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DRUG-DRUG INTERACTIONS (DDIs);

PREVALENCE OF VARIOUS LEVELS IN PRESCRIPTIONS AT PUBLIC SECTOR TEACHING HOSPITAL OF HYDERABAD, PAKISTAN

1. Pharm.D, (M.Phil), Lecturer
Department of Pharmaceutics,
Faculty of Pharmacy,
University of Sindh, Jamshoro
2. B.Pharm, Ph.D, Associate Professor
Department of Pharmacy Practice,
Faculty of Pharmacy,
University of Sindh, Jamshoro
3. B.Pharm, Ph.D, Professor
Department of Pharmaceutics,
Faculty of Pharmacy,
University of Sindh, Jamshoro
4. Pharm.D, Ph.D, Lecturer
Department of Pharmacy Practice,
Faculty of Pharmacy,
University of Sindh, Jamshoro
5. Pharm.D, (Ph.D), Lecturer
Department of Pharmacy Practice,
Faculty of Pharmacy,
University of Sindh, Jamshoro
6. Pharm.D, (M.Phil), M.Phil Scholar
Department of Pharmaceutics,
Faculty of Pharmacy,
University of Sindh, Jamshoro

Correspondence Address:
Ali Qureshi
Department of Pharmaceutics,
Faculty of Pharmacy,
University of Sindh Jamshoro
sciencepk62@gmail.com

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Ali Qureshi[1], Muhammad Ali Ghoto[2], Abdullah Dayo[3], Mudassar Iqbal Arain[4], Rabia Parveen[5], Altaf Mangi[6]

ABSTRACT… Introduction: Drug-drug interaction refers to an altered or impaired response of drug as a resultant of the other drug's activity. However, recently advancement in field of therapeutics has leaded the therapy toward more rational and logical trend in order to improve the patients' health with respect to cost effectiveness. **Objective:** To assess the various levels of DDIs in Prescriptions at public sector teaching hospital of Hyderabad, Pakistan. **Study Design and Settings/Methodology:** A descriptive observational questionnaire based study has been conducted by collecting initially 250 random prescriptions of various patients prescribed with multiple drugs. Tertiary care hospital OPD and In-patient wards were visited for a period of 06 months. The Prescriptions (℞) so collected were analyzed and assessed individually for drug interactions using Standard drug interaction software i.e.. Lexi-comp's Lexi-Interact, Drug Information Handbook, Hansten and Horn's drug interactions. **Results:** For this study, a total 250 Prescriptions were collected. It was observed that 30 (12%) prescriptions contained with single medication, 10 (4%) prescriptions were unreadable, 210 (84%) prescriptions were contained more than one medication. Moreover, 210 (84%) poly-pharmacy prescriptions focused keenly. Subsequently, 51 (24%) prescriptions ensured the prevalence of DDIs and 159 (76%) were Non-DDIs prescriptions. Similarly, 13 ℞ contained four or more than four drugs, 32 ℞ contained three drugs and 06 prescriptions contained two drugs correspondingly. **Conclusion:** It was clearly concluded that the most potential reason of DDIs are Poly pharmacy. So it is of utmost need to enhance the health care policies in overall healthcare system in order to antagonize DDIs associated morbidity and mortality among society.

Key words: Interaction, DDI, ADR, Tertiary care, Hyderabad.

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INTRODUCTION

The actual meaning of drug-drug interaction refers to an altered or impaired action of drug as a resultant of the other drug activity. However, recently advancement in field of therapeutics has leaded the therapy toward more rational and logical trend in order to improve the patients' health with respect to cost effectiveness. Therefore due to this reason there is an easily obtain-ability of medicine in the local market. At contrary, apart from the current optimistic approach towards the easy availability of medications, the prevalence of drug interactions and ultimately adverse drug events increase day by day.[1,2] Furthermore, these drug-drug interactions play an important role in impaired therapeutic outcome or therapy failure.[3-5] Similarly, the drug that causes drug interaction or that interacts with the other drug is known as precipitant drug or precipitating drug. Subsequently the affected drug is termed an object drug respectively.[6] Moreover, many studies reveal it not to be necessary that DDIs always show fatal response but the risk remains.[7] Broadly, DDIs are classified in three classes based on the severity i.e. Minor, Moderate and Major Classes respectively. However, Major class of DDI, can be identified by the mortality rate or death rate. Moreover, there are many precedent cases of DDIs from which few are elaborated i.e. Warfarin and amiodarone, digoxin and Spironolactone, ciprofloxacin and theophylline, etc. Among all the known examples of various types of DDIs digoxin and omeprazole, spironolactone and losartan,

