

# A Study of Prescribing Errors in a Private Tertiary Care Hospital in Saudi Arabia

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## ABSTRACT

**Objectives:** Providing a good quality and safe medical service with medicines that are both effective and safe to patients is the main objective of any health care organization. This study aims to know the types and nature of prescribing errors (PEs), to check Drug - Drug Interactions (DDIs) occurrence and estimate rationality of prescription orders in a hospital with tertiary care. **Materials and Methods:** A cross sectional study of prescribing errors conducted in a private tertiary care hospital located in Jeddah city, Saudi Arabia over 3 months. One hundred thirteen patients were included in the study over the period of 12 weeks that was from October 2017 to December 2017. **Results:** It was detected in this study that as an average 4.35 drugs/prescription were prescribed. 24.8% of prescriptions found incomplete patient information. In this study we found that the majority of prescribing errors are not written the dose /dose error (7 %), lack of direction (2.7%) and also lack of duration of treatment (3.5%). Drug-drug interactions were analyzed by using Medscape drug interaction checker. Among one hundred thirteen prescriptions twenty seven prescriptions are found with minor drug-drug interactions (24%), nine prescriptions were identified with moderate interactions (8%) and

two percent of prescriptions were observed with serious drug-drug interactions. **Conclusion:** In hospital setting computerizing the medication process system and providing the drug formulary in hospital may help the prescribers as quick reference for drug dose may help to lower prescribing errors. To curtail inappropriate application of drugs policy of drug use should be put into action.

**Key words:** Medication errors, Prescribing errors, Drug interactions, Prescribing pattern and Prescription Quality, Adverse Drug Reactions, Polypharmacy.

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## INTRODUCTION

Providing a good quality and safe medical service with medicines that are both effective and safe to patients is the main objective of any health care organization. Any part of the world there is no hospital health care system absolutely error free. The steps whereby writing prescription for medications comprising a huge number of people such as patient, nurse, prescriber, pharmacist or care takers. To provide safe practice these persons interact with each other. In general practice the fatal drugs errors known to be more commonly found in hospitals. The main focus of studies is the common problem of medication errors.

There is no medicine which is effectively safe, while any drug may lead Adverse Drug Reactions even when used properly. During the process of medication non-avoidable errors which can and do happen known as adverse drug reactions.<sup>1</sup> The “5 rights” of safe medication use are the right patient, right time, right route, right dose and right drug administration. Errors in medication will happen if all 5 rights are not implemented together in practice.<sup>2</sup> All the health care team members are responsible for the safety of the patient. Even though medication errors still happen and sometimes leads to real human suffering.<sup>2</sup> In spite of exceptional increase in patient outcomes is obtainable when drugs are

utilized in safe and proper ways and when team members of health care cooperate in well-organized way to managing the outcomes.

Medication errors do happens in all parts of the globe where they have been investigated and are an expected consequence of the contemporary pharmaceutical process. When drugs were first utilized to treat patients the possibility for errors has always remained from the time. Today serious types of errors are increasing widely due to complicated increasing medicine and the drugs. These complications include availability of same drugs in the form of generic and branded name products.<sup>3</sup>

In the year 2004, Ferner and Aronson defined medication error as a failure in the treatment process that leads to, or has the potential to lead to, harm to the patient.<sup>4</sup> Mainly medications errors occur in these 3 areas are dispensing, prescribing or administration of drugs. It is stated in many investigations that prescribing errors comprises the majority of medication errors which occur.<sup>1,2,4,5</sup> Prescription of drug can be divided in to an intellectual part-decision and a technical part including essential information communication.<sup>6</sup> The existence of medication errors in healthcare system can compromise patient confidence level.<sup>7</sup> There is also one more big cause of the error by doctors when they

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prescribe the similar drug to a patient simply by incomplete knowledge about the medication and use both the brand name and generic names. Antiretroviral agents like viramune (nevirapine) and viracept (nelfinavir) used in the treatment of Acquired immunodeficiency syndrome (AIDS).<sup>8</sup> If ambivalence in writing medication name, route of administration, dose, potency and indication may results harmful effects. Illegible prescriptions are medication orders have been extensively cause of medication error. Sound-alike and look-alike drug names cause more than 33% of medication errors that have been noted down to the United States Pharmacopeial convention Medication Error Reporting and Prevention (USP MERP).<sup>9,10</sup> The improper use of abbreviations by prescribers in manual or computerized prescribing system may result medication errors.<sup>11,12</sup> Drug dose calculation errors in the pediatric patients by the prescribers can cause harmful effects and potential serious errors.<sup>13</sup> Institute for Safe Medication Practice (ISMP) has acknowledged the lack of patients understanding to their therapy evolved in the medication errors so the pharmacist should counsel the patient effectively.<sup>14</sup>

