

Incidence of Medication Errors in a Tertiary Care Hospital in South-India

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ABSTRACT

Aim and Objectives: 1) To assess incidence of medication errors. 2) To evaluate percentage of patients admitted with adverse drug reaction. 3) To evaluate percentage of Error Prone Abbreviations. 4) To analyze the adverse drug event in Patients Receiving High Risk Medication. **Methods and Search Strategy:** A systematic review of literature related to Medication errors in prescribing, transcribing, dispensing, administration and documentation in various subjects, error prone abbreviations, adverse drug events in patients receiving high risk medication were collected. The following electronic databases were searched: Embase, Pubmed, EBSCO, Allied Health Literature. **Results:** We reviewed 20796 medication orders and found 1710 medication errors (8.5%), 214 Error Prone Abbreviation (1.1%), 5 patients admitted with Adverse drug reaction (0.45%), 3 adverse drug events in Patients Receiving High Risk Medication (0.27%). Among the 1710 medication errors (8.5%) – 619 transcribing errors (3.29%), 397 prescribing errors (2.11%), 13 dispensing errors (0.06%), 357 documentation errors (1.89%), 214 EPA (1.14%), 5 near miss errors (0.02%), 55 missed dose errors (0.29%) were found. **Conclusion:** Now a days medication errors are being observed most commonly in a tertiary care hospital. Of the observed medication errors transcribing errors were observed more commonly followed by to prescribing, documentation, EPA, dispensing, missed dose errors and near miss errors. We can overcome these medication errors by educating physicians, nurses regarding the areas where medication errors are more prone to occur.

Key words: Medication error, Prescribing error, Dispensing error, Administration error, Documentation error, Transcribing error, EPA (Electronic prior authorization), Near miss, Missed dose.

INTRODUCTION

Drug use is a complex process and there are many drug related challenges at various levels. Medication misadventure can occur anywhere in the health care system and pharmacists have an active role in monitoring the appropriate use of drugs.¹ Medication errors are a common cause for iatrogenic adverse events and are reported to be the seventh most common cause of death overall. They can lead to severe morbidity, prolonged hospitals stay, unnecessary diagnostic tests, unnecessary treatments and death.^{2,3}

Medication errors often occur when clinicians are inexperienced and new procedures are introduced. Extremes of age, complex care, urgent care and prolonged hospital stay are associated with more errors (Table 1). This hospital medication use process

can be categorized into five broad stages: prescription, transcription, preparation, dispensation and administration. An error can occur at any point in this process. Medication errors mainly occur during the administration stage (median of 53% of all errors), followed by prescription (17%), preparation (14%) and transcription (11%) (Table 2). Occurrence of an error that did not result in harm is called near miss error.^{4,5}

The use of inappropriate abbreviations in prescriptions may alter intended therapeutic outcomes and even cause unnecessary harm to patients.⁶ Despite these warnings, error prone abbreviations continue to be used.⁷ The rapid development of electronic prescriptions have minimized this problem to an extent, but hand-written prescriptions will continue to be used, especially in

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Table 1: Incidence of medication error.

MONTH	Jan 2016	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov
Sample	1645	1410	1480	1560	1850	1950	2300	2600	2301	2100	1600
Total Errors	460	272	141	114	87	97	131	115	137	101	55
Inpatient Days	1745	1448	1534	1608	1933	2075	2476	2710	2347	2223	1635
%	26.36	18.78	9.19	7.08	4.50	4.67	5.29	4.24	5.83	4.54	3.48

Out of 20796 medication orders we found 1710 medication errors (8.5%) in span of 11 months, of which highest incidence of medication errors were observed in January and lowest incidence medication errors were observed in November.

Table 2: Incidence of types of medication errors.

Types of errors	Jan 2016	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov
Transcribing	81	56	80	71	54	68	56	49	39	42	23
Prescribing	98	146	13	19	7	7	22	9	27	30	19
Dispensing	1	1	0	0	0	1	2	3	1	3	1
Documentation	184	32	28	12	11	7	14	19	35	6	9
EPA	96	22	14	12	7	3	15	17	14	8	6
Near miss	0	0	0	0	2	1	1	0	1	0	1
Missed dose	0	0	6	0	6	10	3	18	6	5	1

Among 1710 medication errors (8.5%) – 619 transcribing errors (3.29%), 397 prescribing errors (2.11%), 13 dispensing errors (0.06%), 357 documentation errors (1.89%), 214 EPA (1.14%), 5 near miss errors (0.02%), 55 missed dose errors (0.29%) were found

developing countries. Therefore, eliminating error-prone abbreviations and standardizing acceptable abbreviations is an urgent need.⁸

Adverse drug events (ADEs) and their associated morbidity and mortality represent a significant burden on the healthcare system.⁹ Medication error (miscalculations, misadministration, difficulty in interpreting handwritten orders, misunderstanding of verbal orders etc) and ADR together known as ADE. Systemic reviews have estimated that approximately 5–10% of total hospital admissions are related to an ADE (Table 3).

