



Research Article

MEDICATION ERRORS IN OUTPATIENT GENERAL MEDICINE DEPARTMENT AT A TERTIARY CARE HOSPITAL: A CROSS SECTIONAL STUDY

Durga Prasad TS², Sruthi T^{1*}, Sireesha P¹, Reddy Mahesh N¹

¹ Pharm D Intern, Department of Pharmacy Practice, Sri Padmavathi School of Pharmacy, Tiruchanoor, Tirupati, Andhra Pradesh, India

² Associate Professor, Department of Pharmacy Practice, Sri Padmavathi School of Pharmacy, Tiruchanoor, Tirupati, Andhra Pradesh, India

*Corresponding Author Email: mail2sruthi210@gmail.com

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ABSTRACT

Medication errors can cause serious adverse effects and potentially to evoke the fatal risk of the disease. Monitoring the safety and efficacy of the drug adequately can prevent the occurrence of adverse effect. The main aim of this study is to identify and intervene the prescribing and dispensing errors among the Outpatient General Medicine department. Across sectional interventional study was carried out at the General Medicine Out-patient Department. The patients who satisfied inclusion and exclusion criteria were enrolled after obtaining their consent. The required data was collected in the patient's prescription and different types of medication errors was identified and documented. During this study period we found 303 prescriptions with medication errors out of 544 prescriptions. Of the 303 prescriptions prescribing errors was 315(79%) and 85(21%) were dispensing errors. The most common type of medication error was prescribing error. It was absence of strength (35.9%), absence of dosage regimen (32.4%), wrong drug (79.8%). The most common type of dispensing error was required quantity not supplied (55.7%), dispensing wrong drug (32.8%). Occurrence of medication errors was common in Outpatient General Medicine Department in this tertiary care teaching hospital. A clinical pharmacist can play a major role in early detection and prevention of medication errors and thus can improve the quality of care to the patients. Educating the patients about the drugs and their importance of right use can be helpful in minimizing errors.

Keywords: Interventions, medication errors, prescribing errors, dispensing errors, severity of error, clinical pharmacist.

INTRODUCTION

Medications are offered by health services throughout the world¹. Nearly everybody in the world takes medication at one time or another. Most of the time the medications are favourable or at least they root no harm but on occasion they do harm the person taking them². The goal of the drug therapy is the achievement of defined therapeutic outcomes that improve the patient's quality of life while minimising patient risks known and unknown, associated with therapeutic use of drugs and other pharmaceutical agents^{3,4}. The United States National Coordinating Council for Medication Error Reporting and Prevention defines a medication error 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 practice^{5,6}, health care products, procedures and systems, including prescribing, order communicating, product labelling, packaging and nomenclature compounding, dispensing, distribution, administration, education, monitoring and use"⁷. This definition suggests that errors are preventable at different levels¹. Medication errors has also been defined as a reduction in the probability of treatment being timely and effective, or an increase the risk of harm relating to medicines and prescribing compared with generally accepted practice¹.

Medication errors are an important leading cause of patient mortality and morbidity in hospitals. On the other hand, it is considered one of the most challenging problems in any health care system; In the United States, medication errors is estimated

to harm at least 5 million patients per year. Furthermore, one out of every 131 outpatient deaths is related to medication errors⁸. In 1999, the Institute of Medicine reported that 44,000 to 98,000 people annually die in US hospitals as a result of medical errors. Medication errors occurring either in or out of the hospital are estimated to account for at least 7,000 deaths each year⁹. In 11% of the patients experiencing medication errors, risk factors included poor coordination of care, cost related barriers to medical services or medicines, multi morbidity and hospitalization.¹

Based on occurrence medication errors are of two types. They are prescribing errors, Dispensing errors. Any deviation in the process of prescribing and dispensing may leads to the occurrence of these types of errors. These are further sub divided into error of omission and error of commission. Various factors identified for medication errors are illegible orders, non-availability of patient information, inadequate medical knowledge and increased patient load, failure to monitor drug concentration or drug therapy, and not accounting for changes in renal and cardiac functions^{10,11}. In order to prevent the medication errors, potential strategies could be followed such as; 1] Educating the physicians about the risk factors of medication errors, also about the impact of medication errors in therapeutic outcome, 2] Preparing the structured medication system for outpatients setting, 3] Educating the pharmacists to increase their roles in community setting^{12,9}.