warfarin and propranolol shows a moderate type of DDI. However, Aminophylline with H2 receptor antagonists, hydrocortisone with aspirin and Theophylline, a bronchodilator with aspirin showed DDI of minor type.[8,9] Furthermore, another grouping of DDI was given by Hansten, which was based on the possibilities of managing. In first group, the risk of DDI is more than the benefits of the drugs, so mainly these drugs have restricted use. For instance, the diet which enriched with tyramine have more possibilities to interact with the MAOIs i,e Phenelzine, tranylcypromide and isocarboxide respectively. In the second group, certain precautionary measures are been taken as to gain more benefits rather than risks i.e. Azothioprine and allopurinol, methotrexate and aspirin, warfarin with phenobarbital etc. Moreover, in the third group included ketoconazole, verapamil, rifampin etc. Furthermore, in the discussed study, the third group of different interactions, no any special consideration had given because the prevalence of DDI did not noticed to an elevated level.[10]

However, Robert A. Hamilton et al in another study analyzed the occurrence of DDIs in particular to various hospital settings. Moreover, for this purpose, patients were selected randomly. However, among all the observed cases, a comparison was done between those patients who were already been exposed to DDIs and patients who were prescribed with interacting drugs.[11] Thiyagu Rajakannan et al explained that probability of DDIs per prescription is directly proportional to the amount of medications prescribed. Subsequently, it was also notice that patients with cardiac complications were seen more susceptible towards DDIs due to multi-drug use. However, drugs that showed DDI were clopidogrel and heparin, aspirin and heparin, etc.[12] Similarly, M.S Sindhu et al studied the DDI to be responsible to mimic either increase or decrease DDI the effect of an individual drug or two drugs respectively.[13]

METHODOLOGY

A descriptive observational questionnaire based study has been conducted by collecting initially 250 random prescriptions of various patients prescribed with multiple drugs. Tertiary care hospital OPD and In-patient wards were visited for collecting data. Every prescription so collected was analyzed properly. The Prescriptions (℞) so collected were analyzed and assessed individually for drug interactions using Standard drug interaction software i.e.. Lexi-comp's Lexi-Interact[14], Drug Information Handbook[15] (Lacy Charles F et al., 2012-2013), Hansten and Horn's drug interactions.[16]

RESULTS

For this study, a total 250 Prescriptions were collected through random sampling technique. After proper analysis, it was observed that 30 (12%) prescriptions contained with single medication, 10 (4%) prescriptions were unreadable, 210 (84%) prescriptions were contained more than one medication. (Table-I and Figure-1). Further, it was analyzed from the 250 collected prescriptions that 60.8% (n=152) belonged to male gender whereas 39.2% (n=98) belonged to female gender respectively. (Table-II and Figure-2)

Prescription	Number of Prescription	Percentages
Unreadable	10	4%
Single Medication	30	12%
Multiple Medications	210	84%
Total	250	100%

