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A PROSPECTIVE OBSERVATIONAL STUDY ON INCIDENCE OF PRESCRIPTION ERRORS AND DISPENSING ERRORS IN A TERTIARY CARE HOSPITAL

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ABSTRACT

Introduction: Medication errors can be "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, patient, or consumer". **Objective:** To study the incidence of prescription and dispensing errors and to check if the prescription writing is according to W.H.O standards. **Methodology:** A prospective observational study was conducted over a period of six months. The necessary data was collected from inpatient case notes, treatment charts, patient care chart, by interviewing patients and nursing staff. The collected data was analysed using national coordinating council for medication error reporting and prevention (NCC MERP) taxonomy and the level of significance were assessed**. Results**: The high risk population belongs to age group of 21 to 30years. Most of the errors occurred due to dose not dispensed (58.8%) highest error all made by physician (75.83%). Errors are mostly seen in tablet dosage form (59.16%). Most of the errors come under category C (57.83%).Prescription errors are more (75.83%) compared to dispensing errors. Antibiotics linked errors are more (18.33%) when analysed therapeutically. **Conclusion:** In this study we found that prescription and dispensing errors are seen to a considerable extent in the hospitals. These, if neglected may lead to serious medical consequences. Thus, there is a need for monitoring and managing these errors to provide the best care.

INTRODUCTION

The goal of drug therapy is to improve a patient's quality oflife. The drug should be prescribed with good clinical knowledge on the indication, dose, dosage, duration. Inappropriate use of medication wastes resources and diminishes the standard of patient care[1]. The following are the categories of medication errors: prescribing error, omission error, wrong time error, unauthorized drug error, improper dose error, wrong dosage form error, wrong drug preparation error (drug product incorrectly Formulated or manipulated before administration), wrong administration technique error, deteriorated drug error, monitoring errors, compliance error and other medication error (any error that doesn't constitute one of above categories). Any of the above errors can lead to severe morbidity, increase hospital stay, and even death of the patient[2]. International studies have established that the medication error rate varies from 1.5 to 35.0% (Otero et al., 2008).Usually, medication errors are detected by the clinical consequences

manifested by the patient, thus alerting the healthcare professionals (Carvalho, Cassiani, 2002). An adverse reaction is any harmful or undesirable effect presented after administration of medication at doses normally used for prophylaxis, diagnosis, or treatment of diseases. Treatment chart review, spontaneous reporting, and direct observation are the foremost methods for identifying and evaluating medication errors (Coimbra, 2006). A study has calculated medication error cost as 5000 USD. As per the National Health Service (NHS) of UK statistics, medication errors may affect 850,000 people annually and incur a health care expenditure of up to £2 billion. In a US-based study, it absolutely was estimated that medication administration errors have accounted for 34%of medication errors. National Patient Safety Agency (NPSA) shows that 59.3% of medication errors occur at the administration stage having high potential for morbidity and mortality and increased health care costs. Other system-related causes for administration errors include physician's poor handwriting, similar packing of medicine[2].

Core prescribing indicators are aimed toward measuring the degree of poly-pharmacy, a bent to prescribe in generics, levels of antibiotic use and injection, and thus the degree of medication prescribed from the essential drug list. The prescription errors are mainly of two types, errors of omission and errors of commission. An error of omission means essential information is missing in the prescription, while errors of commission mean wrongly written information within the prescription. The prescribing error is an avoidable medication error common (account for 70%) in hospitals worldwide. The National Coordinating Council for Medication Error reporting and prevention reported 15% of the medication errors are due to handwriting problems, abbreviations problems, and incomplete medication orders. Prescribing faults and prescription errors are major problems among medication errors; occur both in general practice and hospitals. Although they are rarely fatal, they will effect patients' safety and quality of healthcare. Prescription errors encompass those associated with the act of writing a prescription, whereas prescribing faults encompass irrational prescribing, inappropriate prescribing, under prescribing, overprescribing, and ineffective prescribing, arising from erroneous medical judgment or decisions concerning treatment or treatment monitoring Appropriate prescribing results when errors are minimized and when the prescriber actively endeavors to realize better prescribing both actions are required[3]. Prescription order forms involving those injectable drugs are generally more complex and might create more uncertainties and more dispensing errors. Errors involving injectable drugs are having a high potential which causes severe damage to the patient and also adverse events than the medication administered through other routes, additionally to their preparation and administration. Most frequent kinds of dispensing errors are dose omission errors, possibly related to the distractions and interruptions and shortage of communication. The term dispensing error refers to the medication errors linked to the pharmacy or to the health care professional who dispenses the medication. "According to Cohen (1999), the most significant explanation for dispensing errors is an excessive workload, the stress and the limited time available for dispensing the medication". A report from the Institute of Medicine suggested that medical errors account for 44,000-98,000 deaths per year and is recognized because eighth leading of death. Errors can arise at any stage during the dispensing process. Some errors aren't detected and should cause serious patient harm and sometimes death. Thus, the pharmacists review data on dispensing errors so risk-reduction strategies are developed to safeguard the standard and safety of patient care[4]. Several sheets of paper and stages from physician's order to drug delivery may confuse and augment the chance of the transcription error.