MATERIAL AND METHODS

Study design and method of data collection

Our study was across sectional, interventional study which was conducted in outpatient general medicine department of Sri Venkateswara Ramnarayan Ruia Government General Hospital - SVRRGGH, Tirupati, Andhra Pradesh.

A specially designed data collection form with the patient demographic details, diagnosis, treatment chart, type of error, severity of error, interventions provided to the occurred errors was made. Patients who visited the outpatient general medicine department were considered according to the inclusion and exclusion criteria for a period of 6 months. All the collected data were subjected to statistical analysis using excel spread sheet.

Study Design: Across sectional, interventional study.

Study Period: 6 months (July 2018 to December 2018)

Sample size: 544 patients

Inclusion criteria

All the patients of age group between 10-80 years of either sex visiting the outpatient general medicine department and having at least one medication error in their prescription was collected randomly at the dispensing area in the pharmacy department.

Exclusion criteria

All the Patients who are not willing to participate in the study, Patients below the age group of 10 years, Patients visiting other

than General Medicine Outpatient department were excluded in our study

Study materials: Data Collection form, Micro-medex solutions.

Ethical committee approval: Approval number-SPSP/2017-2018/PDO6

Statistical analysis

It was performed by using Microsoft office Excel 2016 for analyzing the results in the form of charts and percentages.

RESULTS

A Cross Sectional Interventional study was conducted for a period of six months from July 2018 to December 2018 in Outpatient General Medicine department at a tertiary care hospital, Tirupati.

A total of 544 cases (prescriptions) were collected during the study period. Out of which, we categorize the prescriptions into 2 types based on the presence of errors like prescriptions with errors (303) and prescriptions without errors (241). Among 303 prescriptions we further classified into 2 types based on the occurrence of errors like prescribing and dispensing and further classified the prescribing and dispensing error into Error of omission and Error of commission.

The following data or tables indicate that out of collected 544 prescriptions, we found only 303 prescriptions having medication errors. Out of which, we further categorize 303 prescriptions into different categories like

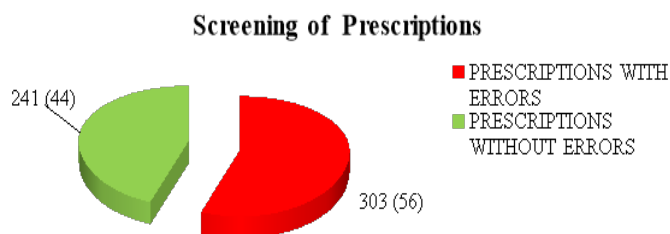


Figure 1: Screening of Prescriptions

It indicates that out of 544 prescriptions, 303(56) prescription with errors and 241(44) prescriptions without errors

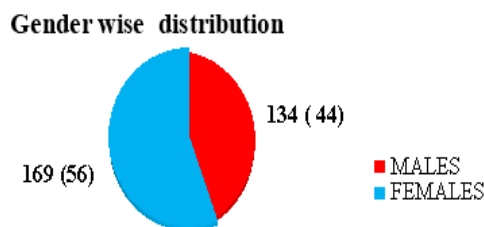


Figure 2: Gender wise distribution

It indicates that out of 303 patients, 169 (56) were females and 134 (44) were males respectively

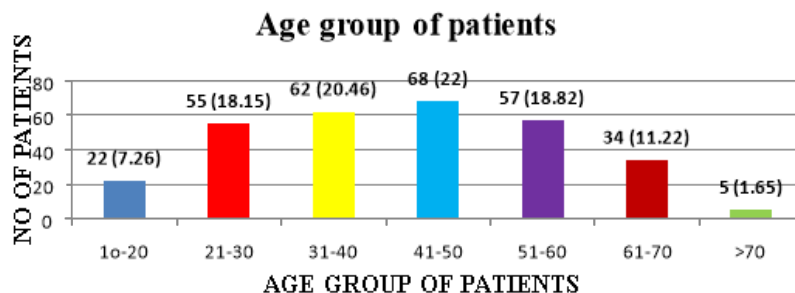


Figure 3: Age wise distribution

It indicates that majority of age group was found in 41-50 years followed by 31-40 years and least were found in > 70 years age group i.e., 68(22), 62(20.46) and 5(1.65) respectively.