Adverse Drug Reactions (ADRs) - unintended, harmful events attributed to the use of medicines - occur as a cause of and during a significant proportion of unscheduled hospital admissions.¹⁰ A careful medication history can assist a prescriber in understanding the patient's previous experiences with drug treatment, particularly in identifying previous ADRs that may preclude re-exposure to the drug (Table 4).⁶

RESULTS

We reviewed 20796 medication orders and found 1710 medication errors (8.5%), 214 Error Prone Abbreviation (1.1%) (Table 5), 5 patients admitted with Adverse drug reaction (0.45%), 3 adverse drug events in Patients Receiving High Risk Medication (0.27%). Among the 1710 medication errors (8.5%) – 619 transcribing errors (3.29%) (Figure 1-3) 397

Table 3: Percentage of admissions with adverse drug reactions.

MONTH	ADR	%
Jan 2016	0	0
Feb		
Mar		
April		
May		
June	1	0.221
July	1	0.193
Aug	0	0
Sep		
Oct	1	0.17
Nov	2	0.44

We reviewed 20796 medication orders of which 5 patients were admitted with adverse drug reaction (0.45%), in a span of 11 months. Highest percentage of adverse drug reactions were observed in November and there were no adverse drug reactions in January, February, March, April, May, August and September.

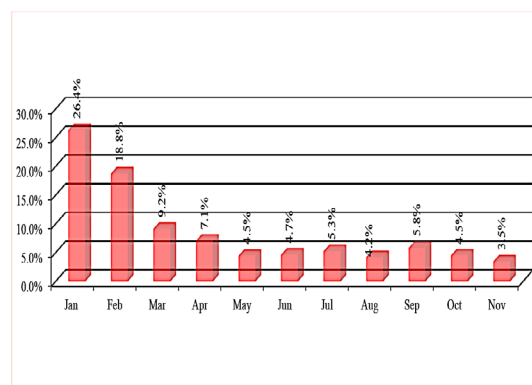
**Figure 1: Graph representing incidence of medication errors.**

Table 4: Percentage of error prone abbreviations.

MONTH	Jan 2016	Feb	Mart	April	May	June	July	Aug	Sep	Oct	Nov
Sample size	1645	1410	1480	1560	1850	1950	2300	2600	2301	2100	1600
Errors	96	22	14	12	7	3	15	17	14	8	6
%	5.83%	1.56%	0.94%	0.76%	0.37%	0.15%	0.65%	0.6%	0.60%	0.38%	0.36%

We reviewed 20796 medication orders and we found 214 Error Prone Abbreviation (1.1%) in a span of 11 months of which we found highest percentage of medication error prone abbreviations in January and lowest percentage of medication error prone abbreviations in November.

Table 5: Percentage of patients receiving high risk medications developing adverse drug events.

MONTH	ADVERSE EVENT (ADE+ADR)	%
Jan 2016	0	0
Feb	0	0
March	0	0
April	1	0.05%
May	0	0
June	0	0
July	0	0
Aug	1	0.18%
Sep	1	0.20%
Oct	0	0
Nov	0	0

We reviewed 20796 medication orders of which 3 adverse drug events in Patients Receiving High Risk medication (0.27%) were observed in a span of 11 months.

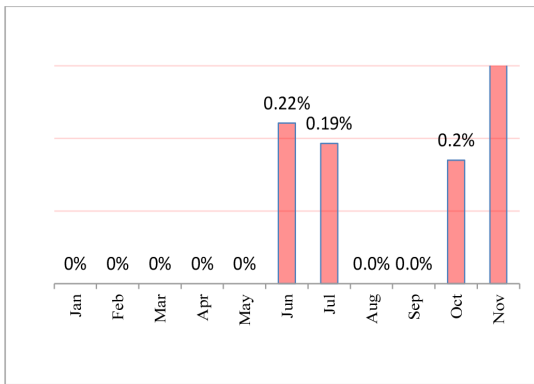


Figure 2: Graph representing % of admissions with adverse drug reactions.