Several strategies are often implemented at different steps within the dispensing process to cut back the danger of medication errors due to drug confusion in pharmacies, like the utilization of barcode scanners, Tall man lettering, and alerts[5].

METHODOLOGY:

The present prospective observational study was conducted in the outpatient and inpatient wards of general medicine and surgical departments of a 500 bedded tertiary care hospital, Hyderabad; over a period of six months (from October 2019 to March 2020).

All prescriptions of inpatients and outpatients were included in the study. The necessary data was collected from treatment charts, in-patient case notes and outpatient prescriptions and checked for the presence of errors. The collected data was entered into Microsoft® access 2007 and analyzed. The prescription errors were analyzed by using NCC MERP taxonomy and categorized into either one of the categories (A, B, C, D, E, F, G, H, and I).For all the categorical variables frequency, percentage (chi-square) was calculated.

RESULTS

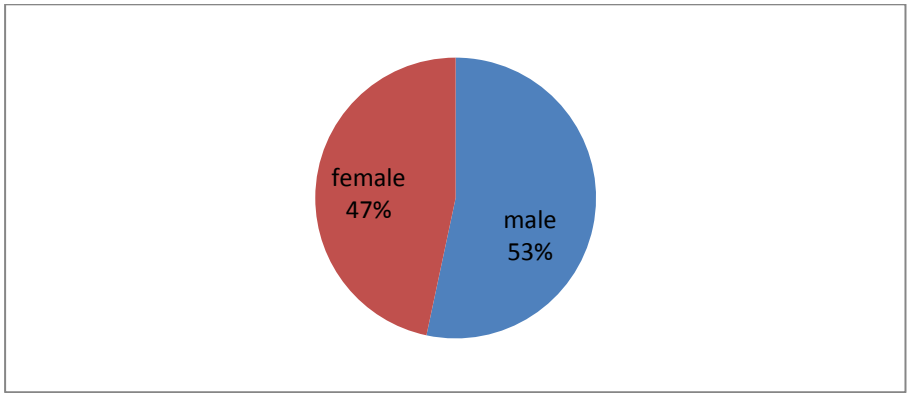

Figure 1: Gender wise distribution of patients.

Errors happened most while prescribing patients in the age group of 21-30 years (31.66%), followed by 51-60 (17.5%), 61-70 (15.83%), and 31-40 (11.66%) and 41-50 (10%) and followed by two age groups that share the same contribution 1-10 (6.66%) and 71-80 years (6.66).