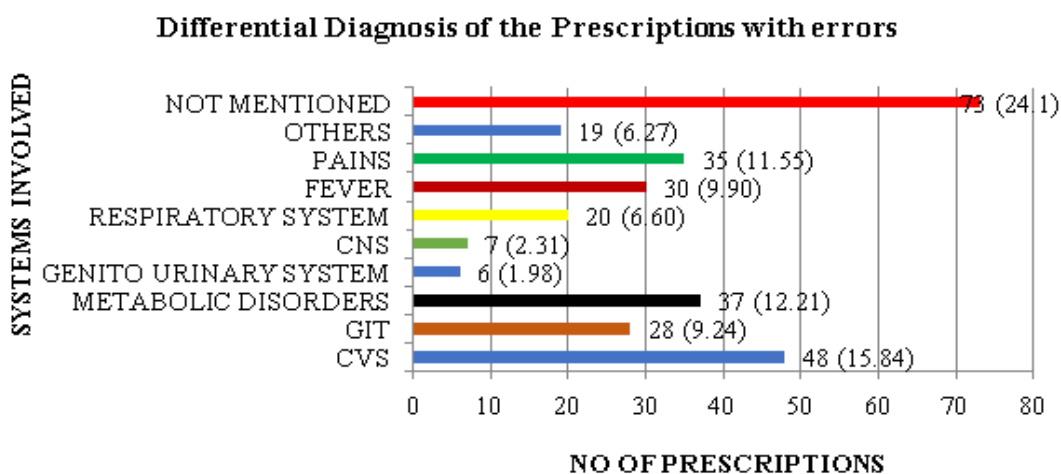


Figure 4: Differential diagnosis of prescriptions with errors

It indicates that out of 303 prescriptions majority of the prescriptions without mentioned of diagnosis 73(24.1), where CVS and pains bearing prescriptions were found to be 48(15.84) and 35(11.55) respectively; while others were found to be 19(6.27).

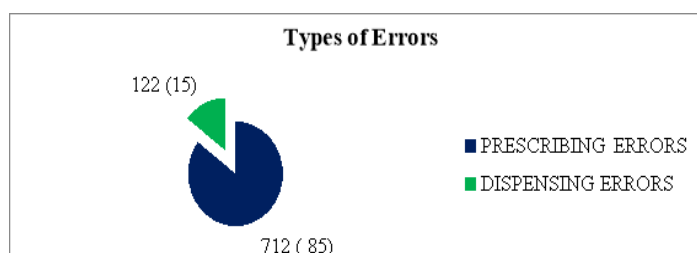


Figure 5: Types of Errors

It indicates that percentages of errors reported in prescribing errors (85) were more compared to errors reported in dispensing errors (15).

- Prescriptions with errors were categorized as prescribing and dispensing errors.
- Sub categorization of these errors were done as Error of Omission and Error of Commission

- Errors were calculated based on the number and type of errors
- A prescription may contain more than one type of error

E.g. If a drug is written in prescription as Diclofenac BD then it comes under Errors like absence of dosage form, absence of dose, absence of quantity to supply. So, this error is taken under 3 subcategories of errors.

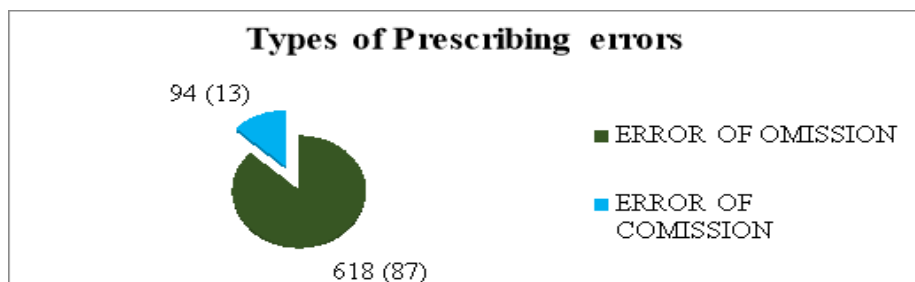


Figure 6: Types of prescribing errors

It indicates that percentages of errors in prescribing error due to error of omission 618(87) were more compared to error of commission 94(13).

Table 1: Error of Omission

Error of Omission	No of Errors	Percentage
Absence of dosage form	19	3.07
Absence of strength	222	35.92
Incomplete specification of dose	4	0.64
Absence of dosage regimen	200	32.36
Absence of quantity	168	27.18
Incomplete specification of duration of drug	5	0.83
Total	618	100

Table 1 shows percentage of majority of errors due to absence of strength 222(35.92) and absence of dosage regimen 200(32.36) reported as error of omission in prescribing errors.

