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ASSESSMENT OF MEDICATION ERRORS AND SCREENING OF ADHERENCE TO WHOPRESCRIPTION WRITING GUIDELINES IN A TERTIARY CARE HOSPITAL IN TELANGANA REGION

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ABSTRACT

Medication errors are 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, patient, or consumer. Medication errors can cause significant morbidity and mortality in patients. The present study was conducted with the main objective to assess the medication errors and adherence to WHO prescription guidelines. A prospective observational study was conducted for a period of 6months in a tertiary care hospital including 208 patients. Data was collected by regular review of patient case records. The collected data is analyzed for identifying different types of medication errors. The reported errors were assessed for severity by using NCCMERP index. The prescriptions were also screened for adherence to WHO guidelines for prescription writing. Out of 208 patients, 186 medication errors were recorded. The prevalence of medication errors in the study were found to be 89% without any fatal outcomes, Majority of the errors recorded were prescribing errors(92%)followed by omission errors(51%)and most of the errors were under the NCCMERP Index Category-D(55%) and Category-C(24%). Most of the errors were recorded in the age group of 31-50 (39%). In our study errors were more in males(56%) than in females(44%).Majority of the errors were observed in antibiotics(35%) followed by antihypertensives(25%).Most of the errors were

recorded in prescriptions containing 6-10 drugs(55%).Among 208 prescriptions, more than half of the prescriptions doesn't have complete details of patient, physician, proper instructions to patient and pharmacist.

Keywords: Medication errors, Preventable event, NCCMERP Index, WHO guidelines, Prescribing errors and Omission errors

INTRODUCTION

Medication is the major essential commodity for every individual to lead a healthy life. Almost every person receives medicines at least once in a lifetime as a part of their healthcare. Most of the time medication are useful and do not create any problem to the patient however in some instances they can cause harm to the patient which are results of today's complex health care system **[1]**.

The National Coordinating Council for Medication Error Reporting and Prevention (NCCMERP) has defined medication error as "Any avertable 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, patient and consumer" **[2]**. MEs have a significant impact on the patient as they increase the morbidity, mortality and health care cost while decreases the patient belief in health care team **[3]**. Annually 5.2million medication errors are reported in India **[4]**. A study conducted by the Institute of Medicine estimated that the health-care cost due to MEs in the US is $37.6 billion/year out of which approximately $17 billion is spent only on preventable errors **[5]**. Yet, the incidence of MEs is not exactly known as they are not well reported unless they results in significant clinical consequences to the patient.

Tragic incidents occurred in recent years brought the medication error scenario to national attention. For example, Administration of Feracrylum (Hemostatic) instead of Paracetamol caused loss of a 34year old women life **[6]**.

Medication errors can occur at any stage of medication use cycle such as from prescribing to monitoring at any stage **[7]**. Hence, based on the stage of the medication use cycle they occur MEs are generally classified as Prescribing, Dispensing, Transcribing, Administration and Monitoring errors **[8]**. However there is a much broader classification given by ASHP (American Society of Health-System Pharmacists) such as Prescribing errors, Dispensing errors, Omission errors, Wrong time errors, Unauthorized drug errors, Wrong dosage form errors, Wrong drug preparation errors, Wrong administration technique errors, Deteriorated drug error, Monitoring error, Compliance errors and

others **[9]**. There are many risk factors that may contribute to errors are irrational prescribing and dispensing, polypharmacy, irrational use drugs without indication, ADRs, DIs, Poor communication among health care professionals, heavy workload **[10]**.

A prescription is a valid authoritative information given by prescriber to pharmacist and patient. It should be comprehensible and should contain all the necessary Information **[11]**. Lack of information of patient/prescriber and lack of proper instructions to pharmacist and physician may leads to errors.

The present study was carried out to identify the Medication errors and to screen the prescriptions to adherence to WHO prescription writing guidelines thereby to create awareness regarding medication errors among health care professionals. Our study also aims to improve a standard Prescription format that completely helps the patient without creating any confusion and to establish a reporting system for medication errors as a blame free tool as it can improve the health care system to resolve loop holes which are reasons for medication errors.

Clinical pharmacist plays an important role in providing safe and effective treatment to patients as they are the major link between prescriber and patient. In today's modern complex medication system, a pharmacist role is contributed to only dispensing however; a pharmacist acts as a major barrier in preventing medication errors. It is the responsibility of every clinical pharmacist to be aware of medication errors as well as to create awareness on medication errors among health care professionals and to ensure safe practice of medicine.

