Suppliers are individual and associations that are meant for the proper supply of affordable quality healthcare services. Individuals belonging to the suppliers' end incorporate specialists, attendants, experts and clinical support and administrative staff. Organizations who are at the supplier's end incorporate doctor's facilities, trained nursing and restoration centers, out-Patient Clinics, Home health agencies and all other in circumstance that can deliver efficient care. (3) Along with the major traits essential for the consumers and Purchasers and suppliers are apprehensive about legal aspect. This worry can impact how suppliers characterize quality.

Authorization and accreditation meant for the providers of the Healthcare services and guidelines meant for premises, tools, and different aspects of Healthcare services turned out to be more stringent during the period of Shewhart's work in the year 1920s. Amid the time Deming and Juran were exhorting Japanese manufacturers, the institutionalization program of American College of Surgeons (ACS) hospital was swung over to The Joint Commission (2007) (4), the United States' most seasoned and biggest Healthcare accreditation group, which assesses and authorizes more than 15,000 Healthcare firms and projects the country over. The program's accreditation gauges set a base bar for the quality standards of Healthcare. (4) While the measures focused on the requirement for doctors and other expert staff to assess the level of quality services delivered to individual patients, none of the quality practices upheld by Deming and

Juran was requisite of the services at the Hospital level. The gauges fixated on auxiliary prerequisites and removing with ineffectual individuals took place without measuring and controlling the variation that was witnessed by the Healthcare service sector.

Through the 1970s, quality necessities meant for healthcare—regardless of whether spoken to by accreditation benchmarks, state authorizing sheets, or government controls—concentrated to a great extent on basic points of interest and on the train of inadequate healthcare providers. (Brennan and Berwick 1996)

The quality uprising influencing different ventures in the 1980s likewise influenced the Healthcare sector. In the year 1980, The Joint Commission included a quality assurance (QA) standard approximately in light of the work of Deming and Juran (5). The QA standard obliged associations to execute an association wide program to (The Joint Commission 1979) that comprised of the following activities:

- identify essential or potential issues or worries with patient care,
- neutrally evaluate the cause and extent of the issues or concerns,
- actualize choices or activities intended to remove the issues,
- examine exercises meant to guarantee expected outcomes that are accomplished and maintained, and
- archive the adequacy of the general program to improve tolerant care and guarantee sound clinical execution.

In the mid1980s, after years of quick enhancement in Medicare and other openly subsidized healthcare services, the government based external groups (known as Peer review institutions) to screen the expenses and nature of care given in Healthcare framework (IOM 2006, 39–41).

Today, a large number of the key thoughts behind quality change in the assembling and administration enterprises shape human services quality administration endeavors. For instance, The Joint Commission initiative standard consolidates ideas from the Baldrige National Quality Award Criteria, and the execution change standard requires utilization of measurable devices and strategies to break down and show information. Proficient

gatherings, for example, the Medical Group Management Association instruct individuals to apply factual deduction to social insurance practices to comprehend and lessen unseemly and unintended process variety (Balestracci and Barlow 1996). The Institute for Healthcare Improvement (2008) supports change ventures gone for institutionalizing persistent care hones and limiting unseemly variety.

The norms and techniques meant for the Quality Management aspect in Healthcare sector will keep on evolving, however the essential standardized procedure of Quality Management including Measurement, Assessment, followed by Improvement will remain as before.

With the changing scenario, Quality Management has turned out to be an essential part of the Healthcare sector. Healthcare Suppliers have a moral commitment to patients to give the most ideal quality care. Also, the stakeholders who are a part of the healthcare sector including — Purchasers, users, regulators, and accreditation agencies—are requiring constant change. Healthcare sector is also witnessing a high degree of competition which has led to the necessity of including standards meant for Quality Management and creating high degree of Patient Satisfaction. Those organizations that frequently upgrade their service and have incorporated Quality procedures have created a competitive advantage among their competitors. (6,7)

Patient Safety

For a long time, Healthcare service providers have depended basically on individuals playing out their occupations accurately to shield patients from unintended harm. Many years of research, generally from different enterprises, has demonstrated that most mishaps are caused by skilled however uncertain individuals working in maladaptive healthcare delivery systems. Healthcare industries are currently lending methods from different businesses and utilizing a frameworks way to deal with enhance the satisfaction of Patients by providing them safe healthcare facilities.