Table 2: Error of commission

Error of Commission	No of Errors	Percentage
Wrong dose	7	7
Wrong dosage regimen	12	13
Wrong drug	75	80
Wrong quantity	0	0
Wrong duration of therapy	0	0
Drug-Drug interactions	0	0
Total	94	100

Table 2 shows that percentage of majority of errors were occurred due to wrong drug 75(80) followed by wrong dosage regimen 12(13) reported as error of commission in prescribing errors

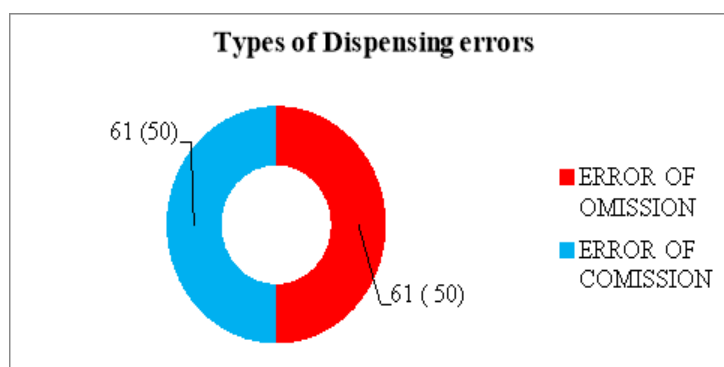


Figure 7: Types of dispensing error

It indicates that Out of 122 dispensing errors, both error of omission and error of commission was found to be 61(50)

Table 3: Error of omission

Error of Omission	No of Errors	Percentage
Required quantity not supplied	34	55.74
Required drug not supplied	12	19.67
Required strength not supplied	15	24.59
Total	61	100

It indicates that percentage of majority of errors occurred due to require quantity not supplied 34(55.74) followed by required strength not supplied 15(24.59) reported as error of omission in dispensing error

Table 4: Error of Commission

Error of Commission	No of Errors	Percentage
Dispensing wrong dose	15	24.59
Dispensing wrong drug	20	32.78
Dispensing wrong dosage form	12	19.67
Dispensing wrong quantity	14	22.96
Total	61	100

It shows that majority of the errors happened due to dispensing wrong drug 20(32.78) followed by dispensing wrong quantity 14(22.96) reported as error of commission in dispensing error

Table 5: Categories of drugs

Category of drugs	No. of drugs	Percentage
Anti-diabetics	98	5.5
Anti-histamines	109	6.2
Antispasmodics	5	0.3
Antibiotics	154	8.7
Cardiovascular drugs	177	10.0
CNS	35	2.0
Corticosteroids	7	0.4
Anti hyperlipidemics	23	1.3
NSAIDS	307	17.4
PPI	370	20.9
Vitamins	386	21.8
Others	97	5.5
Total	1768	100

It indicates that PPI (20.92) and Vitamins (21.83) were the most commonly prescribed drugs followed by NSAIDS (17.36) and CVA (10.01) least were Corticosteroid (0.395) and Antispasmodics (0.282)

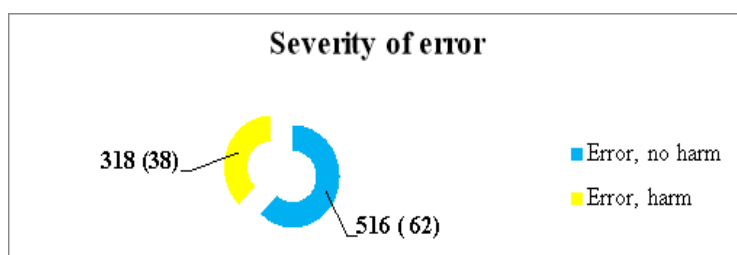


Figure 8: Severity of error

Out of 303 prescriptions, 834 errors were found, of which majority of prescriptions are having errors but no harm 516(62) and remaining prescriptions are having error with harm 318(38)

Table 6: Categorization of interventions provided

Interventions	Number	Percentage
Prescriber	625	75
Pharmacist	187	22
Patient	22	3
Total	834	100

It indicates that majority of the interventions done with prescriber 625(75) followed by pharmacist 187(22)

Table 7: Type of Pharmacist interventions

Type of Pharmacist intervention	Number	Percentage
Required Strength to be mentioned	191	22.90
Required Dosage form to be mentioned	110	13.18
Required frequency to be mentioned	186	22.31
Required quantity supplied	155	18.58
Required drug supplied	97	11.64
Change in dosage form	53	6.36
Change in frequency	42	5.03
Change in duration of therapy	0	0
Discontinuation of drug	0	0
Total	834	100