MATERIALS AND METHODS

Study design, Study site and Sample size

A Prospective observational study was carried out for a period of 6months in a 1000 bedded tertiary care hospital in Telangana region including 208 Patients included in the study.

Study criteria

Inclusion criteria -All the inpatient prescriptions of age group 17-90 years irrespective of gender and co-morbidities and those patients who are willing to participate.

Exclusion criteria -Incomplete patient records, Patients who are LAMA (Left against Medical Advice)

Ethical consideration

Before initiating the study, ethical approval was obtained from Institutional Ethical Committee.

Data collection and assessment

Data was collected from patient's case records and whenever error was identified it was recorded in designed data reporting

form. Collected data is then assessed for all types of medication errors such as Prescribing errors, Dispensing errors, Omission errors, Wrong time error, Unauthorized drug error, Improper dose error, Wrong dosage form error, Wrong drug preparation errors, Wrong administration technique errors, Deteriorated drug error, Monitoring errors. Then the observed errors were recorded and analyzed for following parameters such as age, gender, past medical history, diagnosis, drug interactions, type of errors, ADRs, ADEs. The level of severity of error is then assessed by using NCCMERP index while ADRs were analyzed by using Naranjo scale and drug interactions by using Medscape software.

- Prescriptions were also assessed for adherence to WHO prescription guidelines.

WHO prescription guidelines:

1) Patient Details: Patient name, age, gender, address, date of admission, weight and height
2) Prescriber Details: Prescriber name, contact number
3) Instructions to Pharmacist: Instructions to pharmacist regarding the generic name, dose, dosage form, frequency and duration which has to be dispensed.
4) Instructions to Patient: Instructions to patient regarding how to use the prescribed medicine and for how many days.

Statistical analysis

Statistical analysis was done by using MS Excel. Correlation between number of medications prescribed versus medication errors was analyzed by using Student-t test in MS Excel. The P-value less than 0.05 is regarded as statistically significant.

RESULTS

A total of 208 patients were included in this prospective observational study. A total of 186 medication errors were ruled out from out of these 208 patients. The overall percentage of medication errors observed to be 89 %.

Age wise distribution of errors

In the present study most of the most of the medication errors were observed in the age group of 31-50 years(39 %) followed by 51-70 years(33%) and the other details of age wise distribution were summarized in **Table 1**.

Gender wise distribution of errors

Male patients outnumber the female patients by having 30(75%) errors. The gender wise Distribution of medication errors are summarized in the **Table 2**.

Type of Medication Errors

Out of 40 errors, Prescribing errors (92%) and omission errors (51%) were the most frequently observed and the other errors are summarized in the **Table 3**.

Severity of Medication Errors

Out of 186 errors, 105(55%) majority of errors were under Category-D [Error : No Harm- An error occurred that reached the patient and required monitoring to confirm that it resulted in no harm to the patient and/or required intervention to preclude harm].%). Detailed summary of categorization of errors is given in **Figure 1**.

Number of medications per prescription versus Medication Errors

In present study, out of 208 patients, 117(56%) patients were prescribed with 6 to 10 drugs among them 103 medication errors observed. The remaining details were summarized in **Table 4**.

Different classes of drugs involved in Medication Errors

Majority of observed medication errors were found with drug class belonging to antibiotics 66(35%) followed by antihypertensive 47(25%) and other drug class involved in medication errors are summarized in **Table 5**.

Diagnosis versus Medication Errors

Most of the patients in our study were diagnosed with Renal disorders 52(25%) and also recorded most number of medication errors 50(21%). Results were summarized in **Figure 2**.

Drug Interactions

Out of 208 patients, 121 prescriptions had drug interactions. Details were enumerated in **Table 6**.

Screening of prescriptions for adherence to WHO guidelines

Out of 208 prescriptions, 77% prescriptions doesn't have complete details of patient,82% prescriptions doesn't have details of prescriber's details, 87.5% of prescriptions doesn't have proper instructions to pharmacist, 95% of prescriptions doesn't have proper instructions to patient. Details were summarized in **Table 7**.

