

A STUDY ON FAILURE MODE AND EFFECTS ANALYSIS IN INFECTION CONTROL DEPARTMENT IN MULTISPECIALITY HOSPITAL AT TANJORE

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ABSTRACT:

These days, everyone needs to be in good health. Therefore, the medical profession is geared toward attempting to provide patients with an environment free from infections, such as drug-resistant microorganisms. With an effort to prevent the propagation of infections (VAE, SSI, CAUTI, CLABSI, and NSI) and to lower risk factors, they adhere to infection control policies and protocols. These included cost-effective measures like sanitation of the hands, sharp objects safety protocols, sterilization, and appropriate waste disposal in hospitals. If the above-mentioned method is not followed effectively, they put themselves in possibility of spreading infection. Enhancing comprehension and dedication to infection control measures aids in preventing the spread of infections. Methods: Using the FMEA method for analysing data, this qualitative investigation observed and interviewed hospital support staff members and healthcare professionals to investigate the elements influencing infection control practices. Result: Insufficient adherence to infection control procedures leads to infection transmission. Using the FMEA tool, it was determined that the main factors contributing to the spread of infections are hand hygiene, bundle care, personal hygiene, NSI, improper segregation and labelling and improper cleaning. In conclusion, patient safety is at risk when infection control procedures fail. IPC practice must be the primary focus of healthcare providers with the goal to reduce the risk of nosocomial infections.

Key words: *Infection control, FMEA, BMW, VAE, SSI, CLABSI, CAUTI*

INTRODUCTION:

Using the healthcare failure mode and effects analysis (HFMEA) strategy, possible failures and the reasons for them can be identified in advance of the delivery of new services. HFMEA may offer opportunities to improve on current offerings. Patient safety is the ultimate goal of the HFMEA Process. A prospective evaluation that recognizes and boosts process steps while fairly guaranteeing a safe and therapeutically optimal result is referred to as a healthcare FMEA. HFMEA is an organized method to identify and mitigate risks that may result in patient tragedy while they are in the hospital. One public health priority that is addressed by infection prevention and control is preventing hospital acquired infections.

Hospital acquired infections have been shown to exacerbate clinical care, increase length of stay, and have particularly unsettling effects on recuperation. For all hazard analysis methodologies, risk becomes an imitation for collapse in fresh or altered processes. It's advised to spot difficulties in a process as quickly as is achievable. The finest opportunity for verified mitigation is to identify risks as soon as possible before a process is had adopted. To ascertain the causes of infection that patients experience while in the hospital, the FMEA tool was employed in this process.

MOST COMMONLY OCCURRED HOSPITAL ACQUIRED INFECTIONS ARE:

Ventilator associated pneumonia, Central line associated blood stream infection, Catheter associated urinary tract infection, Surgical site infection, Needle stick injury, Blood and body fluid exposure, Thrombophlebitis.

STATEMENT OF THE PROBLEM:

Failure mode and effect analysis provides an approach for predicting failure and makes it possible to put modifications in place to stop this sort of failures. This makes it possible for proactive detection of possible failures in intricate processes, like avoiding and controlling infections services, and it offers a foundation for ongoing improvement aimed at preventing cross-contamination. In order to stop the spread of infections, hand hygiene, needle stick injuries, bundle care, and patient education about personal hygiene are crucial. However, mistakes may happen when delivering proper care to the patients. These mistakes could have a variety of effects on the patient, ranging from no harm to quite serious injury. Clinical activities within an infection control department can benefit from using FMEA to reduce, anticipate, or eliminate errors. FMEA can be used to pinpoint high-risk sub processes and facilitate targeted improvements to lower the probability of future failures, improving patient safety and streamlining the operation of the infection control department. The risk priority number is lowered with the aid of FMEA (RPN).

OBJECTIVES:

- To understand the basics of infection and the protocols followed in the infection control department.
- To identify potential problems in infection control practice in hospital.
- To implement Failure mode and effect analysis (FMEA) in Infection Control department to reduce the risk priority number (RPN).
- To suggest some measure to resolve the identifies problems in radiology department

REVIEW OF LITERATURE:

According to **Chunlin Wu, Qingqing Tian, Hui Wang, Weiwei Yang**, The purpose of this study is to use Failure Mode and Effects Analysis (FMEA) to thoroughly assess the efficacy of infection prevention and control for multidrug-resistant microbes in after surgery cancer patients. FMEA was used in this investigation's tertiary A-level cancer specialization healthcare in China to evaluate the chance of hospital infections.

The hospital's infection records system was used to retrieve patient data for surgeries performed between 2017 and 2022. Data from 2020 to 2022 served as the intervention group and data from 2017 to 2019 as the control group. The incidence rate of infections in hospitals was 1.66% prior to the treatment was administered (2017–2019), but it dropped to 1.22% after it (2020–2022). Moreover, the incidence rate of MDRM infections dropped from 1.136 after the treatment was administered to 1.808 before it. The efficacy of the FMEA strategy in preventing and managing MDRM infections in cancer patients who have undergone surgery is supported by this study.

Chunlin Wu, Qingqing Tian, Hui Wang, Weiwei Yang, Infection Control Strategies for MDRO Based on Failure Mode and Effects Analysis: An Empirical Study on Postoperative Infections in Cancer Patients(November 2023)

According to **Celeste J Chandonnet, Prerna S Kahlon, Pratik Rachh, Michele Degrazia**, In the NICU, infections caused by central lines , prolong hospitalizations and increase death and sickness. examined central line installation, maintenance, and removing procedures in an effort to lower the risk of CLABSIs through the use of HFMEA. Specialists from the field were brought together to form a multidisciplinary team. The group finished the HFMEA procedure and put action plans into place that included inspections, measurement of outcomes, perform modifications, and reeducation. Five typical failure modes that lead to the development of CLABSIs were found by HFMEA. Contamination, an inadequate care environment, insufficient documentation and assessment of the integrity of the central vein tube dressing, problems with suppliers and equipment, and ignorance were among them. The NICU has seen a notable drop in CLABSIs from 2.6 to 0.8/1000 lines a days since putting the proper action plans into place. The HFMEA procedure strengthened the NICU's culture of present safety and quality improvement while lowering the CLABSI rate.

