Prospective Observational Study on Incidence of Medication Errors in the Inpatient Areas of Narayana Multispecialty Hospital, Ahmedabad

By

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CERTIFICATE

This is to certify that the projects titled '**A Prospective Observational Study on Incidence of Medication Errors in the Inpatient Areas of Narayana Multispecialty Hospital, Ahmadabad**' have been done entirely and submitted by, **Dr.Jasleen Kaur**, a student of Masters Of Business Administration in Hospital and Health Management-19th Batch from Institute Of Health Management and Research, Jaipur.

The study projects were prepared in the internship period from at from February 15, 2016 to April 30,2016, at **Narayana Multispecialty Hospital, Ahmadabad** under my guidance and supervision. This is her original work.

I wish her all success for her future endeavors.

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To Whom So Ever It May Concern

This is to certify that Dr Jasleen Kaur, a student of MBA hospital management at IIHMR Jaipur has carried out project report on **"A Prospective Observational Study on Incidence of Medication Errors in the Inpatient Areas of Narayana Multispecialty Hospital, Ahmedabad** at Narayana Multispecialty Hospital Ahmedabad.

This project work has been prepared by the student and this work has not been presented earlier for any other academic activity.

I wish them all success in life and bright future ahead.

Dr (Maj) Akshaya Kiledar

Clinical Director

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This is to certify that the dissertation titled "**A Prospective Observational Study on Incidence of Medication Errors in the Inpatient Areas of Narayana Multispecialty Hospital, Ahmedabad**" and submitted by **Dr Jasleen Kaur** Enrollment No.IIHMR-U/01/2014-16/0152 under the supervision of **Prof. Dr. Dhirendra Kumar** for award of Postgraduate Diploma in Hospital and Health of the University carried out during the period from February 15,2016 to April 30,2016 embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other Institute or other similar institution of higher learning.

Signature

ABSTRACT

A Prospective Observational Study on Incidence of Medication Errors in the Inpatient Areas of Narayana Multispecialty Hospital, Ahmedabad

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Introduction

Medication error has been defined as "any preventable event that may cause or lead to inappropriate medication use or patient harm, while the medication is in the control of health-care professional, patient or consumer.The error may be of commission or omission, with potentially negative consequences for the patient, which would have been judged wrongly by skilled and knowledgeable peers at the time it occurred, independent of whether there were any negative consequences. Medication errors can be broadly considered to be of three types: prescribing errors, dispensing errors, and administration errors.

Background

Medication errors are the serious problems in health care and can be the source of significant morbidly and mortality in the health care setting. In India, irrational use of drugs is common and this has led to antibiotic resistance, adverse drug reactions, medication errors and other drug related problems.In order to reduce the medication errors, it is necessary to know more on the type of medication errors and the stages at which they take place.

Objective

- To assess the medication process of the hospital under study.
- To measure the medication error rate for the study period
- To identify the causes for the medication error

Methodology

Study Type

Prospective observational study

Data Collection

Primary Data: Structured checklist is used. The scoring pattern used is:-

1 = Compliance, 0= Non Compliance

Secondary Data:

- Review of medicine card and issue slip
- Observation of nursing staff at nursing station

Results

Total Medication Error Rate (%) is 15.35 wherein Prescription Error Rate is highest i.e. 22.80% followed by Administration Error Rate i.e. 13.4%.

Medication Error Rate is high in General Ward in comparison to Semi private Ward of the Hospital.

Conclusion

Prescription errors were highest in number; doctors miss out important information like allergic reaction to drugs, dose, route and frequency about drugs while writing prescriptions.Nurses do mistakes while indenting the drugs and while checking the drug at the time of administration. There is unavailability of many drugs in Pharmacy. There are systems available to detect, correct and prevent the medication errors.The main reason for occurring the errors is improper and inadequate implementation of these systems.

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I take the opportunity to express my profound sense of gratitude and respect to all those who helped me throughout the duration of project.