In the process of diagnosis of the aged patient play a vital role because in the geriatric patients change their pharmacokinetics, may result higher rate of co-morbidity due to the adverse events and medication errors as compared to adult patients.<sup>15,16</sup>

This study is conducted to find out the prescribing errors and to assess the incident of Drug-drug interactions (DDIs) and check the rationality of prescriptions in a hospital with tertiary care system.

## MATERIALS AND METHODS

A cross sectional study of prescribing errors was conducted in over three months from October 2017 to December 2017 in a private tertiary care hospital located in Jeddah City, Saudi Arabia. This study was approved by the Institutional Human Ethics Committee of Ibn Sina National College (approval number H-07-16112017).

Sampling technique was non-probability convenience method and the recruitment done based on the study's inclusion and exclusion criteria. The Patients admitted to different wards of tertiary care hospital was included in the study. Whereas the patients on ventilators, seriously ill patients requiring ICU admission, patients shifted to other wards and those patients with mentally diseased conditions were excluded from the study. The patients' data were collected using a patient data form and all the information of the patients were got from the patient medical files

the information includes chief complaints, co morbidities and prescribed medications.

Detection of prescribing error was done by the pharmacists who were well-trained in prescribing errors. A list of ten patients was selected during observation day for error reviewing using the chart review method at the pharmacy where medications were dispensed and also the physician orders were evaluated. The main resources used during the Prescribing error detection process are Medscape Drug Interaction Checker and Lexicomp Clinical Drug Information software.

## RESULTS

One hundred thirteen prescriptions were included in the study out of two hundred prescriptions depending on the inclusion criteria, over a period of 12 weeks the data was collected from the different wards of the tertiary care hospital. This study found that as an average 4.35 drugs /prescription were prescribed. 24.8% prescriptions were found with incomplete patient information (Figure 1).

In this study we observed that there were around twenty five percent of prescriptions were found with incomplete patient demographic information as shown in Figure 1 and around ten percent of the prescriptions do not mention the age of the patient, it is the basic requirement for the optimization of therapy shown in Figure 2. The maximum percentages of prescriptions were from the medical ward and around twenty seven percent prescription not mentioned the department shown in Figure 3. We observed the majority of prescriptions were containing more than five drugs that are around forty seven percent of prescriptions as shown in Figure 4. Approximately seventy three percent prescriptions contain brand names but fewer prescriptions were written in generic names illustrated in the Figure 5. All the prescriptions were handwritten twenty two percent of prescriptions were found in illegible handwriting as shown in Figure 6 and it was difficult to understand the drug names.

We found the majority of prescribing errors were dosing error or not written the dose that was seven percent, around three percent prescriptions with improper drug selection, around three percent prescriptions had unsuitable dosing intervals or not mentioned dosing intervals, 3.5 percent prescription were inappropriate route or not mentioned the route of administration, around three percent of the prescriptions were found with duplications of medications, in 2.7 percent of prescriptions found with lack of direction to administrations

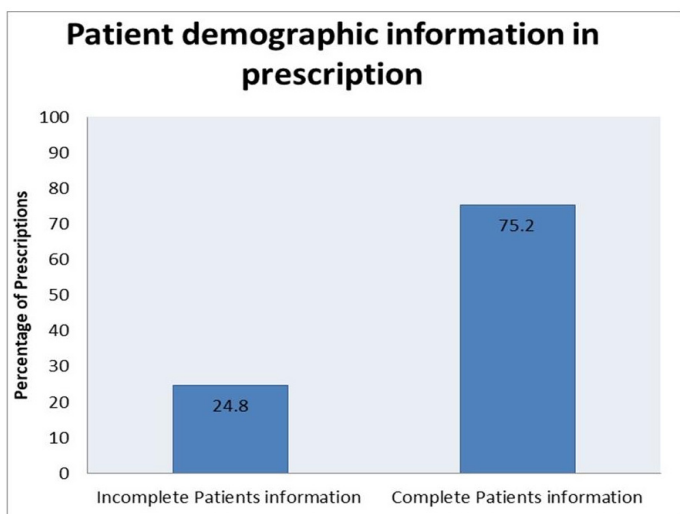


Figure 1: Patient demographic information in prescription.