Patient Safety is just a single measurement of human services quality, yet it gets a considerable measure of consideration from controllers, buyers, and

accreditation gatherings. Customers' inclusion is required for the improvement of Patient safety is turning into a noteworthy supporter for the improvement of the delivery of the safe healthcare services. Patient safety dimension has been using the Continuous Improvement Technique which includes Measurement, Assessment and improvement.(8)

As per the report by Institute of Medicine (IOM), the dominant part of therapeutic blunders comes about because of flawed framework and process, not people. The point of adequacy and wellbeing are focused through procedure of – Care Measure, getting to know whether suppliers of the healthcare services perform processes that have been exhibited to accomplish the desired aims and maintain a strategic distance from those procedures that are inclined toward damage.

The objectives of measuring health care quality are to decide the impacts of healthcare services on attaining the expected results and to evaluate to which healthcare clings to forms in light of logical proof or consent to by expert accord and is steady with patient inclinations.

Since mistakes are caused by stem or process malfunction, it is critical to receive different process enhancement methods to distinguish wasteful aspects in valuable care and preventable blunders to then impact changes related with framework.

There are various aspects related to Patient Safety which is quite vast in quantity. The authors in this paper have confined their study to the aspect related to Fire Issue as the case studies discussed in this paper are related to Fire Mishaps in four hospitals of the Eastern Zone.

Fire Safety Measures as recommended by National Disaster Management Guidelines for Hospital Safety as per February 2016.

As the hospital service is associated with the Human life it is quite essential for each every process involved in it need to be safe, secure, effective, efficient, Patient centric and Equity. In order to attain these objectives, the Hospital sector has been recommended to adhere to the guidelines meant for them in order to create a fire resistant atmosphere. The measures comprise of the Design and Construction part, concerned with the detection and alarm system, Fire mitigative measures, Planning and training activities and lastly transfer or evacuation of

the occupants. Few of the measures are mentioned below:

- Hospitals should make arrangements for adequate open space in and around the Hospital premises to encourage the free movement of patients and fire vehicles.
- There should be provision of sufficient way for passage and clearance for the fire extinction vehicles
- The purpose of the basements should be confined to only the parking of vehicles and should be well protected by automatic sprinkler systems.
- Provision of air inlets and smoke outlets should be made and need to be clearly marked
- Separate accessibility need to be provided from the basement to the main and alternative staircase.
- From lower basement levels, provision of Mechanical extractors should be made for smoke venting system. The actuation of the system shall be incorporated with the detection and sprinkler systems. The performance of the system shall be superior to standard units.
- Ventilation ducts shall be integrated with the structure of the building and shall be made out of brick masonry or reinforced cement concrete as far as possible. Wherever this duct intersects the transformer area or an electrical switch board, fire dampers shall be provided.
- An openable window on the external wall shall be fitted with locks that can be easily opened.
- The exits in Healthcare facilities should be limited to doors leading directly outside the building, internal staircases and smoke proof enclosures, ramps, horizontal exits, external exits and exit passage.
- Vertical evacuation of occupants within a health care facility is difficult and time consuming. Therefore, horizontal movement of patient is of primary importance. Because of the time required to move patients, exit access routes should be protected against Fire effects. Spaces open to the corridors shall neither be used for patients' sleeping, as treatment rooms nor for storing hazardous material.
- The staircase shall be continuous from ground floor to the terrace and the exit door at the ground level shall open directly to the open spaces or a large lobby.