Dr. Jasleen Kaur

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INTRODUCTION

Medication error has been defined as "any preventable event that may cause or lead to inappropriate medication use or patient harm, while the medication is in the control of health-care professional, patient or consumer. The error may be of commission or omission, with potentially negative consequences for the patient, which would have been judged wrongly by skilled and knowledgeable peers at the time it occurred, independent of whether there were any negative consequences. There are 2,000 deaths every year from unnecessary surgery; 7,000 deaths from medication errors in hospitals; 20,000 from other errors in hospitals; 80,000 from infections in hospitals; and 106,000 deaths every year from non-error, adverse effects of medications. It is reported that nearly 98,000 people die annually, because of mistakes committed by medical professionals in hospitals in a ratio of 1:5 doses. Deaths in India, due to adverse drug reactions (ADRs) are estimated to be around 400,000 annually in 720,000 ADRs.

Physician-Patient-Pharmacist relationship is the basis of a good prescription to ensure better compliance. The causes for medication errors can vary from miscommunication between physician, patient, pharmacist and other paramedical staff involved, to improper storage, labelling, packaging, confusion of look-alike sound alike (LASA), lack of information of current trends, protocols, dosing, references, medicine formularies or unawareness of the staff regarding new medicines, narcotics or high-alert medications.

Other than this, other causes include human factors such as workload, fatigue, inexperience, lack of training, poor handwriting, and verbal orders; workplace factors such as poor lighting, noise, interruptions, excessive workload as well as pharmaceutical factors such as excessive prescribing, confusing drug nomenclature, packaging, or labelling, increased number or quantity of medicines per patient, frequency and complexity of calculations needed to prescribe, dispense, or administer a medicine and lack of effective policies and procedures.

Drug use is a complex process and there are many drug related challenges at various levels, involving doctors, pharmacists, nurses and patients. Medication misadventure can occur anywhere in the health care system and many errors are preventable and pharmacists have an active role in the appropriate use of drugs.

Medication errors are a common cause for iatrogenic adverse events. They can lead to severe morbidity, prolonged hospitals stay, unnecessary diagnostic tests, unnecessary treatments and death. A medication error is an episode associated with the use of medication that should be preventable through effective control systems. Adverse events and medical errors are an inevitable reality of health care. They are the serious problems in paediatrics as well as in adult medicine. In 1999, IOM report on quality of health care, To Err Is Human: Building a Safer Health System called for a more systematic approach to medical errors and out lined the importance of identifying and learning from errors through mandatory and voluntary

reporting system. Medication errors have a huge impact on health care system, patients and payers alike. It compromises the confidence of patients on health care system.

REVIEW OF LITERATURE

Medication errors can be broadly considered to be of three types as described by Barber and colleagues (2003): prescribing errors, dispensing errors, and administration errors. Errors occur most commonly at the stage of drug ordering, dosing errors, and errors involving the intravenous route are the most frequent. What led to these studies are the observations that nearly half of all medication errors occur during the prescribing process with a subsequent cascade effect, which causes errors downstream in dispensing or administration (Thomsen and Schroeder 2004). The most common types of errors include giving the wrong drug or wrong dose, using the wrong route or failure to check the patient's identity (Allan et al 1995; Ferner et al 1999).

Underreporting of medication error is a major challenge for all healthcare facilities and medication errors are often under-reported if the provider perceives no harm to the patient or the errors are not considered worthy of reporting (Allan and Barker 1990; Wilson et al 1998). Underreporting of medication errors by nurses is due to fear of reaction from the nurse managers and coworkers, fear of punishment, complex and low self-esteem, organizational factors, and potential termination from job (Beardsley 1999; William 1999; Uribe et al 2002). Ineffective reporting of medication errors occurred in all medication distribution categories: prescribing, transcribing, dispensing, and administration (Hirtz et al 2002).

Medication misadventure can occur anywhere in the health care system from prescriber to dispenser to administration and finally topatient use, the simple truth is that many errors are preventable. According to studies cited in the institute of Medicine report, "to Erris Human; Building a Safer Health System" 44,000 to 98,000 Americans die each year as a result of medical errors.The subject of medication errors has received more national attention recently than any other time, thanks to attention drawnto the subject by physicians. Pharmacists have a long history of conducting research on medication errors, starting 40 years ago with astudy that demonstrated errors are a much bigger problem than anyone realized. Barker and McConnell compared the effectiveness ofincident reports and voluntary reports to direct observation of nurses as error detection methods. Thirty-six errors were documented by incident reports during the year studied. By comparison, two weeks' worth of data collectedby direct observation when extrapolatedover the same one year period indicated that 51,200 errors may have occurred (including 600 wrong time errors). This figure is 1,422times the number identified by incident reports. Other studies have confirmed the difference between the two methods