Table 1: Age Wise Distribution of Medication Errors

Age	Number of patients(n=208)	Percentage	Number of patients with Medication errors(n=186)	Percentage
17-30	49	23.55	43	23.11
31-50	81	38.94	73	39.24
51-70	68	32.69	61	32.79
71-90	10	4.80	9	4.83
Total	208	100	186	100

Table 2: Gender Wise Distribution of Medication Errors

GENDER	Number of patients(n=208)	Percentage	Number of patients with Medication errors(n=186)	Percentage
Females	97	46.63461538	81	43.54
Males	111	53.36538462	105	56.45
Total	208	100	186	100

Table 3: Type of Medication Errors

Type of error	Number of errors (n=186)	Percentage
Omission error	95	51.07
Prescribing error	172	92.47
Monitoring error	27	14.51
Unauthorized drug error	2	1.07
Total	186	100

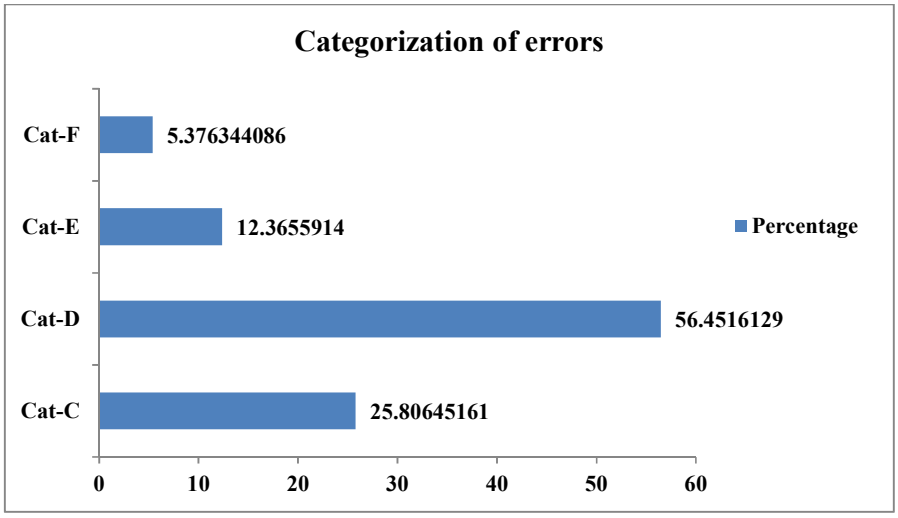

Figure1: Severity of Medication Errors

Table 4: Number of medications per prescription versus Medication Errors

Number of medication prescribed	Number of patients(n=208)	Percentage	Number of medication errors(n=186)	Percentage
1 to 5	34	16.346154	29	15.5914
6 to 10	117	56.25	103	55.37634
11to15	51	24.519231	49	26.34409
16to20	6	2.8846154	5	2.688172

Table 5: Different classes of drugs involved in Medication Errors

Drug class	Number of errors reported (n=186)	Percentage
Antibiotics	66	35.48
Antihypertensives	47	25.26
Antidiabetics (Hypoglycemics)	45	24.19
Diuretic	41	22.04
Gastrointestinal agents	39	20.96
Antiepileptics	39	20.96
Vitamin supplements	24	12.90

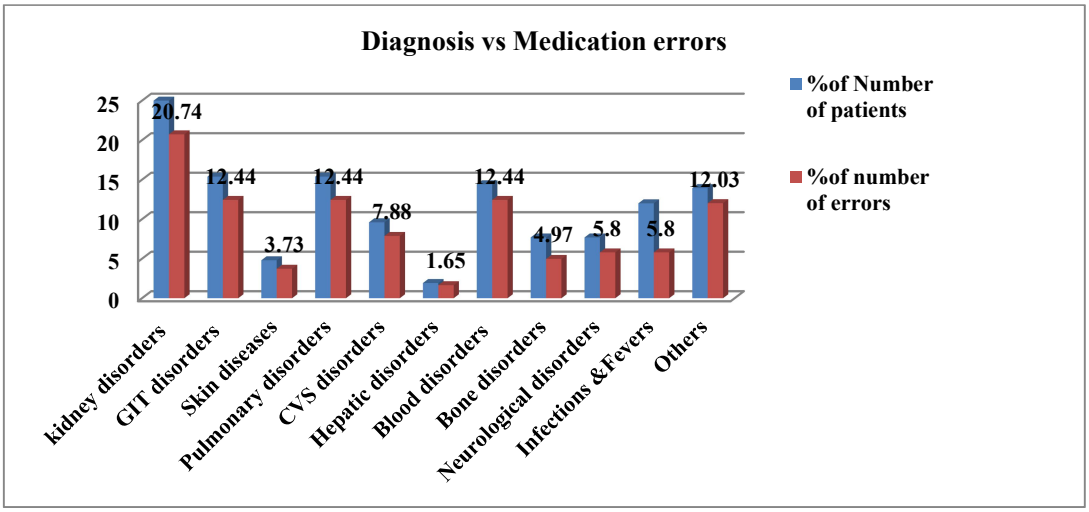

Figure 2: Diagnosis vs Medication Errors

Table 6: Drug Interactions

Drug Interactions	Number of patients	Percentage
Present	121	58.17%
Absent	87	41.82%