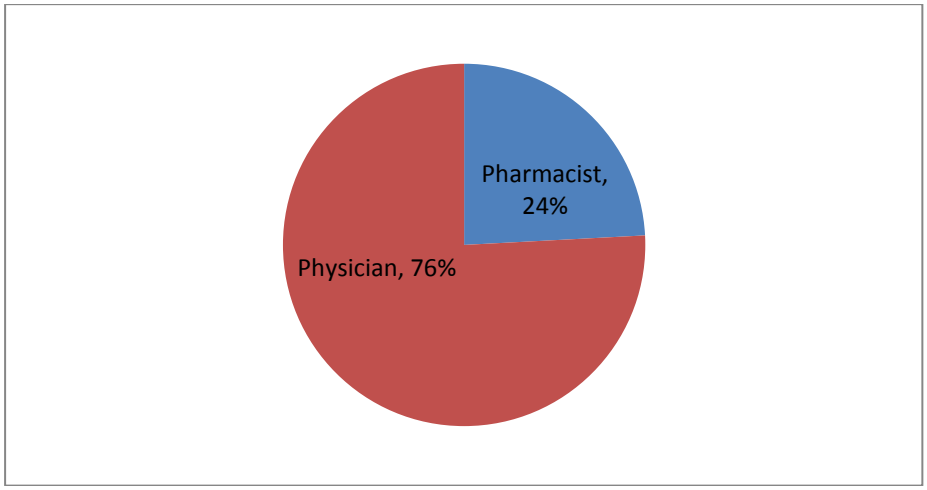

Figure 2: Distribution of errors on the basis ofpersonnel involved.

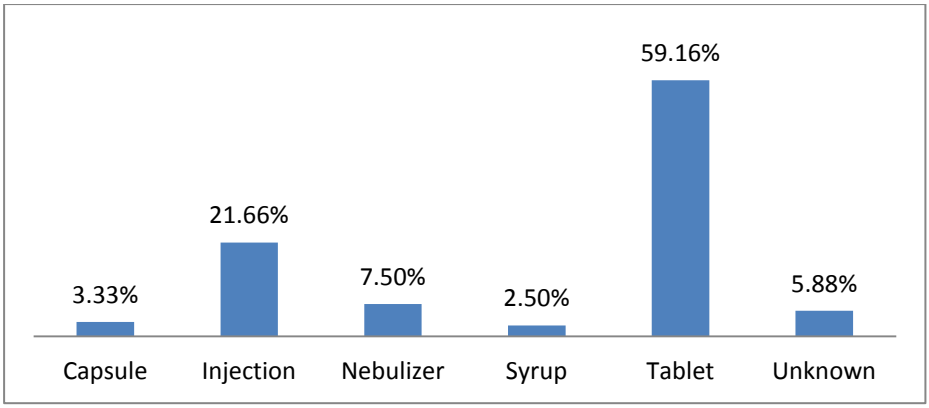

Figure 3: Errors distributed according to dosage forms.