A medication error is an episode associated with use of medication that should be preventable through effective control system. The factors that that increases the chance of medication errors are the attributes of complex mechanisms involved in the prescribing, dispensing and

administration of drugs. Many authors have reported mechanisms for reducing medication error include reduced reliance on memory, improved asses to drug information, simplification, standardization and training. Substantial evidence suggests that pharmacists in decentralized patient care setting can reduce the frequency of medication errors. The demographic reports conducted by Jerry Philips et al in analysis of mortalities associated with medication errors showed high incidence of medication errors in male (77.4%) over Females (22.6%), and the study conducted by the Massachusetts Board of registration in pharmacy cited a predominate of males over females.
The study conducted by Massachusetts Board of registration in pharmacy showed higher incidence of medication errors in patients ranged between 31-40 years of age but in the study conducted by LeelavatiD.Acharya et al in the Study and evaluation of medication errors in tertiary care south Indian teaching hospital showed higher incidence of medication errors in age group of 40-60years.

Phillips J. et al did a retrospective analysis of medication errors between 1993 – 1998 and found that the most common types of errors were from administering improper dose (40.9%); overdose (36.4%), wrong drug(19%) and wrong route of administration (9.5%). The investigators also found that the most common causes of errors were performance and knowledge deficits (44%) and communication errors (15.8%).

Communication barriers can result in medication errors during every step within the medication administration process. In manycases, the physicians orally give medication orders, which can create errors due to the fact that many drug names sound alike and can be mispronounced . Doctors often write medication orders, and the nurses transcribe, by hand, the information. Messy and illegiblehandwriting, by both the physicians and nurses, can result in errors, such as wrong patient, incorrect medication, incorrect dose, and/orincorrect route. In addition, some hospitals use medication order forms that produce duplicate copies, and handwriting can becomevery illegible through several carbon copies.

Classification of medication errors should allow for better management of follow-up activities upon medication error detection. A simple classification of medication errors is the following:

- Level 0—No medication error occurred (potential errors would be classified here).
- Level 1—an error occurred that did not result in patient harm.
- Level 2—an error occurred that resulted in the need for increased patient monitoring but no change in vital signs and no patient harm.
- Level 3—an error occurred that resulted in the need for increased patient monitoring with a change in vital signs but no ultimate patient harm, or any error that resulted in the need for increased laboratory monitoring.

- Level 4—an error occurred that resulted in the need for treatment with another drug or an increased length of stay or that affected patient participation in an investigational drug study.
- Level 5—an error occurred that resulted in permanent patient harm.
- Level 6—an error occurred that resulted in patient death.

