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Prevention of medication errors by using failure mode effect analysis in a multi-speciality hospital

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Abstract

Introduction: The medication error is an event which can be preventable that may cause or prompt unseemly prescription use or patient injury while the drug is in the control of medical care proficient, patient and customer".

Such events can be related to the professional practice, healthcare products, procedures, and systems including prescribing, order communication, product labeling, packaging, compounding, dispensing, distribution, administration, education, monitoring, and use. Medication errors increases cost, significantly prolongs hospital stay and increase the risk of death. Other common factors contributed to medication error include lack of drug information, incorrect diagnosis, drug-drug related reactions, dose miscalculations, incorrect drug administration and drug order resulting from poor handwriting, missing data when the medication is filled into more smaller units, outside components like interference, responsibility, work related pressure, inappropriate preparing or instruction on look alike and sound alike medicines.

Objectives: To determine the nature and types of medication errors, to assess the effect of medication errors on the respondents, to investigate the causes of medication errors, to provide strategies to prevent medication error.

Research Methodology: Source of data: secondary source of data is collected through nurses' record.

Study design: The nature of this study is descriptive and is time-bound.

Sample size and sampling technique: out of all the patient files received during the study period (2 months), the record having an error is considered to be the sample of the study.

Inclusion criteria for data collection: patient records having errors when the researcher is having rounds.

Exclusion criteria for data collection: those records which are shifted to MRD after patient discharge were not included for the study.

Results: The current study was conducted to find out various medication errors prevailing in hospital.

Conclusion: Medication errors are one of the most serious aspects that interfere the patient's safety in hospitals.

Keywords: medication error, failure mode effect analysis, High risk medicines. medication administration record, potential adverse drug events

1. Introduction

Medication safety is one of the cornerstones of safe medical care. In medication administration we need to follow five rights' i.e., right patient, drug, dose, route, and time. These rights are ingrained in every medical, nursing and pharmacy students training as quoted by S Michael ROos MD, MHA, March 13, 2019, 12.30pm. So, medication error could be explained as a failure of a planned action to be completed as intended. The medication error can be due to health care products, professional practice or procedures like prescribing, order communication, dispensing, monitoring, education etc. Hence, we here understand that medication error occurs at any stages like prescribing, transcribing, dispensing, administering, monitoring, and reporting. Few factors which are associated with the medication error could be identified are inadequate knowledge about the drug therapy with risk factors like age, impaired renal function or drug allergy. Medication error also includes factors like calculation of drug dose, specialised drug formulation characteristics and medication prescribing nomenclature. Other factors like incorrect diagnosis, drug to drug relation reactions, inappropriate drug administration due to poor handwriting, missing

information when drug is transferred into smaller units. Medication error has significant effect on the patient and the health care unit. It may risk the death of the patient, prolong hospitalisation, additional medical interventions, and increase cost to the patient and the hospital directly or indirectly. High risk of medication error may be in the nursing task. Medication error also is contributed through the factors like work load of the medical staff, improper training or insufficient information about drug administration, sound alike-look alike packaging of medications and work stress.

As reported by the institute of Medicine ^[1], it is seen that out of every 131 outpatient deaths and one out of 854 inpatient deaths, medication related errors were a significant cause of morbidity and mortality.

Various other studies also show that medication error is observed in various sectors of the hospital services. Camilla Haw et al. (2007) ^[2] in their study reported that in one of the UK psychiatric hospital for the aged, 25.9% medication error had occurred. The commonest error that was observed was unauthorised tablet crushing or capsule opening (30.1%), omission of medicine without valid reason (27.1%), failure to record administration (23.6%). The study was conducted using direct observation, medication chart review and incident reports. Authors concluded that medication error in the study was minor in nature, which was reported by the chart review which was only 148 errors and none in incident reports. Hence they suggested that direct observation is a useful and sensitive method for detecting medication administration error than chart review or incident reports².

Medication errors are preventable events. This could be acquired by safe medication practices, appropriate human resources, and safe environment free from stress, work pressure and interruptions. It may also include the training of immediate reporting if the medication error occurs to the proper channel to reduce further destructions. There is a study conducted by Berdot S *et al.* (2012) where disguised observation technique was used by a Pharmacist accompanied with nurses who witnessed the preparation and administration of drugs. The result showed that 27.6% errors

were detected with 1501 error opportunities. It also observed 7.5% wrong time errors. The study also reported that 6% of these errors had serious or significant impact on the patients and concluded that medication administration error are frequent and the process of identification will help to undertake appropriate interventions ^[3].

Hence with an interest to provide quality and safe patient care service in the hospital, medication error is studied in the present research, with the failure mode effect analysis.

2. Methodology

The present study was conducted in wards and ICUs of a Multispeciality hospital in Mangalore, DK district. The medication error was identified by the patient file during the rounds of the Investigator accompanied by the clinical Pharmacist of the hospital. The study was undertaken for the period of 2 months (January and February of 2020), and hence all the files of the patients available in wards and ICUs, were included in the study. Files of the discharged patients which was stored back in MRD was excluded from the study.