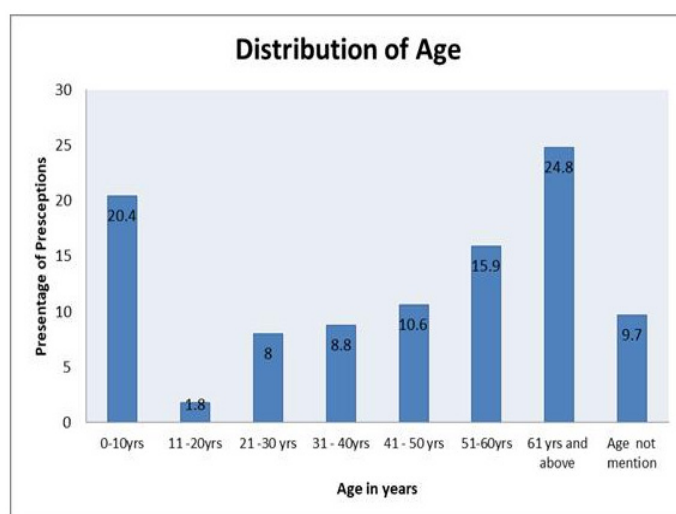


Figure 2: Distribution of Patients by Age wise.

and also 3.5 percent prescriptions found lack of duration of treatment or incorrect duration as shown in Figure 7.

The drug-drug interactions were analyzed in individual prescription by using a Medscape drug interaction checker and Lexicomp Clinical Drug Information software. Among one hundred thirteen prescriptions twenty four percent prescriptions were found with minor drug-drug interactions, eight percent prescriptions were identified with moderate interactions and two percent prescriptions were observed with serious drug-drug interactions exhibit in Figure 8.

## DISCUSSION

This study was carried out on the prescription errors in hand written prescriptions of inpatients in tertiary care hospital. It was observed that nearly twenty eight percent prescriptions were incomplete in patient demographic information, whereas the other study conducted in Saudi Arabia reported 8.6 percent of outpatient computerized prescriptions were missing patient demographic information,<sup>17</sup> in another study reported in Saudi Arabia revealed only ten percent of outpatient electronic encounters and seven percent of inpatient electronic prescriptions were missing patient demographic information.<sup>18</sup> Our data shows that around twenty five percent of hand written prescriptions were reported with prescribing errors but in previous studies in United kingdom reported 14.7 percent of prescription errors<sup>19,20</sup> and in the another study conducted in united kingdom revealed 8.9 percent hand written prescriptions were reported with prescription errors.<sup>21</sup> We noticed in our study only 27.4 percent of drugs were prescribed in generic

name but the other study conducted in Saudi Arabia reported 94 percent of outpatient computerized prescriptions were prescribed in generic name<sup>17</sup> and in other study was reported 54.2 percent of the drugs were in generic name.<sup>22</sup> We found an average of 4.35 drugs per prescription were prescribed, similar results were reported in the previous studies,<sup>22,23</sup> but in other study conducted in the primary health units reported 2.3 drugs per prescriptions,<sup>24</sup> whereas world health organization recommend 1.6 to 1.8 drugs per prescription.<sup>25</sup>

Our data presents twenty four percent interactions were minor drug-drug interactions in other study conducted in Saudi Arabia reported fifteen percent were minor interactions<sup>17</sup> and in another study was reported as nearly eighteen percent were minor drug interactions.<sup>23</sup> we found in this study an eight percent of prescriptions were identified with moderate interactions and other study conducted in Saudi Arabia reported 4.5 percent were moderate interactions,<sup>17</sup> in contrast with other study which reported seventy eight percent<sup>23</sup> and two percent prescriptions were observed with serious drug-drug interactions in our study and the other study conducted in Saudi Arabia reported only one percent were with serious drug interactions<sup>17</sup> and the another study reported with around four percent were serious drug interaction.<sup>23,24</sup>