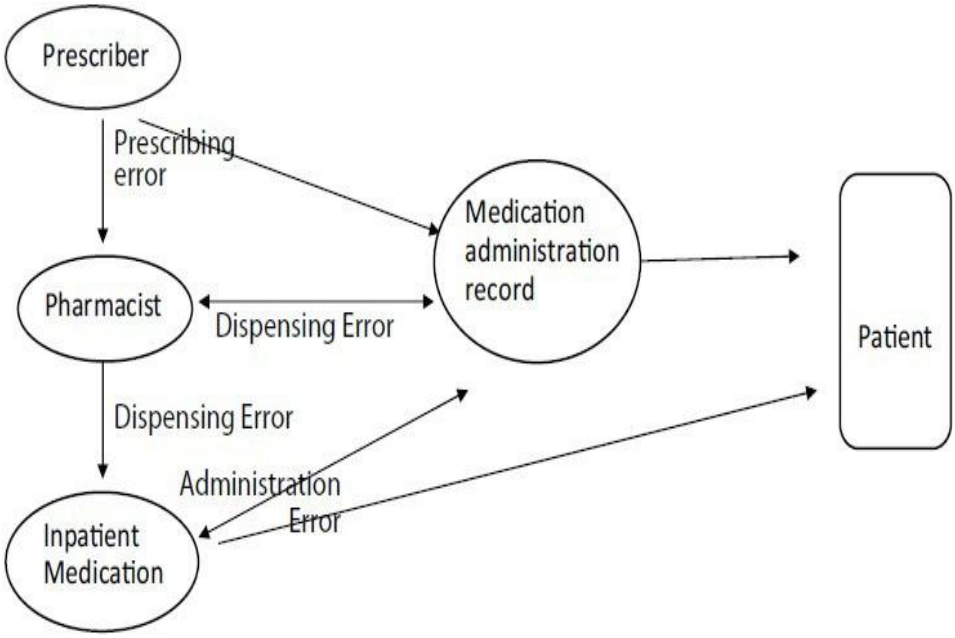


Fig1: Types of errors

RATIONALE

Medication errors are the serious problems in health care and can be the source of significant morbidly and mortality in the health care setting. In India, irrational use of drugs is common and this has led to antibiotic resistance, adverse drug reactions, medication errors and other drug related problems.

Medication errors increases cost, significantly prolongs hospital stay and increase the risk of death almost 2-fold.Several easily identifiable factors associated with large populations of medication errors includes inadequate knowledge regarding drug therapy, such as age, impaired renal function and drug allergy , need for calculation of drug dose, specialized drug formulation characteristics and medication prescribing nomenclature, other most common factors contributed to medication error include lack of drug information, incorrect diagnosis, drug-drug related reactions, dose miscalculations, incorrect drug administration and lack of patient education, miscommunication of drug order resulting from poor handwriting, missing information when the drug is packed into
Smaller units, external factors such as interruption, work load, job related stress, improper training or education and sound-alike look alike packaging of medications.

In order to reduce the medication errors, it is necessary to know more on the type of medication errors and the stages at which they take place. The medication ordering system has many components and breach in these processes leads to medication errors, which can cause harm to patients. The medication ordering sequence involves prescribing a medication, transcribing the order, sending the order to pharmacy, dispensing the medication from pharmacy to the floor, administering the medication to the patient, documenting the administered medication and assessing its effect on the patient. Each step involved in this procedure has the potential to cause medication error.

Medication error is one of the critical aspects involved in patient safety and hence is identified as one of the quality indicators for nursing and pharmacy. This study will provide the baseline data regarding the rate of medication errors for the assessment of NABH Accreditation.Medication errors are not reported every time they occur, so this study will aware the staff about the prevalence of the errors and the importance to report them.

AIM

The purpose of present study is to identify and evaluate the incidence and types of errors and to assess the severity of medication errors in NH Hospital, Ahmedabad.

OBJECTIVES

- To assess the medication process of the hospital under study.
- To measure the medication error rate for the study period
- To identify the causes for the medication error
- To develop the solutions to reduce and or to prevent medication errors in the hospital under study.

METHODOLOGY

- Sample size- 92 patients
- Study design- Prospective observational study.
- Sampling procedure- purposive sampling method.
- Study period-data collection period – 20thFebruary to 20th April, 2016.
- Data source-Hospital and medical records, Case sheet of the inpatient who will be admitted in hospital.
- Inclusion criteria: Indoor patients of General Ward, Semiprivate Ward
- Exclusion criteria: OPD and Emergency patients

DATA COLLECTION TOOL

- Type of data: Primary and Secondary data
- Instrument used for data collection: Structured Checklist
- . The scoring pattern used is: 1 = Compliance, 0= Non Compliance
- Methods of data collection:
- Review of medicine card and issue slip
- Observation of nursing staff at nursing station
- Review of drugs at patient's bedside
- Interview of patients and attendants
- Software used for analysis: Microsoft Excel

DATA ANALYSIS

- Total 92 prescriptions were analyzed.
- Per prescription, criteria were observed for medication error.
- Total errors 339 were found out.
- *Medication Error Rate (%)*
- = *Total Number of error observed * 100*