The study is retrospective where data was collected by the Medication Administration Record (MAR) sheet of the patient files.

The data collection evaluated the errors and classified by the type of error and the cause of the error was analysed. The information about the effect and causes of the medication error was identified by interviewing the Nursing staff and Doctors who were treating the particular patient. The information about the patient condition was collected through direct observation.

3. Result

3.1 Identification of Type of Medication Error

Medication error is associated with more than one error producing condition. With the 150 files which were evaluated from wards and ICUs, the total of 67 errors were identified. The type of medication errors is reported in the chart below.

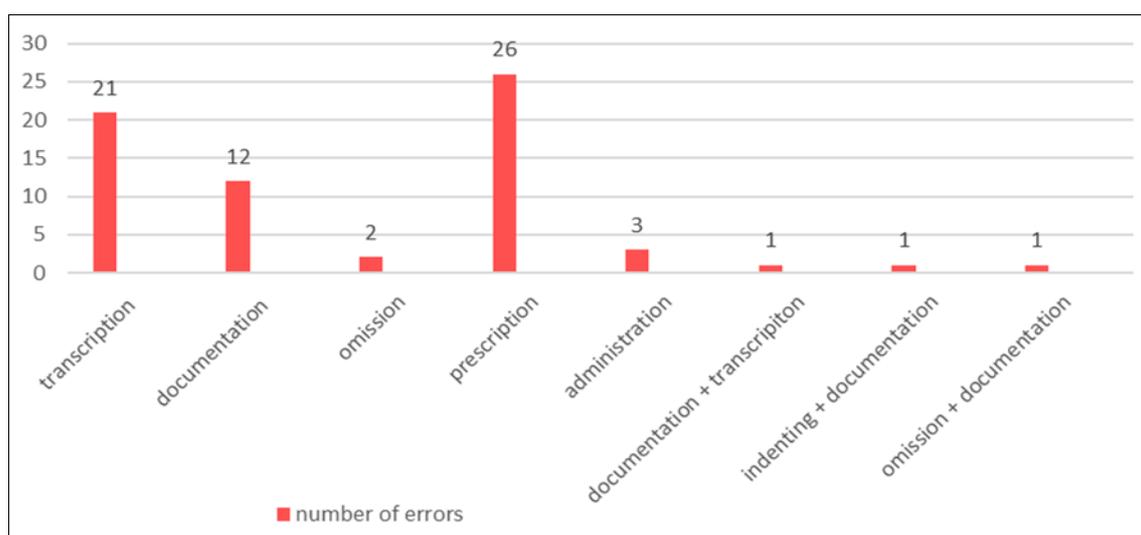


Fig 1. Types of Medication errors

The main objective of the study was to find the medication error with (Failure mode effect analysis (FMEA). This is a systematic, pro-active method for reviewing components assemblies and subsystems to identify potential failure

modes in a system and their causes and effects. This will help to identify the parts of the process that are most in need of the change. This overall will seek to improve patient safety by minimising risk potential in high-risk process.

The process of FMEA include reviewing of

- Failure modes- what could go wrong
- Failure causes -why could the failure happen
- Failure effects- what could be the consequence of each failure.

Failure Modes: Out of the total 21 transcription error that had occurred in the first month, major of the errors happened in writing the drug dosage, and highlighting the high risk medications. This occurred while documenting the medicines from doctors order sheet to nurse’s drug order sheet. The documentation error (N=12) occurred due to forgetting to document the administration of the medication to the patients and double verify High Risk Medicines (HRM).

Omission error (N=2) was due to the delay in giving medication to the patients in time.

Failure causes: Out of the total medication errors, 39 medication error occurred by the Nursing staff, 26 error by the Doctors and 1 error because of the Doctor and Nursing staff.

Failure causes occurred in the present study was due to ineffective communication during handover stage of shift duty. It clearly showed the carelessness of the staff responsible. Work stress and time pressure was another cause that was the reported by the staff.

Failure effect: this data showed the effect of the medication error on the patients.

The study result showed that the medication error occurred were potential adverse drug events and out of the 67 errors, only 10 errors had a direct effect on the patients. The below graph shows the number of patients who were affected with the different types of Medication errors which had an effect directly on the patients.