- Fire/Smoke check doors shall be provided for a minimum of 2 hrs fire resistance rating.
 - No electrical shaft and panel, AC ducts or gas pipelines, etc. shall pass through or open onto the staircases.
 - No combustible material shall be used for decoration/wall panelling in the staircases.
 - The external exit doors at ground floor shall open directly onto open spaces or a lobby and Fire & Smoke check doors shall be provided.
 - External staircases serving as a required means of egress shall be of permanent fixed construction.
 - Doors shall not be equipped with a latch or lock that requires the use of tool and/or key from the egress side. Mental hospitals are permitted for door locking arrangements.
 - Where door locking arrangements are provided, provision shall be made for the rapid removal of patients by such reliable means as remote control of locks or the keys of all locks made readily available to staff who are in constant attendance.
 - Doors in fire resistant walls shall be so installed that they may be normally kept in an open position, but shall close automatically. Corridor doors opening into the smoke barrier shall be not less than 2000 mm in width. Provision shall also be made for double swing single/double leaf type doors.
 - The fire resistance rating of doors shall meet fire resistance rating of construction material.
 - The minimum width and height of corridors and passage ways shall be 2.4 metre. The exit corridor and passage ways shall have a width not less than the aggregate required width of Exit doorways leading from them in the direction of travel to the exterior. Corridors shall be adequately ventilated.
 - Corridor walls shall form a barrier to limit the transfer of smoke, toxic gases and heat.
 - Service shafts/ducts shall be enclosed by walls with 2 hr and doors with 1 hr fire resistance rating. All such ducts/shafts shall be properly shielded and facilities shall be available to control fires along these shafts/ducts at all levels.
 - The inspection panels and doors of air conditioning shafts shall be well fitted, with a fire resistance rating of 1 hr.
 - There need to be a provision of Fire Pump Room, Yard Hydrant, First aid hose reels, Hose box and even Automatic Sprinkler System.
 - Emergency lighting shall be powered from a source independent of the normal lighting system.
 - Emergency lights shall clearly and unambiguously indicate the escape routes.
 - Emergency lighting shall provide adequate illumination along escape routes to allow the safe movement of persons towards and through the exits. (9,10,11,12)
- Along with all these above mentioned measures there also need to be provision for periodic drill of inspection in order to ensure compliance with the objectives of the hospital that is patient safety. There also need to be a periodic maintenance plan for the servicing of the critical equipment and accessories and need to be made sure that they are fully functional.

Hospitals

The World Health Organization (WHO) characterizes current Hospital accordingly: "A doctor's facility is a vital piece of social and restorative association, the capacity of which is to give finish medicinal services to the populace, both therapeutic and preventive and whose out-patient administrations connect with the family and its home condition. The Hospital turns out to be the source of training for the medical staff as well as a source for Bio-Social Researches."(13)

As per Pan American Health Organization (PAHO) and the World Health Organization (WHO), A Safe Hospital is defined as the one which would be having the following characteristics:

- won't crumple in any kind of catastrophe, which leads to the death of patients and staff members;
- can proceed to work and give its services as and when it is most required; and,
- is sorted out, with alternate courses of action set up and the workforce need to be prepared to keep the system operational.

The idea of safe healthcare services through hospitals does not simply allude to the physical and useful uprightness of the facilities meant for healthcare services. It also revolves around the planning to work at full limit and take into account the requirements of the community that has been affected instantly after debacle strikes. In this

manner, making healing facilities safe includes understanding and relieving elements that add to their helplessness amid a crisis or debacle, for example, the building's area, plan particulars and materials utilized, harm due to non-auxiliary components, untrained experts and absence of essential comprehension of fiasco administration. Basic administrations, for example, power, water and sanitation, squander treatment and transfer of medicinal squanders are essential to guarantee progression of operations amid a crisis circumstance. The significance of all types of healthcare service providers including hospitals reach out past the immediate life-sparing part they play. Thusly, exceptional consideration must be given to guarantee that hospitals are fundamentally sheltered and healthcare experts are sharpened, arranged and prepared to deal with crisis conditions. (14,15,16,17)

Aims & Objectives

- Identify the causes responsible for the Fire Mishaps in the hospitals
- Highlighting the corresponding effects through Cause and effect Diagram
- Recommend measures to reduce the fire mishaps in order to enhance Patient Safety

Material & Methods

Caselets:

There have been numerous incidents of fire breakouts in hospitals across the country leading to loss of precious lives and property. These incidents also cast aspersions on the safety standards followed by hospitals and the regular inspections conducted by the authorities concerned. Here are few of the examples which are cited below. The incidents which have been cited in this paper are taken because these are the hospitals which are quite famous among the patients and unfortunately have led to high number of life losses in their mishaps.

