

Original Research Article

# A preliminary study on profile and pattern of medication errors from a tertiary care teaching hospital

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## Abstract

**Background:** A medication error is an episode associated with use of medication that should be preventable through effective control system. Investigating the incidence, type, and nature of medication errors are very crucial to prevent them.

**Aim:** The study aimed to analyze and ascertain profile and pattern of medication errors among admitted patients in a tertiary care teaching hospital.

**Material and methods:** The present prospective study was carried out by the Department of Pharmacology in collaboration with the Department of Internal Medicine and Office of Medical Superintendent, MSDS Medical College, Fatehgarh, among the patients admitted to the General medicine ward during October 2013-February 2014. Hospital/medical records, Case sheet of the study

subjects, a 46 item self administered questionnaire and Medication error reporting and documentation form served as study tools.

**Results:** Overall incidence of medication errors was found to be 28.3%. 31.4% were 'Errors in medication ordering and transcription', 24.4% were 'Errors in medication dispensing', whereas 44.2% were observed as 'Nursing errors in medication administration'. Most frequent nursing errors in medication administration was found to be 'Medication not given' i.e. Omission error. 67.4% were due to nurses, 22.1% were due to pharmacists and remaining 10.5% were due to physicians. Most of the nurses attributed cause of this error to 'Repeated distraction' and 'High activity duty hours' 41.4% and 39.6% respectively.

**Conclusion:** A robust surveillance system to detect such medication errors is need of an hour. Competencies of pharmacology department hibernating in a tertiary care teaching institution could be utilized in the early detection and prevention of medication errors and thus can improve the delivery of care quality to the patients.

## Key words

Profile, Pattern, Medication Errors, Pharmacology, Patients, General Medicine.

## Introduction

In recent years there is a growing appreciation of the 'medication errors' in health care delivery system. The topic of medication errors has received more attention globally recently in view of patient safety and accreditation quality management process and system. Medication errors are the serious problems in health care and can be the source of significant morbidity and mortality in the health care setting [1, 2]. 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 [3].

Medication error is defined as, 'The failure of a planned action to be completed as intended or use of a wrong plan to achieve an aim' [4]. It is also 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 the health care professional, patients and consumer' [5]. The quality of health care delivery can be improved if we can quantify the problem of medication errors and take necessary steps to minimize them till certain extent. Investigating the incidence, type, and nature of medication errors are very crucial to prevent them. A medication error is an episode associated with use of medication that should be

preventable through effective control system. This study would generate certain correlates which could be utilized to prevent medication errors. The present study was therefore planned to analyze and ascertain profile and pattern of medication errors among admitted patients in a tertiary care teaching hospital.

## Material and methods

The current study was planned and executed by the Department of Pharmacology in collaboration with the Department of Internal Medicine and Office of Medical Superintendent, MSDS Medical College, Fatehgarh among the patients were admitted in the general medicine ward.

**Study area:** MSDS Medical College, Fatehgarh

**Study Population:** Patients admitted in the General Medicine ward.

**Study design:** Prospective study

**Study period:** Five months (October 2013-February 2014)

**Sample size:** 300 in-patients

**Sampling method:** Random selection method

**Inclusion Criteria:** Patients admitted to General Medicine ward Medicine Department and willing to participate in the study.

**Exclusion Criteria:** Patients not willing to participate in the study.

**Study tools:** Hospital/medical records, Case sheet of the study subjects, a 46 item self administered questionnaire and Medication error reporting and documentation form.

**Study strategy:** The randomly selected eligible study subjects and his/her relevant details were followed till discharge of the patient. In-patients case records was reviewed, which includes patients case history, diagnosis, physician medication order sheets, nurse medication administration records, progress chart, laboratory investigations and report of other diagnostic tests. The information was captured in the patient profile form. Whenever Medication error was identified, during the review data from patient profile form was transferred to medication error reporting and documentation form. All the documented medication errors were analyzed for demographic status of patients, month wise distribution of the errors, professionals involved in the errors, Causes of medication errors, Incidence of medication errors, Types of medication errors and system wise distribution of errors.

National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP) proposed 'Medication Error Index' was used to assess the severity of medication error. Causes of medication errors were documented according to Root Cause Analysis (RCA) as per Joint Commission on Accreditation of Health Care Organizations (JCAHO). All the questionnaires were manually checked and edited for completeness and consistency and were then coded for computer entry in Microsoft Excel. After compilation of collected data, analysis was done using Statistical Package for Social Sciences (SPSS), version 21 (IBM, Chicago, USA). The results were expressed using appropriate statistical variables.

## Results

A total of 1263 patients were admitted in the department of medicine during the study period of five months (October 2013-February 2014). Among them a total of 300 patients were selected

randomly and were followed for the study period. Among the 300 patients followed, 86 medication errors were found in 73 patients. Hence overall incidence of medication errors was found to be 28.3%. Out of total 86 medication errors detected in the study, majority of errors (67.4%) were due to nurses, 22.1% were due to pharmacists and remaining 10.5% were due to physicians. Most of the nurses attributed cause of this error to 'Repeated distraction' and 'High activity duty hours' 41.4% and 39.6% respectively. Majority of medication errors by physicians were due to 'Verbal orders'. (**Table - 1**)

Out of total 86 medication errors observed in this study, 31.4% were 'Errors in medication ordering and transcription', 24.4% were 'Errors in medication dispensing', whereas 44.2% were observed as 'Nursing errors in medication administration'. Most frequent (n=16) nursing errors in medication administration was found to be 'Medication not given' i.e. Omission error. (**Table - 2**)

It was found that 87.2% medication errors belonged to the category 'Error, No harm' which comes under sub-category B 30.2%, subcategory C 55.8% and subcategory D. Only 3.6% of medication errors were observed in the category of 'Error, harm'. (**Table - 3**)

## Discussion

Medication errors are an unfortunate reality at hospitals approximately, 30% of problems occurring during hospitalization are related to medication errors which are preventable. Such errors may 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. 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.