Table 7: Adherence to WHO prescription writing guidelines

Parameter	Present	Absent
Patient details	47(22.5%)	161(77%)
prescriber details	36(17%)	172(82%)
Instructions to pharmacist	26(12.5%)	182(87.5%)
Instructions to patient	10(5%)	198(95%)

Table 8: Correlation of number of medications Versus Number of medication errors

Number of drugs prescribed	Number of patients with medication errors(n=186)	Number of patients without Medication errors(n=22)	Total
1 to 5	29	5	34
6 to 10	103	14	117
11to15	49	2	51
16to20	5	1	6
Total	186	22	208

Significant correlation obtained between number of drugs vs errors as P-value in student-Ttest is 0.04(P-value<0.05)

DISCUSSION

Medication errors are considered as a major health related problem in health care settings and can results in significant mortality and morbidity yet not reported always. The overall percentage of medication errors observed in present study was 89% while a study conducted by Reddy P *et al* demonstrated the incidence of medication errors was 66.32% **[12]**.

According to age wise distribution medication errors were observed more in the age group of 31-50years (39%) followed by 51-70 years (33%) which is similar with the study conducted by Sandeep Patel *et al* **[3]** which is consistent to elder age, polypharmacy and multiple co-morbities **[13]**. In present study male patients experienced more number of medication errors (56%) than female patients (43%) because male patients were more in number in the study which is similar to the results obtained by Dilnasheen Sheik *et al* **[13]**.

We found that majority of the medication errors recorded were prescribing errors (92%) which includes untreated condition, drug without indication and improper diagnosis. This could be related to lack of proper pharmacological knowledge, lack of complete data on patient condition, and time complexity .The second most frequently observed errors were omission errors(51%) which is similar with the results obtained in a retrospective study conducted in a hospital in Oman, Ahlam Omar Al –Rashdi *et al* **[14]**.

While assessing the severity of medication errors, out of 186 errors recorded, 103 errors were under Category-D followed by 46 under Category-C which

is similar to the results obtained by M. Bothiraj *et al* **[15]** where most of the errors observed were under category C and D. The results implying that medication errors are about to cause serious threat to the patients.

The results suggests that there is requirement of serious and effective reporting system and also the requirement of experienced clinical pharmacist in every hospital for continuous monitoring for safe practice of medicine and to improve the health care.

Among the different classes of drugs involved in medication errors, antibiotics were the most frequently observed drug class (35%) followed by antihypertensives (25%) and antidiabetic agents (24%) .A study conducted by Peddolla Sushma Reddy *et al* also shown that antibiotics were the most commonly involved drug class in medication errors **[16]**.

The present study demonstrated that more number of medication errors were observed in prescriptions having 6-10 drugs which is consistent with the results obtained by Dilnasheen Sheik *et al* **[13]** as more number of drugs has the capability to cause multiple errors.

Our study recorded no adverse drug reactions and adverse drug events in contrast to the study conducted by Shanmugham Sriram *et al* which stated that the incidence rate of ADRs is 1.8% **[17]**. And out of 208 patients, 121 prescriptions had potential drug-drug interactions.

We also included screening of prescriptions for adherence to WHO prescription guidelines where the results suggested that majority of prescriptions doesn't have complete details of patient ,prescriber and also lack of proper instructions to pharmacist and patient.

In present study, about 77% of prescriptions doesn't have complete details of patient and 83% of prescriptions doesn't have details of prescriber and 88% of prescriptions doesn't have proper instructions to pharmacist and about 95% of prescriptions doesn't have proper instructions to patient which are similar to the study conducted by Wajiha Gul **[18]** where majority of the prescriptions are lack of patient and prescriber details and lack of instructions to pharmacist and also similar results were obtained in D. Sheik *et al* study.