All around the globe the medication errors are the most common problem in all healthcare systems these results in increase health costs, patient injury and liability claims. To avoid the occurrence of these errors all health care professionals have a responsibility in ensuring safety of patient, removing risk parameters and implementing new strategies.<sup>25-28</sup> There were reports about the antibacterial irrational prescribing, this may increase antibacterial resistance and increase cost of treatment.<sup>29,30</sup>

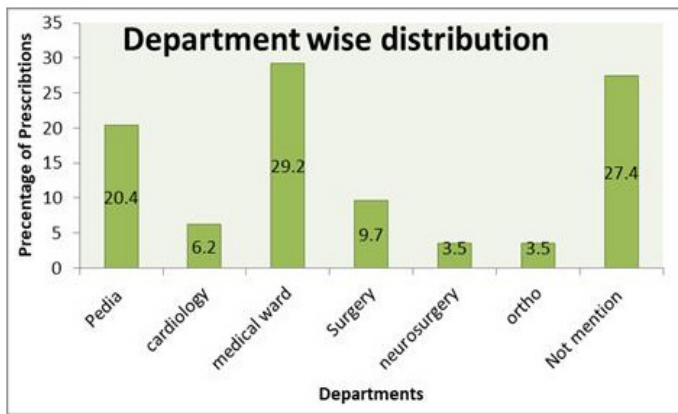


Figure 3: Patient distributions by department wise.

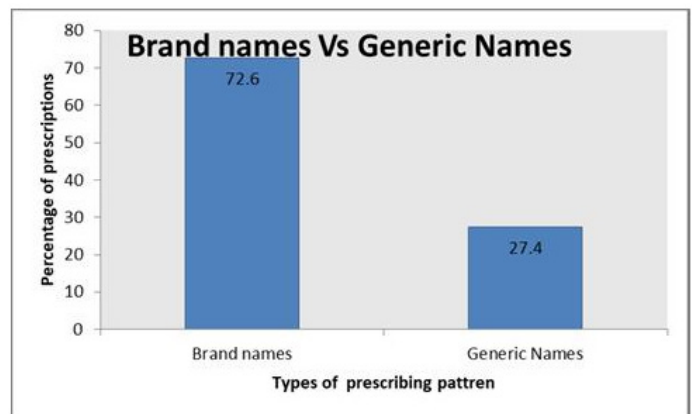


Figure 5: Prescribing Pattern.

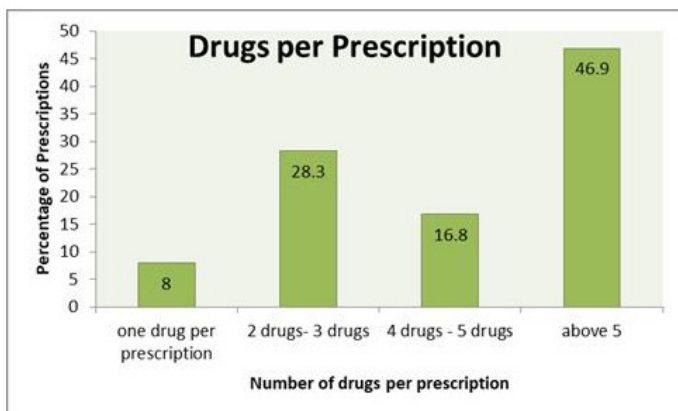


Figure 4: Number of Drugs prescribed per Prescription.

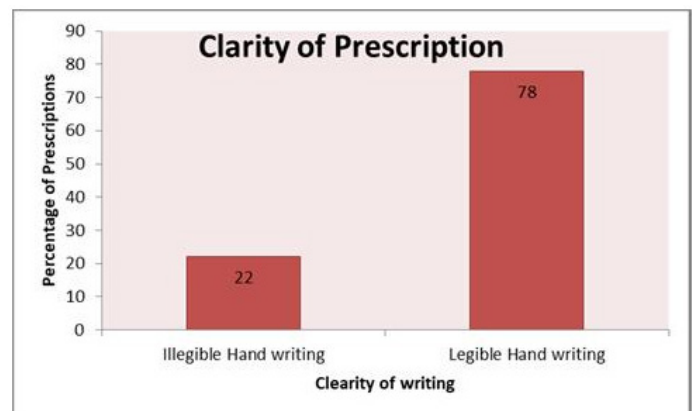


Figure 6: Prescriptions Quality.