  Total Opportunities for the occurrence of errors

  = *339*100/*

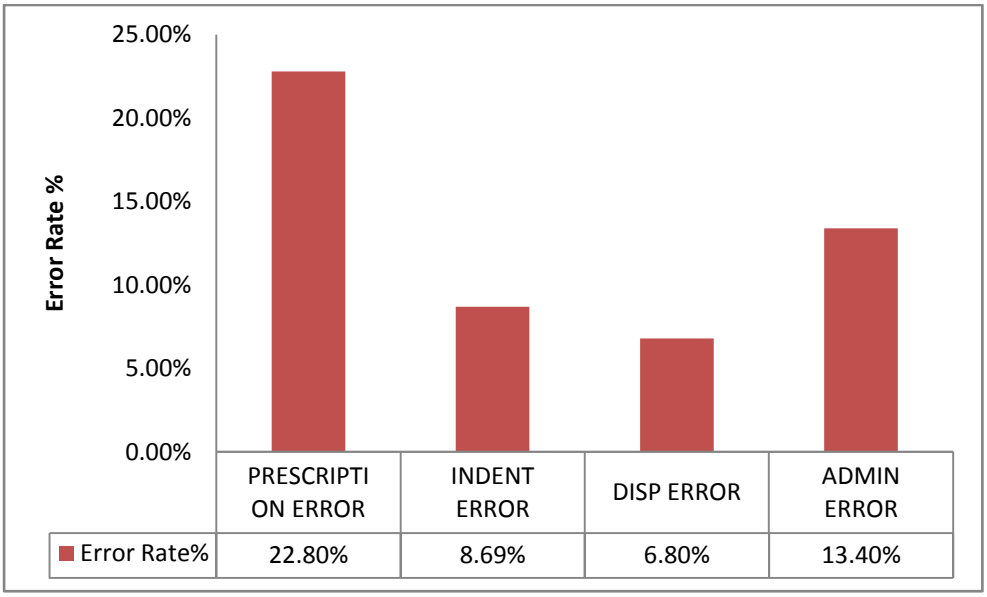
  2208

  = *15.35%*

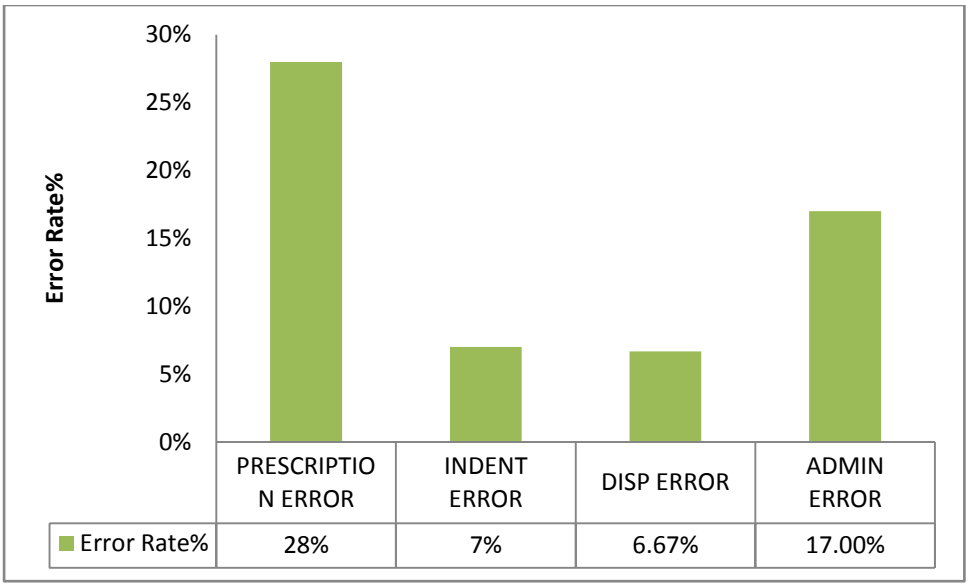
Prescription Error Rate	22.80%
Indenting Error Rate	8.69%
Dispensing Error Rate	6.80%
Administration Error Rate	13.4%