CONCLUSION

Medication errors are the major preventable health related burden in our complex health care system. The overall percentage of medication errors in the present study was found to be 89%.Most commonly observed errors were prescribing errors and omission errors. Most of the errors were under category-D of NCCMERP index. The major class of drugs involved in medication

errors was antibiotics. The adherence of prescriptions to WHO prescription writing guidelines is very poor. We conclude that there is a need of strict regulatory authorities to improve health care system. The results also suggesting that there is also requirement of an experienced and well trained clinical pharmacist in every hospital and health care institutions to prevent medication errors. Clinical pharmacists play a major role in the implementation of safe medicine practice and to decrease health care burden on patients as clinical pharmacists are well trained in the field of medication errors. Clinical pharmacists can also provide required additional drug related information to physicians and health care professionals and can also provide counselling to patients. A standard prescription format should be implemented throughout the country that helps to collect the complete data about patient medical history and also allows providing all the required information to pharmacists, nurses and patients. Finally, we conclude that there is a requirement of collaborative work among physicians, pharmacists and nurses to prevent health related errors and to achieve the WHO global challenge "Medication without harm".

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REFERENCES

[1] Goulding PM, Prevention of Medical Errors, 2016, 12-17

[2] The National Coordinating Council for Medication Error and Prevention (NCCMERP).

[3] Sandip Patel, Ashita Patel, Varsha Patel, Milay Solanki, Study of medication error in hospitalised patients in tertiary care hospital, Indian Journal of Pharmacy Practice, 11(1), 2018, 32-36.

[4] Rashmi Salhotra, Asha Tyagi, Medication errors : They continue, Journal of Anesthesiology Clinical Pharmacology, 35(1), 2019, 1-2

[5] Sneha Ambwani, Arup Kumar Misra, Rajesh Kumar, Medication Errors: Is it the Hidden Part of the Submerged Iceberg in Our Health-care System? , International Journal of Applied and Basic Medical Research, 9(3), 2019, 135-142

[6] Abhijit Sathe, Latha Mishra, KEM horror: Patient dies after nurse gives her wrong injection, 2016

[7] Kamal Boostani, Hamid Noshad, Farahnoosh Farnood, Haleh Rezaee, Soheil Teimouri, Taher Entezari-Maleki, Reyhane Najafiazar, Azam

Hassanpouri-Olia, Afshin Gharekhani, Advanced Pharmaceutical Bulletin, 9(1), 2019, 174-179.

[8] Williams DJP, Medication errors, Royal College of Physicians of Edinburgh, 37, 2007, 343–346

[9] Gabriella Rejane dos Santos Dalmolin, Eloni Terezinha Rotta, José Roberto Goldim, Medication errors: classification of seriousness, type, and of medications involved in the reports from a University Teaching Hospital, Brazilian Journal of Pharmaceutical Sciences 49(4), 2013, 793-802

[10] Kadir A, Subish P, Anil K, Ram B, Pattern of potential medication errors in a tertiary care hospital in Nepal. Indian Journal of Pharmacy Practice, 3(2), 2010, 16-22.

[11] V. Roy, P. Gupta, S, Srivastava, Medication errors: causes and prevention, Health administrator. 29, 2005, 60-64.

[12] Purushothama Reddy. K and 2Mallesh Mandha, Medication errors: Identification, prevention and implementation of safe medication practice in a tertiary care teaching hospital, World journal of pharmacy and pharmaceutical sciences, 4(3), 2015,1249-1256.

[13] Dilnasheen Sheik, Udayvenkat Mateti, Shamaprakash Kabekkodu and Sanal T, Assessment of medication errors and adherence to WHO prescription writing guidelines in a tertiary care hospital, Future journal of Pharmaceutical Sciences, 3(1), 2017, 60-64.

[14] Ahlam Omar Al - Rashdi, Safiya Mubark Al - Shamsi and Dr. Alka Ahuja ,An excellent system to control medication errors: a retrospective study in a hospital in oman, World journal of pharmacy and pharmaceutical sciences, 5(7), 2016, 31-43.

[15] Bothiraj M. Alagusundaram M and Chandra Sekhar KB, A study on prevalence of medication errors in a multispecialty hospital, International Journal of Pharmaceutical Sciences and Research , 11(5), 2020, 2444-47.

[16] Peddolla Sushma Reddy, Vidya Biju, Inuganti Bhavana-Identifying Medication Errors in a Tertiary Care Teaching Hospital: A Prospective Observational Study, Journal of Drug Delivery and Therapeutics , 9(6-s), 2019, 103-106.

[17] Sriram S, Ali G, Rajeswari R, Manjula Devi, Rajalingam B, Ravi

TK, Ali MS, Prevalence of adverse drug reactions at a private tertiary care hospital in south India, Journal of Research in Medical Sciences, 16(1), 2011, 16–25.

[18] Wajiha NG, Prescription errors: preventable medication errors, World Journal of Pharmaceutical Research, 3(3), 2014, 3575-3584.