**Table - 1:** Professionals involved and perceived causes of medication errors among study subjects.

Professionals involved in medication errors		Perceived causes of medication errors		
		Causes	Frequency	Percentage
Medication errors by nurses	58 (67.4%)	Untrained Nursing staff	11	19.0
		High activity duty hours	23	39.6
		Repeated distraction	24	41.4
Medication errors by pharmacists	19 (22.1%)	Illegible Handwriting	8	42.1
		High workload	2	10.5
		Generics drugs	5	26.3
		Repeated distraction	4	21.1
Medication errors by physicians	9 (10.5%)	Verbal orders	6	66.7
		Unclear medication orders	3	33.3

Three hundred patients were randomly selected and followed up for a period of five months prospectively to investigate profile and pattern of medication errors. The overall incidence of medication errors was found to be 28.3% in the current study. The incidence was higher when compared to other studies, where it ranged from 3 to 17%. Study from south India [2] on medication errors in tertiary care hospital showed a mean medication error rate was 17% and one other study carried out by Barker, et al. [6] on medication errors in nursing home and small hospitals showed a mean medication error rate of 12.2% and 11% respectively. It could be due to variation the method followed and variables such as hospital set-up, number of beds, duration of study and number of patients followed.

Our study revealed that 31.4% were 'Errors in medication ordering and transcription', 24.4% were 'Errors in medication dispensing', whereas 44.2% were observed as 'Nursing errors in medication administration'. Most frequent (n=16) nursing errors in medication administration was found to be 'Medication not given' i.e. Omission error. This comes in the agreement with the findings of Clyde D. Ford, et al. [7] on study of medication errors in community hospital in oncology ward.

It was observed in the current study that majority of errors were due to nurses, followed by due to pharmacists and very few due to physicians. Most of the nurses attributed cause of this error to 'Repeated distraction' and 'High activity duty hours' 41.4% and 39.6% respectively. But on the other hand, in spite of committing more errors nurses were less likely to report medication errors that they felt were innocuous, especially late-arriving medications from the pharmacy. The result of this study is in agreement with previous studies [8, 9].

Another study showed that prescription errors are the most common among the types of errors. But in our study omission error (44.5%) was the most common among the all types of errors [10, 11]. Similar results observed in study carried out by others [12, 13]. Regarding severity level assessment of medication errors, it was found that 87.2% medication errors belonged to the category 'Error, No harm' which comes under sub-category B 30.2%, subcategory C 55.8% and subcategory D. Only 3.6% of medication errors were observed in the category of 'Error, harm'. Another survey on recording of medication errors for error category index showed that 35% of recorded errors did not reached the patients, 49% of the recorded errors reached the patients [14].

**Table - 2:** Professionals involved and perceived causes of medication errors among study subjects.

<b>Types of Medication errors</b>		
(A) Errors in medication ordering and transcription	27	31.4
(B) Errors in medication dispensing	21	24.4
(C) Nursing errors in medication administration	38	44.2
<b>(A) Errors in medication ordering and transcription N=27 (31.4%)</b>		
<b>a. Physician order writing errors</b>	5	18.5
i. Order illegible	2	40.0
ii. Order written on wrong chart	1	20.0
iii. Wrong dose	1	20.0
iv. Wrong Frequency	1	20.0
<b>b. Ward clerk errors</b>	3	11.1
i. Fails to send copy of order to pharmacy		
<b>c. Nursing errors</b>	4	14.8
i. Enters wrong order into MAR		
<b>d. Pharmacy errors</b>	15	55.5
i. Miscopies written order into computer	5	33.3
ii. Places order into computer without a written order	4	26.7
iii. Fails to put order into computer	3	20.0
iv. Fails to discontinue medication from computer when ordered	3	20.0
<b>e. Errors not otherwise classifiable</b>	0	00.0
<b>(B) Errors in medication dispensing N=21 (24.4%)</b>		
<b>(A) Nursing dispensing errors</b>	16	76.2
a) Dispenses wrong medication	9	42.9
b) Dispenses incorrect dose	7	57.1
<b>(B) Pharmacy dispensing errors</b>	5	23.8
a) Failure to send medication to the ward at appropriate time	2	9.5
b) Dispenses wrong medication	1	4.7
c) Dispenses an incompatible medication	1	4.7
d) Dispenses incorrect dose	1	4.7
<b>(C) Nursing errors in medication administration N=38 (44.2%)</b>		
1. Medication not given (Omission error)	16	42.1
2. Wrong medication given	5	13.2
3. Wrong time	4	10.5
4. Wrong dose	3	7.8
5. Administered after discontinue order	3	7.8
6. Wrong route	3	7.8
7. Failure to chart medication	3	7.8
8. Wrong patient	1	2.6

## **Conclusion**

It can be concluded on the basis of findings of this study that overall incidence of medication errors is quite high and is not acceptable. A robust surveillance system to detect such medication errors is need of an hour.

Competencies of pharmacology department in a tertiary care teaching institution could be utilized in the early detection and prevention of medication errors and thus can improve the delivery of care quality to the patients.

**Table - 3:** Severity level assessment of medication errors observed among study subjects.

Level of severity	Category	Medication errors	
		Number	Percentage
No Error	Category A	8	9.3
Error , No harm	Category B	26	30.2
	Category C	48	55.8
	Category D	1	1.2
Error, harm	Category E	2	2.4
	Category F	1	1.2
	Category G	0	0.0
	Category H	0	0.0
Error, Death	Category I	0	0.0

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