Celeste J Chandonnet, Prerna S Kahlon, Pratik Rachh, Michele Degrazia, Health Care Failure Mode and Effect Analysis to Reduce NICU Line-Associated Bloodstream Infections, PEDIATRICS 131(6)(May 2013)

METHODOLOGY:

RESEARCH DESIGN: Descriptive research

SAMPLING METHOD: simple random sampling

SAMPLE SIZE: 1798

c)METHODS OF DATA COLLECTION: In this study, only primary data were used

TOOLS: Failure Mode and Effective Analysis

DEFINITION:

Failure Mode and Effects Analysis, or FMEA, is a forward-thinking technique that helps identify possible breaches in business processes in order to ensure their effects can be minimized or avoided by determining their likely causes and effects. The rigorous process of Failure Mode and Effect Analysis (FMEA) can help prevent exorbitant production issues, improve product quality and service reliability, and increase customer satisfaction by identifying and addressing failure causes.

Components of the FMEA:

First Section: Failure Modes, or those malfunctions, concerns, issues, or mistakes that arise in services, goods, or processes .The second section, "Effects Analysis," deals with identifying and analyzing the results or repercussions of the failures.

- Step 1: Locate the Problems That Need to Be Fixed
- Step 2:Create an Interdepartmental FMEA.
- Step 3: Implement the process, framework, or actions
- Step 4: Examine Every Step To Spot conceivable Problems
- Step 5:Which Problems Need to Be Prioritized
- Step 6:Determine the Risk Priority Number (RPN) for FMEA. Deploy the changes.
- Step 7: Monitor The Implementation Of The Changes And Assess Their Effectiveness

Risk Priority Number (RPN)= Calculation Severity x Occurrence x Detection. Severity: A severity rating typically ranges from 1 to 10, with 1 denoting negligible and 10 denoting catastrophic. Write only the failure mode's highest severity rating on the FMEA table if it has multiple effects.

Occurrence: Occurrence is typically scored from 1 to 10, with 1 denoting an extreme lack of probability and 10 denoting certainty. List each cause's occurrence rating on the FMEA table. Detection is typically graded from 10 to 10, with 10 denoting that there is no control or that the control is certain not to detect the issue. Indicate the detection rating for on the FMEA table

ANALYSIS:

FMEA FINDINGS IN INFECTION CONTROL DEPARTMENT

FAILURE MODE	FAILURE CAUSE	FAILURE EFFECT	SEV	DET	OCC	RPN
Hand Hygiene	Not following the hand washing principles in patient care	Spreading infections	9	7	4	252
Bundle care	Ignorance of delivering patient care services	Spreading infections	10	8	3	240
Personal Hygiene	Improper following of personal hygiene	Prone to get infectious disease	10	9	3	270
Needle stick injury	Lack of concentration and ignorance in handling sharp objects	Disease transmission	10	6	3	180

FMEA FINDINGS IN BIO-MEDICAL WASTE MANAGEMENT

Improper segregation	Lack of knowledge in segregation of wastes and unawareness	Infection transmission	8	9	6	432
Without label	Lack of knowledge about proper labelling and ignorance	Needle stick injury and disease transmission	7	9	4	252
Improper cleaning	Improper following of sterilization principles	Spreading disease from one to another	9	8	3	216

FINDINGS:

1. Inadequate segregation has high RPN score , and the score is 432. This resulted from inappropriate needle disposal, misinformation, and a lack of understanding regarding waste management colour coding.
2. The second high RPN score is 252, resulting from incorrect labeling or no labeling at all happened because of worker ignorance, neglect, or poor attention to detail or cooperation.
3. Staff members' inaccurate and ignorant understanding of the importance of hand washing has a 252 RPN Score, endangering patient safety or increasing the risk of infection.
4. Owing to the staff's inexperience in bundle care, which resulted in an RPN score of 240 and a lack of knowledge, skills, and expertise , patients might be susceptible to infections.
5. The patient's failure to maintain personal hygiene results in a potentially fatal condition or a serious disease with a 240 RPN score. This could be because they disregarded the advice of the medical personnel or failed to follow their guidance.

SUGGESTIONS:

- 1.The supervisors should provide their staff with instruction and information regarding BMWWM colour coding, as well as how to properly dispose of waste, in order to help them avoid mishandling.
2. When disposal of waste products, proper labeling is required. Include the name of the floor incharge, the date, the time, the floor name, etc.
3. Inexperience or a lack of knowledge or expertise in bundle care and hand hygiene can be remedied by giving staff members the right instruction and training twice a week for new hires and once every three months for experienced, but not during working hours.
4. Make sure the patient understands the importance of maintaining good personal hygiene in order to protect them from unwanted diseases. Give visual aids in your classes to aid with comprehension.

CONCLUSION

A practical, team-based approach to infection control and prevention that complies with hospital and government protocols can help determine the likely source, its effects, and how it occurred. The FMEA tool is used in the infection control department to help hospitals by analysing potential failures that have a higher chance of occurring, the failure mechanism that is either in part clarified through this inquiry or has an impact on the infection control department's current procedures and functions. Putting into practice has provided a detailed action plan. It might help the infection control department's work run more smoothly.

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