Table-I. Categorization of various collected prescriptions

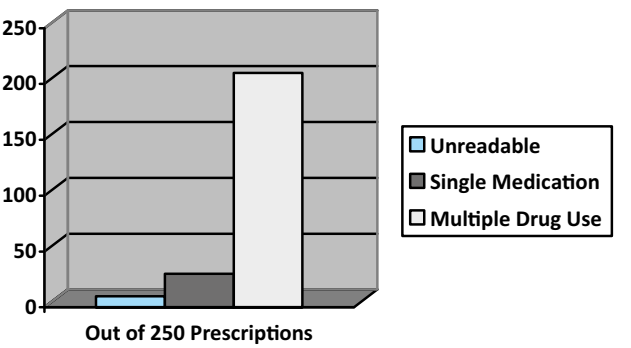

Figure-1. Categorization of various collected prescriptions

Gender	Frequency	Percentage	Cumulative
Male	152	60.8%	60.8%
Female	98	39.2%	100%
Total	250	100%	-

Table-II. Distribution of prescription based on Gender

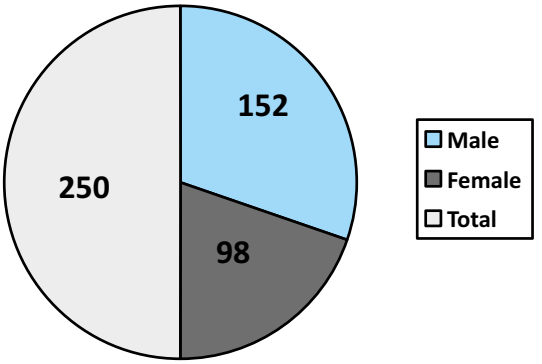

Figure-2. Distribution of total number of Prescriptions based on gender

Gender Wise	Number of Prescription	%age
Male	155	62%
Female	95	38%
Total	210	100%

Table-III. Gender wise distribution of prescriptions containing poly-pharmacy practice

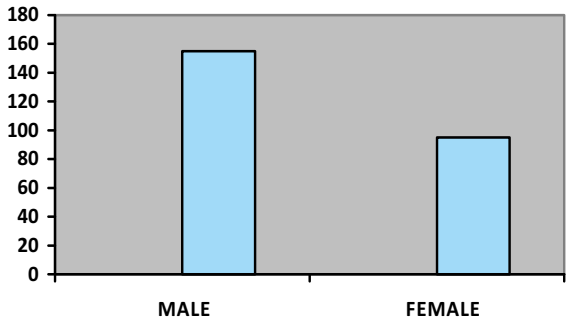

Figure-3. Gender wise distributions of poly-pharmacy containing prescriptions

At the other hand, out of the total 250 prescriptions, 155 (62%) belonged to male and 95 (38%) prescriptions belonged to female genders which shows that the male gender prescriptions were more comparatively to the female gender respectively. Moreover, 210 (84%) poly-pharmacy prescriptions focused keenly. Subsequently, out of 210 total prescription, 51 (24%) prescriptions ensured the prevalence of DDIs and 159 (76%) were Non-DDIs prescriptions (Table-IV & Figure-4). Similarly, 13 ℞ contained four or more than four drugs, 32 ℞ contained three drugs and 06 prescriptions contained two drugs correspondingly (Table-V). Furthermore, out of 51 prescriptions of DDIs 34 ℞ contained one DDI, 12 ℞ contained two DDIs and 05 ℞ contained three DDIs respectively (Table-VI). Since, all the collected data evaluated and found about 73 DDIs in total out of 51 prescriptions that contained DDI. However, as per severity out of 73 DDIs, 07 DDI were major, 42 DDI were mild and 24 DDI were of mild nature respectively.

Poly-Pharmacy Prescriptions	Number of Prescriptions	Percentage
Prescriptions without DDI	159	76%
Prescriptions With DDI	51	24%
Total Number of Prescriptions	210	100%