***Figure2*:Medication error rate according to process involved**

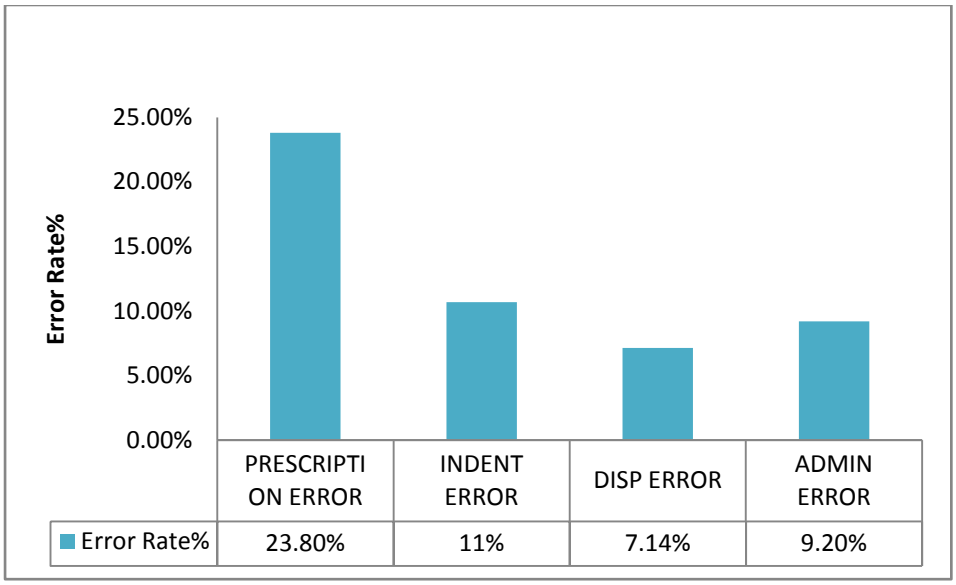
RESULTS



Graph 1: Total Medication Errors



Graph 2:General Ward Medication Errors



Graph 3: Semi private ward errors

	Presription error	Indent Error	Dispensing Error	Adminstation Error
General Ward	28.00%	7%	6.67%	17%
Semi -Private Ward	23.80%	11%	7.14%	9.20%

Graph 4:Comparing Error Rates among two Inpatient areas as per the process involved

Process	System	Problem identified
Prescribing	Standard order sets Ongoing Medication	Lack of awareness and training among doctors
Indenting	Computerized system	Lack of mechanism to countercheck the drug
Dispensing	Unit Dose Distribution	Inaccurate dose Calculations
Administration	Medication Administration record	Lack of mechanism to countercheck the drug
Monitoring	Regular reporting	Done by nurse