AMRI (Kolkata)

On 9th December, 2011, the people of Kolkata witnessed a fire mishap at AMRI hospital. In a distressing flame that broke out in an AC unit of AMRI-a head private hospital, where 89 individuals, comprising of patients from ICCU, ICU, Intensive Therapy Unit and Critical Care units and orthopaedic unit were suffocated to death. The fire was first seen by nearby occupants at around 3.30a.m. Fire Control Room, Kolkata was intimated about the

episode at 4.10 am. Prompt reaction from the fire administrations was done within 20 mins. In spite of the fact that the fire was principally started and confined inside the basement of the hospital yet toxic smoke was sucked via ventilating pipes that brought it through the rooms and the halls of the seven-story halfway air cooling facility. Entire doctor's facility building was loaded with thick heap of smoke, caused colossal suffocation for all the indoor patients. Ninety individuals gagged to death, a hefty portion of them are in their rest or were not in condition to try and escape. (18,19,20)

Murshidabad Medical College and Hospital (West Bengal)

When a fire broke out at the Murshidabad Hospital in West Bengal, two staff members were killed. Sources said that fire broke out from an AC machine which was due to a short circuit. Although there were media reports of a death of a child, hospital authorities cleared the air saying it was due to Pneumonia and the death had occurred prior to the incident. Eye witnesses alleged that there was no disaster management equipment available to douse the flame on time. The State government in turn declared a compensation of Rs. 2 Lakhs each to the kith and kin of the deceased. The State Government ordered a CBI inquiry to find out the cause of fire, so that adequate measures would be taken to prevent such accidents in the future. (21)

ShishuBhawan Hospital, Cuttack

After a fire broke out at Cuttack's ShishuBhawan hospital, a new born baby was injured in the mishap and several other babies were immediately shifted to other wards. There were many equipment and other facilities that were damaged in this incident too. According to the sources the cause of the fire was due to an electric warmer installed in the Pediatric ward. This Pediatric ward is also infamous for other reasons. Prior to this incident, around 70 infants had died within a week. Initial investigations revealed that the fire broke out because of a short circuit. This one again brings into focus the lack of fire safety equipment. Hospital authorities claimed that the fire alarm did not work, although fire fighting gadgets were installed. The Chief fire officer however said that firefighting equipment had to be handled manually and said that the authorities concerned had not taken timely preventive measures and that the medical staff needed to be

trained to handle such situation. The attendants on the other hand alleged that many warmers had developed technical snags. Though, many relatives of the patients have complained about receiving electric shocks from warmers due to fluctuations in power supply. (22)

SUM Hospital, Bhubaneswar

October, 2016, the people of Bhubaneswar had witnessed a devastating fire in the premises of SUM hospital located in the capital of Odisha taking life of around more than 20 people and injuring a great number. This fire originated from a mere short circuit in the Dialysis ward and the smoke spread to the nearby ICU wards. The degree of the fire was so intense that was quite difficult for the fire fighters to have control over it and save the patients from getting choked by the toxic smoke which took the lives of many people especially the patients who were on oxygen support in the ICU. Due to the negligence of the management and proper communication during the evacuation process, it resulted into chaos and led to the injury of many people. The management had never taken any steps regarding the firefighting measures and has not abided by the proposal that was put to them after the fire safety audit that took place in 2016 audit. (20)

Results

Nicole R Hartnel et al., Based on their study stated that the service providers and receivers of the Healthcare services acknowledged diverse issues that play up the role in enhancing the degree of blunders. Human services experts recognized issues related with people, while patients recognized both individual and framework based issues. As indicated by the fishbone outline, members felt that "individuals" and methodology and administration" are the zones where intercessions to decrease issues ought to be principally coordinated.

Best and Neuhauser, Cause and Effect Diagram is utilized to recognize all conceivable reasons for an impact (in our case it's Fire Mishaps in the hospital). They are in some cases called Ishikawa charts after the name of Kaoru Ishikawa, a quality pioneer who made and first utilized them in the 1960s for quality control purposes. They are additionally called fishbone outlines in light of the fact that the lines interfacing real cause classifications take after the foundation of a fish. (23)

Esmail, (24), Institutions in which staff are urged to assess practice, hazard and missteps when they happen have a tendency to have a culture where underlying root cause analysis or fishbone analysis is utilized. This serves to genuinely comprehend the reason for an issue and to elucidate issues.

Discussion

Kavanagh, Kevin T., Saman, Daniel M. et al., the study focuses that there surely has been a decline in accidents in hospitals, but still there is a need for uniform implementation of different standards of patient safety which would help the developing nations to enhance the efficiency as compared to different developed nations.

Kroch, Eugene, Duan, Michael MS et al., (25), the study focuses on QUEST (Quality, Efficiency, Safety and Transparency) method that has been the major reason behind Quality Improvement in any Hospital Performance.