Table-IV. Categorization of Poly-pharmacy containing 210 Prescriptions

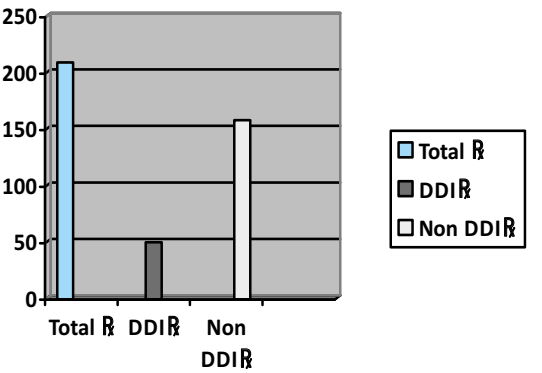

Figure-4. Categorization of Poly-pharmacy containing 210 prescriptions

℞ with 4 or more than 4 drugs	℞ containing 3 drugs	℞ containing 2 drugs	Total Prescriptions ℞ containing DDI
13	32	06	51
25.49%	62.74%	11.76%	100%

Table-V. Categorization of 51 Prescriptions containing DDI (℞) based on drugs contained

1 DDI Prescriptions	2 DDI Prescriptions	3 DDI Prescriptions	Total DDI Prescriptions
34	12	05	51
66.66%	23.52%	9.80%	100%

Table-VI. Distribution of DDIs containing prescription ℞

Severity of DDI	Number of DDIs	Percentage (%)	Cumulative %
Mild	24	32.87%	32.87%
Moderate	42	58.53%	91.4%
Major	07	9.58%	100%
Total	73	100%	

Table-VII. Total number of DDIs found as per severity.

DISCUSSION

This study revealed a new dimension towards the prescribing pattern of multiple drugs concomitantly. The whole data gathered from patients who were using multi-drug therapy at a time from various ward at tertiary care hospitals of Hyderabad, Pakistan. It was observe that different hospitals so visited that the hospital pharmacies were not developed properly even, there was total scarcity of qualified people and these were running by quacks. However due to this lack of drug expert at the pharmacy and drugstores, the overall prevalence of ADR seems more. This study mainly based on the analysis of 250 total prescriptions. However, 10 (4%) prescriptions were not apt. Similarly, 210 prescriptions out of 250 contained poly pharmacy practice. Moreover, total of 73 DDIs were reported with an average of 02 DDIs per prescription. However, one of the previous studies shows a data of 26 % DDIs respectively.[14] At the other hand, we also compared our findings with precedent studies done globally and found that prevalence of DDIs depends upon the proper endorsement of overall healthcare policies of a specific country. Similarly, in this study we have categorized interactions as Mild, Moderate and Major respectively as per severity and potential to cause the worse effect. Subsequently, the total DDIs so observed were 73 out of which 24 mild, 42 moderate and 07 major DDIs reported. At contrast, another study showed 11% of total DDIs. This again shows a less prevalence of DDI as per this current study. However, it was also assessed that the prevalence of DDIs and concomitant use of multiple medications at a time are directly proportional to each other. However, there is a bit increase in DDIs with respect to the poly-pharmacy prescribing trend of medicines.[15] Subsequently as per this study, a huge number of prescriptions contained moderate level DDIs respectively.

CONCLUSION

The data so collected during this study showed that out of 250 Collected Prescriptions, 24% Prescriptions contained the DDIs. However, a total number of 70 DDIs found in all 50 Prescriptions. Most of the prescriptions belong to male comparatively to the female gender. Moreover, it is of utmost need to enhance the health care policies in overall healthcare system in order to antagonize DDIs associated morbidity and mortality among society.

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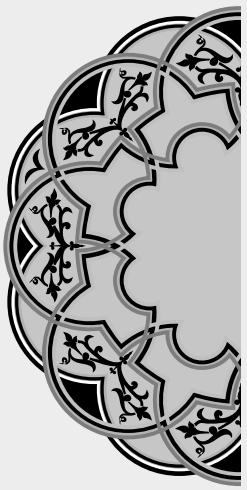

"You are not required to set yourself on fire to keep other people warm"

Unknown

AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Ali Qureshi	Data collection and writing	
2	Muhammad Ali Ghoto	Data collection and writing	
3	Abdullah Dayo	Check Article english	
4	Mudassar Iqbal Arain	Article write up	
5	Rabia Parveen	english ensemble	
6	Altaf Mangi	Data collection	