It indicates that majority of the pharmacist interventions done due to required strength to be mentioned 191(22.30) followed by required frequency to be mentioned 186(22.31) and least were found in change in frequency 42(5.03)

Table 8: Acceptance of Interventions

Interventions	Number	Percentage
Accepted	565	67.74
Rejected	269	32.26
Total	834	100

It indicates that out of 834 errors majority of interventions majority were accepted 565(68) and 269(32) were rejected

DISCUSSION

Medication errors are the serious problems in health care and can be the source of significant morbidity and mortality in the health care setting³. The medication error is any preventable mistake which occurs during the medication use process may cause harm or sometimes remain neglected. Since human life is at stake, this topic is always important issue in the health care system. To build safer system the first step is to detect the errors and perform the root cause analysis⁵.

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. Drug therapies are important parts of medical care, contributing to medication errors and other drug-related problems. Keeping up with the growing number of prescription medications is a major challenge for the physicians³.

In our study high incidence of medication errors in females (56%) over males and (44%) of medication errors in patients; in our study we have categorized the differential diagnosis for the prescriptions with errors (n = 303) shows that majority of the prescriptions have not mentioned the diagnosis (73; 24.1%), majority of them have diagnosis belongs to CVS (48; 15.84%) followed by Metabolic disorders, Pains, Fever, GIT, Respiratory system, others; where CNS and Genito Urinary system was found to be least in number.

In our study prescription errors (712; 85%) are the most common among the types of errors. Similar findings were reported by different studies indicating prescription errors as commonly perceived errors^{4,7,13,14}. Improperly written medical orders directly or indirectly lead to commitment of errors as the investigators found that it leads misinterpretation of orders leading to undue commission or omission of drugs, wrong dosing or schedules.¹⁵

Among the prescribing errors, error of omission was found to be more i.e. (618; 87%) than the error of commission. Our result demonstrated that absence of dose (35.92%), dosing frequency (32.36%) was the most common followed by quantity of the drugs to be supplied to the patient (27.18%) are the most common types of prescribing errors which comes under error of omission¹⁶. The consequences of prescribing error may lead to a reduced probability of effective treatment being timely or increased in risk of harm among patients due to drug related adverse effects or drug interactions⁷.

Error of commission was found to be (94; 13%) in the prescribing errors. Among the commission of errors, prescribing the wrong drug (80%) was found to be more followed by wrong frequency (13%), wrong dose (7%)^{7,13}.

Some recommendations reducing prescribing errors are improving the prescription writing skill, give some training to the nursing staff and pharmacist regarding prescriptions at regular interval, follow the correct prescribed format, prescriber should include age, gender, weight, diagnosis and other demographics of the patient on the prescription and medicine chart.

Among the dispensing errors, error of omission was found to be equal i.e. (61; 50%) with the error of commission. Our result demonstrated that required quantity not supplied (55.7%) was found to be more followed by required strength not supplied i.e. (24.59%) and required drug not supplied (19.67%).

Error of commission was found to be (61; 50%) in the dispensing errors. Among the commission of errors, dispensing the wrong drug i.e., (32.78%) was found to be more followed by dispensing wrong dose (24.59%), dispensing the wrong quantity (22.96%) and dispensing the wrong dosage form (19.67%). These errors could be caused due to the higher number of prescription, limited number of pharmacist, sound alike drugs and look like medicine.

Strategies to prevent medication errors are optimization of the medication process can be achieved by medication standardization, computerized physician order entry, clinical decision support, bar code technology, computerized intravenous infusion devices. The risk factors can be minimized by avoiding excessive consecutive and cumulative working hours, minimize interruptions and distractions and training supervision and graduated responsibility, adequate staffing and last but not the least incorporation of quality assurance into academic education¹⁵.

These verify level assessment of medication error that majority of belonging to the category error, no harm i.e., (516; 62%) and followed by error, harm (318; 38%) according to NCCMER Pindex.

A clinical pharmacist can play a major role in this situation appears to be a strong intervention and early detection and prevention of medication errors and thus can improve the quality of care to the patients⁷. Educating the patients about the drugs and their importance of right use, literacy can be helpful in minimizing errors. "This helps to ensure that the 'right' patient is receiving the 'right' drug in the 'right' dose in the 'right' time by the authorized clinician".