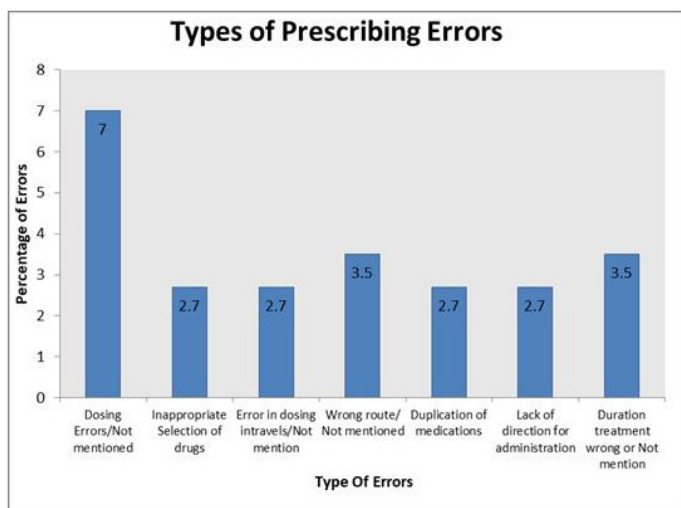


Figure 7: Types of Prescribing Errors.

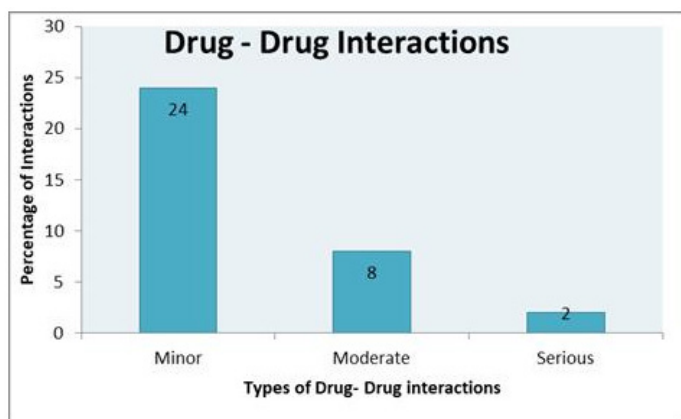


Figure 8: Drug-drug Interactions.

Computerized prescription order entry system is one of the system with clinical decision support will help in decreasing the prescription errors compared with paper based prescriptions. It is not the ultimate solution to resolve the errors; however this system will mark to enhance the prescription pattern and reduce the medication errors as well as continuous monitoring of the prescription errors moreover by addressing those issues in the pharmacy and therapeutic committee (PTC) along with doing the root cause analysis obliging to find solution. A clinical pharmacist has important responsibility in preparing the new policies to overcome the errors, conducting the training programs to the physicians and implementing the precautionary methods to prevent the medication errors in the hospitals. Our study had few limitations such as less number of the patient prescriptions with less time.

## CONCLUSION

Our research shows the occurrence of prescribing errors at the medication use cycle, along with semi-rational prescriptions and potential DDIs. In hospital setting computerizing the medication process system and providing the drug formulary in hospital may help the prescribers as quick reference for drug dosage may help to lower prescribing errors. The duties of the pharmacist play an important part in the detection and correction of medication error necessity to have acknowledgement and formalized into a routine monitoring and feedback system. The pharmacist should review all the prescriptions on

regular basis and should give the feedback to the prescribers and also present the medication error report on monthly basis in Pharmacy and Therapeutic Committee (PTC) and prepare the guideline to prevent the prescribing errors. The newly appointed doctors should be trained effectively to prevent the prescribing errors.

Future plans are to continue the complete medication errors including dispensing and administration errors along with invite representatives from each ward unit to form Medical Emergency Teams (METs) and conduct weekly medical emergency teams meetings to increase awareness of medication errors and solutions. METs will continue to utilize information collected from these reports to improve the rationality of treatment.

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## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

## ABBREVIATIONS

DDI: Drug-drug Interaction; PTC: Pharmacy and therapeutic committee; METs: Medical emergency teams; ISMP: Institute for Safe Medication Practice; USP MERP: United States Pharmacopeial Convention Medication Error Reporting and Prevention; AIDS: Acquired immunodeficiency syndrome; PEs: Prescribing errors.

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