Figure 3:Available systems to address the medication error

Fishbone Analysis

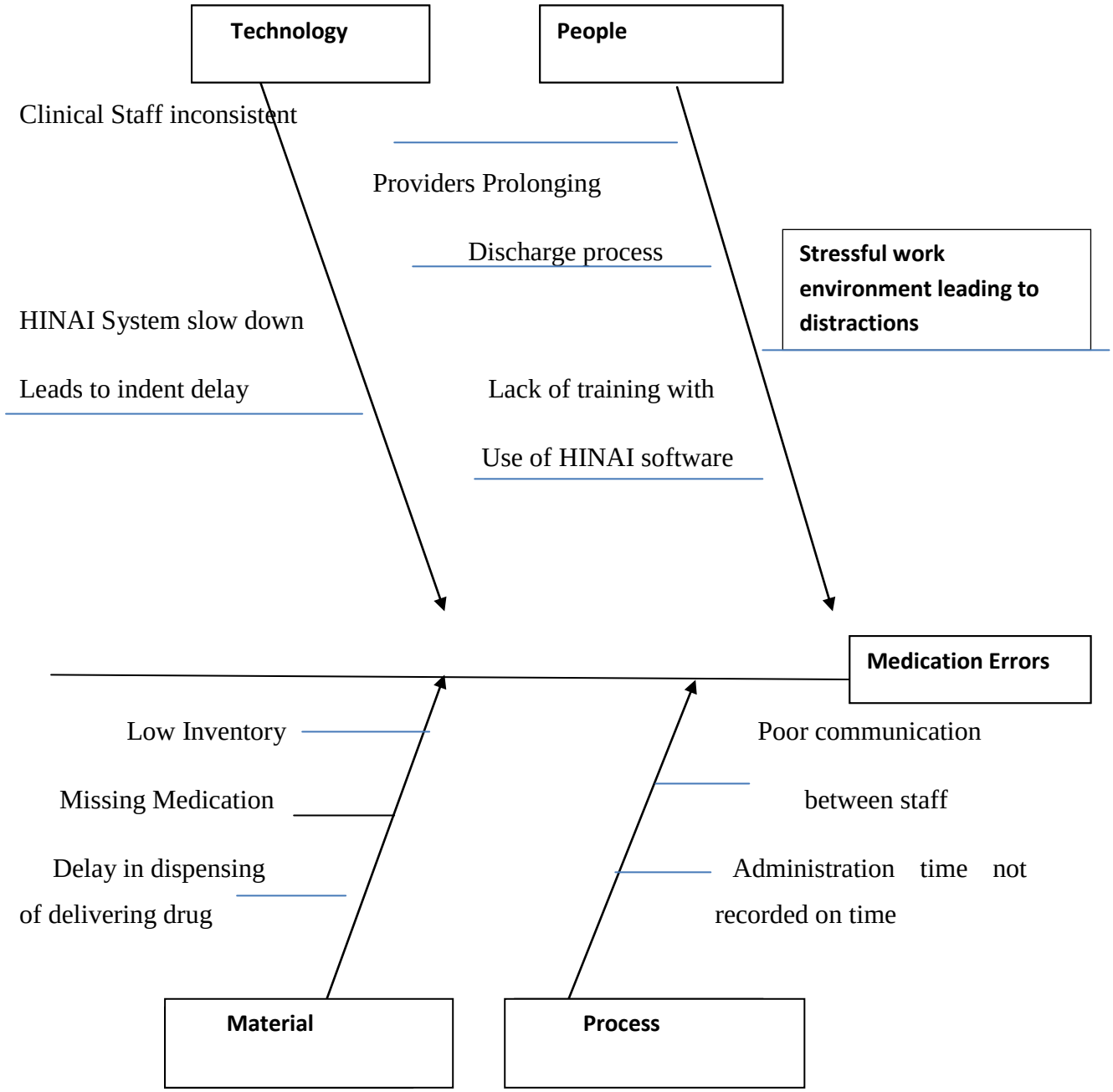


Figure 4: Fish Bone Diagram

DISCUSSIONS

- The standard acceptable Medication Error rate is 3% which was 5% previously. In this study it is higher than the standard. (Source: Indian Journal of Pharmacology, A prospective study on medication errors by Thakur H and others, 2013)
- The Prescription error rate is maximum followed by administration error.
- There are systems available to detect, correct and prevent the medication errors.
- The main reason for occurring the errors is improper and inadequate implementation of these systems.

Causes for medication errors

- Lack of attention to details
- Prescription errors were highest in number; doctors miss out important information like allergic reaction to drugs, dose, route and frequency about drugs while writing prescriptions.
- SOS Drug Indication is not written in many cards.
- Dosage not written properly and if written in many cases it is not understandable.
- Nurses do mistakes while indenting the drugs and while checking the drug at the time of administration.
- Inaccurate dose calculations which lead to extra indent or dose miss.
- Unavailability of many drugs in Pharmacy.
- Dispensing delay from pharmacy in many drugs that leads to dose delay.
- Administration time is not written immediately after administering drug; Nurses fill up the medication card after completion of their rounds which can lead to errors.
- Sign and counter sign are done by same staff in many cases. So there is no check on it.
- Indent slips are not maintained in patient file properly.

RECOMMENDATIONS

Medication process needs to be error-free which is the responsibility of a team of doctors, nurses, pharmacists and patients.

- Prescription Errors are highest in number as noticed, so doctors as well as nurses should be trained to avoid future mistakes.
- Sufficient stock level for commonly used drugs should be maintained in Pharmacy to avoid dose delay.
- Nursing staff should maintain the medication card timely and should be updated timely this will reduce chances of errors.
- One Pharmacist is required in General Ward which will do work of indenting and Pharmacy return asnursing staff due to work overload causes delay in indenting of drugs through system .
- Developing mechanism for counterchecking the drug while indenting and administration.
- Regular audits of medication errors done by pharmacist
- Patient Education

ANNEXURE

MEDICATION ERROR DAILY AUDIT RECORD

	WARD:											DATE:															
		PRESCRIPTION ERROR									INDENT ERROR				DISP ERROR			ADMIN ERROR								
No	PATIENT ID	ALLERGY	ONGOING MEDICATION	WRONG ORDER	ILLEGIBLE	DOSE	ROUTE	FREQUENCY	DR NAME,SIGN, DATE AND TIME	SOS DRUG INDICATIOON	INDENT DELAY	WRONG DRUG	WRONG DOSE	EXTRA INDENT	DISPENSING DELAY	WRONG DRUG	WRONG DOSE	ADMINISTRATION TIME	WHITOUT ORDER	SIGN	COUNTER SIGN	DOSE MISS	DOSE DELAY	WRONG DRUG	WRONG DOSE
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