CONCLUSION

This study clearly showed that need for a clinical pharmacist to work fulltime at the hospital to develop hospital formulary, drug protocols and prescription policies. The results may be a better proof to the fact that award based clinical pharmacist can prevent negative consequences related to the medications. Since our system lacks a well organised detection and reporting mechanism, there is a means for preventing the errors in first place. Hence, as the first step we must implement a system where errors are routinely detected and reported.

REFERENCES

1. Medication Errors: Technical Series on Safer Primary Care. Geneva: World Health Organization; 2016. Licence: CC BY-NC-SA 3.0 IGO
2. Dilnasheen Sheikh, Day Venkat Mateti, Shamaprakash Kabekkodu, T. Sanal, Assessment of medication errors and adherence to WHO prescription writing guidelines in a

- tertiary care hospital, Future Journal of Pharmaceutical Sciences 2017; 3: 60-64.
3. Khavane Karna, Sanjay Sharma, Shiv Kumar Inamdar, Anil Bhandari, Study and evaluation of medication errors in a tertiary care teaching hospital - A baseline study, International Journal of Pharmacy and Pharmaceutical Sciences 2012; 4(5): 587-593.
 4. Nrupal Patel, Mira Desai, Samdih Shah, Prakruti Patel, Anuradha Gandhi, A study of medication errors in a tertiary care hospital, Perspectives in Clinical Research 2016; 7(4): 168-173.
 5. Garima Sinha, Leelavathi D Acharya, Girish Thunga, Treasa Mathews, A study of medication errors in general medicine wards of the south Indian tertiary care hospital, Asian Journal of Pharmaceutical and Clinical Research 2016; 9(4): 196-200.
 6. Surendra Shrestha and K.V. Ramanath, Study and evaluation of medication errors in medicine and orthopaedic wards of a tertiary care hospital. British Journal of Pharmaceutical Research 2015; 7(3): 183-195.
 7. Sandip Patel, Ashita Patel, Varsha Patel, Nilay Solanki, Study of medication error in hospitalized patients in tertiary care hospital, Indian Journal of Pharmacy Practice 2018; 11(1): 11-32.
 8. Salma AL-Khani, Amani Moharram, Hisham Aljadhey, Factors contributing to the identification and prevention of incorrect drug prescribing errors in Outpatient setting, Saudi Pharmaceutical Journal 2014; 22: 429-432.
 9. Arun N.A, Patient counselling: A study on prescribing and dispensing practice in a south Indian corporate hospital; April 2014. p. 1-36.
 10. Binu Mathew, Rajendra Singh Airee, Jibili Joy, Cherukuri Sri Sindhu, Rajput Nayan Raj Priya, Sarfaraz MD, Study and evaluation of medication errors in a tertiary care teaching hospital, Asian Journal of Pharmaceuticals and Medical Science 2015; 5(4): 1321-1326.
 11. Muhammed Vally, Prescribing Errors at an Academic Teaching Hospital in Johannesburg; October 2017. p. 1-50.
 12. Dyah Aryani Perwitasari, Jami ul Abror, Iis Wahyuningsih, Medication errors in Outpatients of government hospitals in Yogyakarta Indonesia, International Journal of Pharmaceutical Sciences Review and Research 2010; 1(1): 8-10.
 13. Syed Muhammad Ashar, Asif Hanif, Ayub Jadoon, Assessment of drug use pattern using WHO prescribing indicators in the medication therapy of indoor diabetic patients, International Journal of Basic Medical Sciences and Pharmacy 2016; 6(1): 16-20.
 14. Chua Siew Siang, Kuan Mun Ni, Mohamed Noor Bin Ramli, Outpatient prescription intervention activities by pharmacists in a teaching hospital, Malaysian Journal of Pharmacy 2003; 1(3): 86-90.
 15. Sanjay Gaur, Jay Kumar Simha, Bhavana Srivastava, Medication errors in medicine wards in a tertiary care teaching hospital of a hill state in India, Asian Journal of Pharmacy and Life Science 2012; 2(1): 56-63.
 16. Ramesh Sharma Poudel, Shakti Shrestha, Dipendra Khatiwada, Santhosh Thapa, Aastha Prajapati, Prescription errors and pharmacist intervention at Outpatient pharmacies of two teaching hospitals of central Nepal, World Journal of Pharmaceutical Sciences; 2015. p. 448-452.

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