James, John T, in his paper conclude that the wide spread problem of unsafe conditions that a patient in subjected to in hospitals should be taken notice of. These incidences of fire accidents or any other case of negligence should be brought down with immediate effect. The patient opinion should be taken if we want to identify the factors that cause such accidents, there should be accountability on the part of the authorities and transparency as well. Effort should be made to identify the main causes of such errors so that actions can be taken accordingly to achieve the objective of providing a safe environment to patients.

Marcia Kirwan, Anne Matthews, P. Anne Scott(26), in the paper they discussed that in order to enhance the patient safety in the hospital it is essential that the work environment need to be properly identified and controlled by the Hospital Management. The efficiency of the nurses and the support staff also plays a major role in providing patient safety.(27)

Conclusion

In order to evade the fire accidents in the hospitals the inert way of safety design, life safety provisions and the active way of fixing fire fighting accessories in the building cannot assure full safety. Having fire safety measures and having an apt design to avoid such instances may not be sufficient for the Hospitals to avoid fire mishaps. On the other hand there are many other factors that are responsible for these catastrophes. Few of these variables have been identified in our study through the Cause and Effect

Method. These variables that have been identified as the causes for such mishaps are all found to interrelated and interdependent. And in order to reduce the impact of such incidents we can very well depend on the solutions like fire risk management, security management, preparedness, awareness of fire, keeping away the fire sources from the inflammable materials, reduction or elimination of combustible materials in side. The cases very well emphasizes that the negligence of the management has also enhanced the chances of the life losses of the patients and the people associated with the hospitals. As hospitals are associated with Human life, the concerned service industry need to keep Patient Safety at the Priority basis. In the above mentioned cases, the consequences of the mishaps could have been reduced, if proper prevention measures related Fire safety would have been taken by the hospital management. WHO has also come across with certain guidelines and even the National Disaster Management Authority has also prescribed certain safety measures that could have been followed by these institutions. These were the minimal safety measures that each and every health institutions need to follow

Recommendation

A hospital is a place where patients and their attendants go with the belief of getting well and coming back home healthy, happy and safe. A patient's health and safety is of prime importance to all concerned such as the patient themselves, family members, hospital, doctor and other staff members. This also involves money that is spent on the treatment of the patient, a hospitals' reputation and the medical staffs' concern for the patient and the entire thing is based on a single hope that is the safe return of the patient.

But, today despite the presence of so many multispecialty hospitals, big brands and reputed doctors, there are many mishaps, such as the fire tragedies that took place at AMRI Kolkata, SUM Hospital, Bhubaneswar and Sishu Bhawan, Cuttack where the patients' life is at stake.

From the above analysis, it has been highlighted that the patient safety need to be given higher priority with the implementation of Quality standards and proper monitoring system at every levels starting from the process, policy, infrastructure and people.

Limitation of the study

Due to time constraint, we have done our analysis only on the basis of secondary data. Our study was also confined to few hospitals.

Relevance of the study

As hospitals are associated with Human life, the concerned service industry need to keep Patient Safety at the Priority basis. Hence, such study will help in highlighting the issues and would make the hospitals proactive towards such concerns

Authors Contribution

SSR: Substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; ST: Final approval of the version to be published; RO: Drafting the article or revising it critically for important intellectual content

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Tables

TABLE 1 CASE COMPARISON OF THE FIRE MISHAPS IN THE FEW SELECTED HOSPITALS

Hospital Affected	Source of Fire	Fire Spread	Causalities and its reasons	Failure Aspects
AMRI (Kolkata)	The basement floor which was used as storage area for diesel, motor oil and wooden furniture	The doors and windows of the hospital were made of unbreakable glass	Around 90; Cubical shape of building which was without proper ventilation. Patients got choked due to the spread of the toxic substances through smoke	As per the safety norms, inadequate measures for fire-fighting, unalert support staff members, no proper security system and lack of systematic disaster management and evacuation process
		Fire Sprinklers, Fire smokers and vent opening on the top were not provided		
		Toxic smoke spread through centralized AC vents		
Sum hospital	Short Circuit in the ICU meant for Dialysis	The smoke spread through AC ducts and false ceilings.	Around 22, Patients got suffocated due to delay in the decision making and proper communication that prolonged the evacuation process	No proper mitigative measures are provided for fire safety, lack of Crisis management training to the staff members, No proper maintenance of the electrical equipment