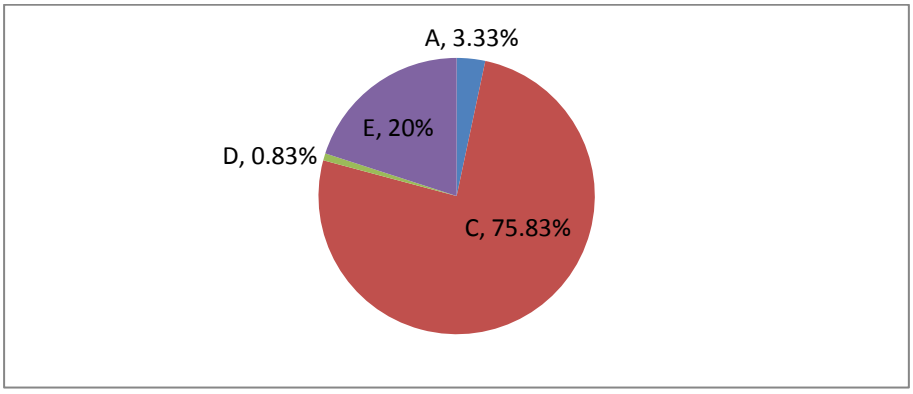

Figure 4: Errors distributed according to Patient outcome category

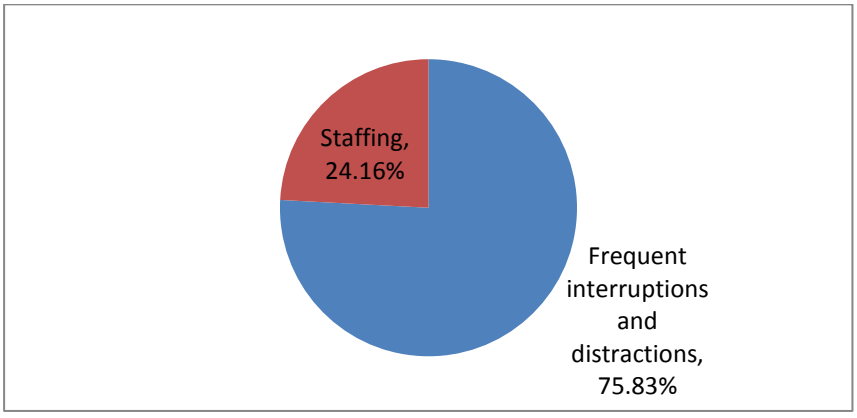

Figure 5: Errors distributed basing on contributing factors

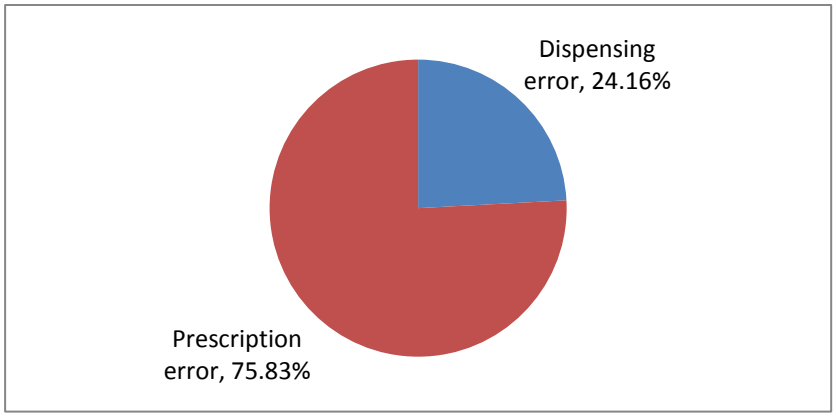

Figure 6: Errors distributed according to type of error

Table 1: Patients distributed according to the description of errors

Brief description of errors	Number of errors occurred	Percentage
Another drug dispensed	1	0.8
The Cannula not dispensed	1	0.8
The dose not prescribed	70	58.3
The drug not dispensed	25	20.8
Frequency not prescribed	21	17.5
Gloves not dispensed	1	0.8
The injection not dispensed	1	0.8
Total	**120**	

Table 2: Errors distributed according to therapeutic classification.

Therapeutic classification	No of errors occurred	Percentage
Antiemetics	6	5
Analgesics	1	0.83
Anti anginals	1	0.83
Antibiotics	22	18.33
Antibiotic and antiprotozoals	3	2.5
Antibiotic and Proton pump inhibitors	1	0.83
Anticholinergics	2	1.66
Anticoagulants	1	0.83
Anticonvulsants	2	1.66
Antidepressants	2	1.66
Antifibrinolytics	1	0.83
Antihistamics	2	1.66
Antilipidemics	3	2.5
Antiplatelets	2	1.66
Antipsychotics	1	0.83
Antispasmodics	3	2.5
Bronchodilators	5	4.16
Bronchodilators+Corticosteroids	1	0.83
Calcium supplements	1	0.83
Cannulas	1	0.83
CalciumChannelBlockers	1	0.83
Corticosteroids	6	5
COX 2 selective Non-Steroidal Anti Inflammatory Drugs	1	0.83
Diuretics	1	0.83
Enzymes	1	0.83
Enzymes + Antioxidants	1	0.83
Gastro Intestinal protectants	2	1.66
Gloves	1	0.83
Heparin	1	0.83
Injection	1	0.83
Iron supplements	1	0.83
Multivitamins	11	9.16
Non Steroidal Anti Inflammatory Drugs	3	2.5
NonSteroidalAnti Inflammatory Drugs + Opioid analgesics	1	0.83
Opioid analgesics	3	2.5
Pancreatic enzymes	1	0.83
Proton pump inhibitors	11	9.16
Normal Saline	3	2.5

Bile acid sequestrants	2	1.66
Sedatives	1	0.83
Selective serotonin reuptake inhibitors	2	1.66
Thiazide diuretics	1	0.83
Thyroid hormone supplements	2	1.66
Vitamin B supplements	1	0.83
Total	**120**	

Table 3: Errors distributed according to suggestion given by study team.