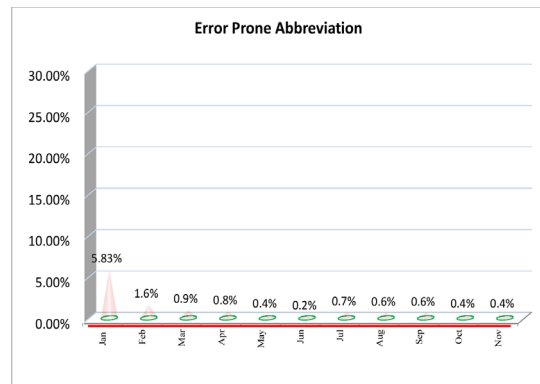


Figure 3: Graph representing % of error prone abbreviations.

prescribing errors (2.11%), 13 dispensing errors (0.06%), 357 documentation errors (1.89%), 214 EPA (1.14%), 5 near miss errors (0.02%), 55 missed dose errors (0.29%) were found (Figure 4,5).

CONCLUSION

Now a day’s medication errors are being observed most commonly in a tertiary care hospital. Most of those errors are the results of problems created by today’s complex health care system. Of the observed medication errors transcribing errors were observed more

commonly followed by to prescribing, documentation, dispensing, missed dose errors and near miss errors. We can overcome these medication errors by educating physicians, nurses regarding the areas where medication errors are more prone to occur. Computerized physician order entry, automated dispensing, bar code medication administration, medication reconciliation and personnel health records are vital components to prevent medication errors now a days (Table 6,7).

Suggested Recommendation

According to the review results, the following

Table 6: Compliance rate to inpatient medication prescription in capitals.

Month	Total prescriptions observed in IP	In capital	%
May 2016	250	225	90
June	270	250	92.5
July	480	450	93.75
Aug	2505	2410	96.34
Sep	2347	2301	98.04
Oct	2100	2017	96.04
Nov	1600	1580	98.75

We reviewed 9552 inpatient prescriptions of which 9233 prescriptions were written in capitals (96.66%) in a span of 7 months. More no. of prescriptions were written in capitals during April, lowest were observed in January.

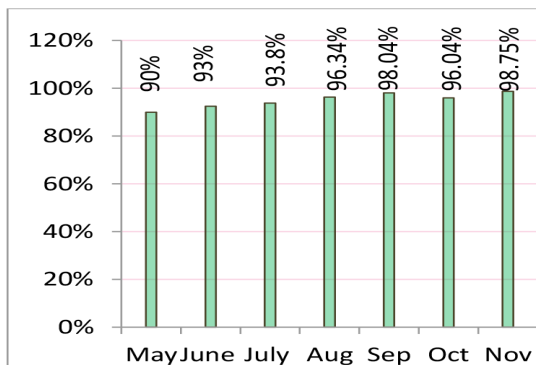


Figure 4: Graph representing compliance rate to outpatient medication prescription in capitals.

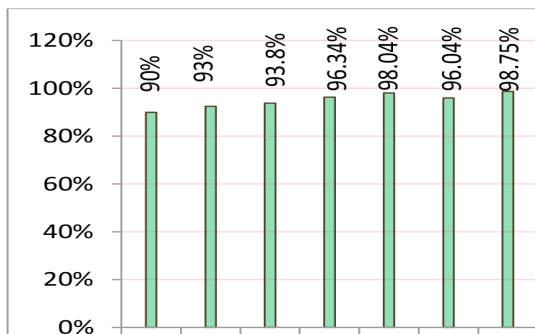


Figure 5: Compliance rate to inpatient medication prescription in capitals.

recommendations are suggested to allow decision makers to improve medication safety and reduce medication errors:

- Increase the awareness of medication errors of healthcare professionals.
- Prescribers need to pay more attention to drug dosing.

Table 7: Compliance rate to outpatient medication prescription in capitals.

Month	Total prescriptions observed in OP	In capital	%
May 2016	150	60	40
June	170	60	64.70
July	210	159	75.71
Aug	180	120	66.6
Sep	230	140	60.86
Oct	210	132	72.38
Nov	190	120	68.42

We reviewed 1340 outpatient prescriptions of which 791 prescriptions were written in capitals (59.02%) in a span of 7 months. More no. of prescriptions were written in capitals during March, lowest were observed in January and February.

- Improve medication error reporting systems and policy among organizations by removing barriers, clarifying the importance of reporting and encouraging healthcare professionals.
- Carryout regular intensive educational and training programs in pharmacotherapy for undergraduate medical and para medical students.
- Educational programs by clinical pharmacies and clinical pharmacologists in drug therapy are urgently needed for doctors and nurses.

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CONFLICT OF INTEREST

No conflict of interest.

ABBREVIATIONS

EPA: Electronic prior authorization; **ADR:** Adverse drug reactions; **ADE:** Adverse drug event.

SUMMARY

We can overcome these medication errors by educating physicians, nurses regarding the areas where medication errors are more prone to occur. Computerized physician

order entry, automated dispensing, bar code medication administration, medication reconciliation and personnel health records are vital components to prevent medication errors now a days.

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