Murshidabad Medical college and Hospital(West Bengal)	Short Circuit in the AC machine installed in the second floor of VIP Cabin	Due to lack of proper ventilation and inadequate fire fighting infrastructural necessities, fire had spread to the hospital's Neo natal and MRI units	Around 3; Emergency gate was closed and only one staircase was meant for exit. Alert mechanism was faulty and staff members were not well trained for such crisis	No fire extinguishers were present inside the ward, the elevator was malfunctioned, the AC machines were not properly serviced, and electrical wiring were not properly maintained or replaced. Absence of water sprinklers and smoke detectors, no water reservoir for fire fighting
SishuBhawan Cuttack	Fire broke out in the pediatric ward due to a short circuit in an electric warmer	As the electrical system was faulty the fire got spread to other wards	Around 2, death was because of the incompetent behavior and negligence of the staff members	No proper maintenance, Faulty electrical framework, Fire alarm did not work although fire fighting gadgets were installed. No proper training for handling of the fire fighting equipments.

TABLE 2 SUB COMPONENT OF CAUSES

Environment	Personnel	Equipment	Management
Smoke spread through AC Ducts and False Ceiling(En1)	Delay in the intimation to the fire department (P1)	Short Circuit in AC Machine and other electronic equipment's (Eq1)	No proper Training for Crisis Management (M1)
Mechanical Ventilation Facilities was missing (En2)	Incompetent behavior and negligence of the staff members (P2)	Inactivated Fire Alarms and faulty Firefighting equipment's (Eq20)	Illegal conversion of the basement meant for car parking into dumping place for inflammable materials (M2)
Emergency Gate was closed and one staircase available for exit (En3)		Elevator was not functioning (Eq3)	Basement was used as smoker's zone by keeping the fire alarm in inactive mode (M3)
			Insufficient firefighting measures led to absence of Firefighting certificate (M4)
			Lack of communication during the evacuation process which led to chaos (M5)
			Proper maintenance of different machine and wires were lacking (M6)

Figures

FIGURE 1 CLASSIFICATION OF HOSPITALS

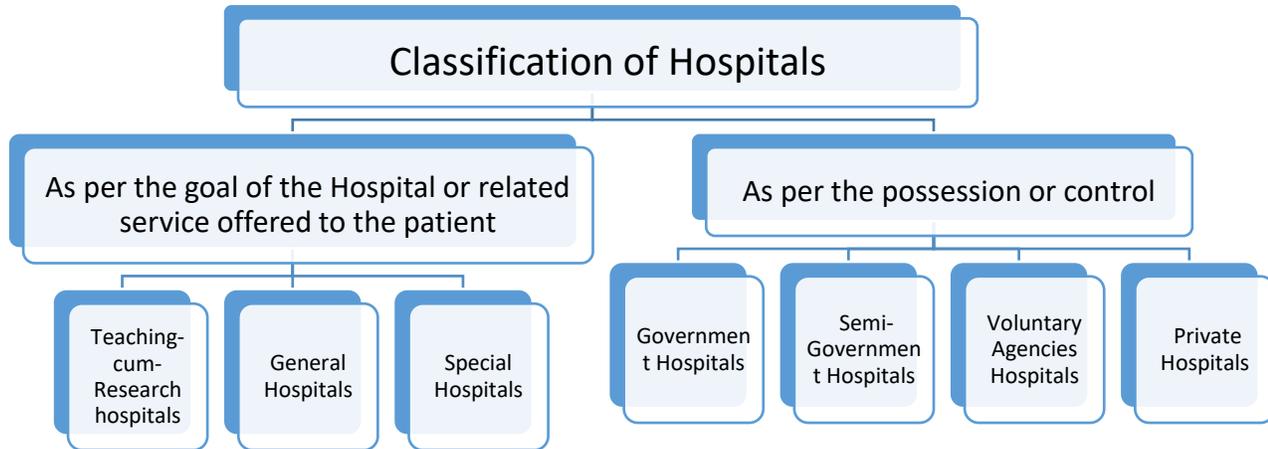


FIGURE 2 FISHBONE DIAGRAM (CAUSE AND EFFECT DIAGRAM)