Suggestion Given	Number Of Cases	Percentage
Dose should be properly prescribed in order to avoid many types of error	72	60
Drug is not dispensed which is essential and may cause harm to patient	24	20
Frequency should be appropriately prescribed in order to avoid many types of error	18	15
Cannula is not dispensed which is necessary and it may lead to minor errors while administering errors	1	0.83
Injection is not dispensed which is necessary and it may lead to minor errors while administering errors	1	0.83
Gloves were not dispensed which is necessary and it may lead to monor errors while administering errors	1	0.83
Inappropriate dose was dispensed which may leads to harm to patient	1	0.83
Dispensed drug is more than the prescribed which may leads to harm to patient and leads to stock-out for needed patient	1	0.83
Another drug is dispensed instead of one drug which may leads to severe harm to patient	1	0.83
Total	12	

DISCUSSION

Our study found that errors happen most while prescribing to the age group of 21-30 years (31.66%). "In 2013, Drug-related problems in prescribed medicines in Germany at the time of dispensing. Andrea Nicolas et al," found that patients with age group ≥ 65 years (20.8%) experience most errors. In our study, we found that patients with normal weight i.e., 18.5 to 24.5 BMI were more likely to have errors (95%) "In 2009, Incidence, type, and causes of dispensing errors: A review of the literature; David Barlow et al," found that highest errors are due to wrong strength dispensed (22.7%). In our study, we found that the highest errors occurred when the dose was not prescribed (58.3%) which is not relatable with reference. this may occur due to lack of time and negligence. In this study we found that highest number of errors were with tablet dosage form (59.16%) "In May 2018, Journal of Applied Pharmaceutical Science Vol. 8 (05), pp 109-114; Categorization, Appraisal, and Reporting of Medication errors Ascertained in Medical Ward of Tertiary Care Hospital; Vinodkumar Mugada et al" found that hoghest errors fall under the patient outcome category D (44.3%). In this study we found that highest errors are present in the category C (75.83%) which is not similar with the reference; indicative of an improvement in the prevention of errors and proper follow up of guidelines. "In 2009, Incidence, type, and causes of dispensing errors: A review of the literature; David Barlow et al," in their study found that highest errors are due to contributing factors such as heavy workload of HCPs (11.81%). In this study we found that most errors are due to frequent interruptions and distractions (75.83%).

"In May 2018, Journal of Applied Pharmaceutical Science Vol. 8 (05), pp 109-114; Categorization, Appraisal, and Reporting of Medication errors Ascertained in Medical Ward of Tertiary Care Hospital; VinodkumarMugadaet al" prescription errors (89%) are the most common type of errors. Their results coincide with our study results and the chief reason behind it is the negligence of the physician.

"In May 2018, Journal of Applied Pharmaceutical Science Vol. 8 (05), pp 109-114; Categorization, Appraisal, and Reporting of Medication errors Ascertained in Medical Ward of Tertiary Care Hospital; Vinodkumar Mugada et al" found highest errors occurred while prescribing antibiotics (16.4%). The results are similar to the findings of our study and it throws a light on the point that physicians should be more concerned with the guidelines while prescribing antibiotics.

In this study, we found when errors are distributed according to suggestions provided and found highest is with suggestions not provided (55%) which is due to the lack of interaction with the physician and the errors are not much severe. 'Dose should be properly prescribed to avoid many types of errors' is the suggestion given highest number of times(60%) as most errors occurred as a consequence of prescriber not prescribing the proper dose. "In 2018; Shaik Ali Basha. Et al. / International Journal of Research in Pharmaceutical and Nano Sciences. 7(3), 79-84." Found that among all the health care professionals, physician is more involved (38%) in the occurrence of errors. Results are similar to our study (75.83%).

CONCLUSION

Although India, has more pharmacists than in other countries, most don't practice in setting; don't work closely with prescribers or nurses and discuss medication-related problems to develop safer medication use systems. So, it is very necessary to conduct studies on medication errors and disseminate the findings among the professionals which can help in reducing the frequency of errors incidence. It also helps the pharmacist to make sure that patients make the most effective use of medication[7].

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Conflict of interest: The authors declare that there is no conflict of interest.

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