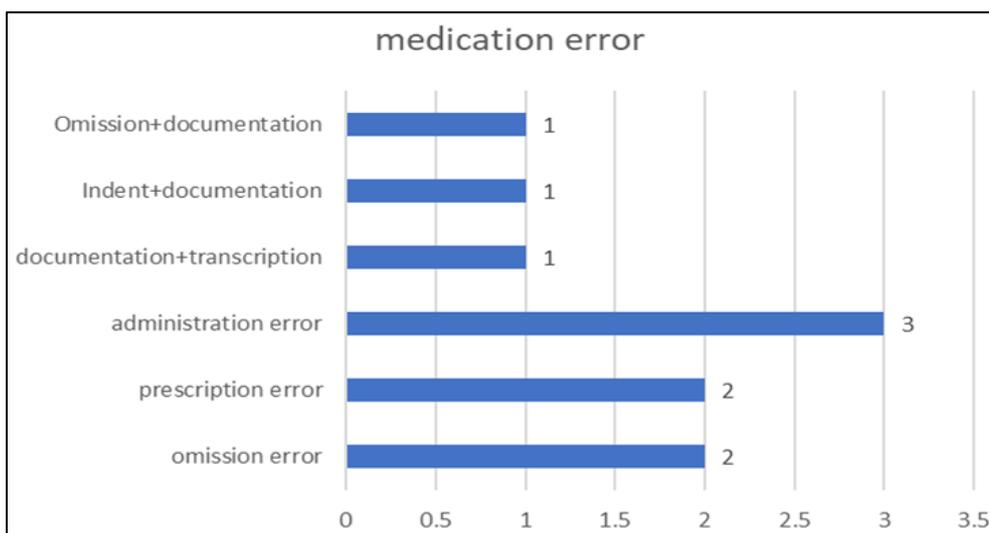


Fig 2: Medication error

Considering the above mentioned type of error and the reasons for the errors, few strategies were adopted to prevent the medication error in the hospital. The strategies like, spot questioning and monitoring the medication administration and on the job training was administered. The staff also were on close observation and monitoring and compulsory reporting the incidence was followed in the hospital. There was regular seminars and conference was conducted which helped them to acquire more knowledge regarding medication errors. The data collection on medication error continued for the second month. It was seen that the medication error although was present, it was reduced to some extent. The below chart shows the data.

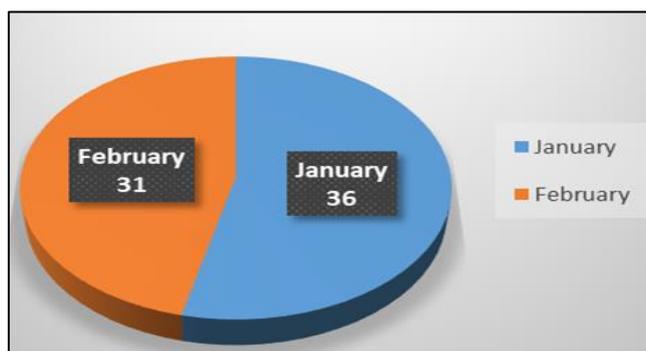


Fig 3: Month wise distribution of error

In the month of January, when the data collection of medication error began, there were 36 errors, which was reduced in the month of February, with 31 errors.

4. Discussion

Medication error interfere with patients safety and quality service in hospitals. This human err will be sometimes fatal to the patients. It may cause financial, physical and emotional stress to the patients and also to the healthcare providers. Camilla Haw *et al.* (2007) [2] also highlighted that although the medication error is minor, it is common. However, this error is preventable.

We should make sure that few strategies to be implemented to minimize this error. Firstly, at the top level, there should be few policies to be followed. The health care providers should follow the policies strictly in very area of the medical service that is provided in the hospital. Monitoring frequently is the prime factor to be followed in the hospital. This factor was also reported in the study made by Suzan N K *et al.* (2003) [4] who reported that the adverse drug effect could be prevented by monitoring like rounding process and suggesting the changes which was done by the Pharmacist and general medicine unit. They should develop the culture of safety and robust reporting system in the workplace without any restrictions. This will help the error to be prevented during the near-miss phase itself. They can also update the technology and utilise the computerised order

entry, bar-coding and smart pumps, computerised ADE monitoring. The in-charge staff for medication administration should be trained regularly and compulsory supervision and evaluation to be held. The psychological aspects of the staff also should be considered with immediate action in the hospital to be held. Sufficient manpower should be provided to the sensitive area of the hospital. A printed drug guide should be available in each nursing station to recheck every medication before administering to patients.

Hence the current study reveals that even though there exist 44.4% of medication error due to failure in effectively functioning of the above strategies, it can be overcome through continuously increasing the efficiency of the handler's operations which helps in improving the accuracy and reducing the error.

5. Conclusion

Medication errors are one of the most serious aspects that interfere the patient's safety in hospitals.

While it very well may be the consequence of precise issues or plain human error, prescription mistakes can make serious actual injury and conceivable death of the patients.

While it very well may be the consequence of deliberate issues or human error, medicine blunders can make serious actual injury and conceivable death of the patients. These preventable errors could likewise cause extreme monetary, mental and intense pressure to the medical care suppliers and association. By following the preventive strategies, the doctors, nurses and the pharmacists can provide safe medication administration to the patients. This study reveals different types of medication errors prevailing in hospital and the strategies to prevent the same. Even though 44.4% of medication error calculated from this study, none of them affected the patient care during their hospital time.

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