Available online at www.scholarsresearchlibrary.com

Scholars Research Library

Der Pharmacia Lettre, 2010: 2 (1) 368-373
(http://scholarsresearchlibrary.com/archive.html)

ISSN 0974-248X
USA CODEN: DPLEB4

Analysis of In-Patients Drug Interactions: Facts and Challenges

Sathish Amirthalingam[1]*and Bhaskar H. Vaidhun[2]

[1]A. R. College of Pharmacy, V. V. Nagar, Gujarat
[2]M. P. Patel College of Pharmacy, Kapadwanj, Gujarat

Abstract

A large number of drugs are introduced every year, and new interactions between medications are increasingly reported. The interaction may increase (or) decrease the effectiveness of the drug, it also may result in a new side effects**.** Drug - Drug interactions (DDIs) may lead to adverse drug reactions that can be severe enough to necessitate hospitalization. Approximately 37-60% of patients admitted to the hospital may have one or more potentially interacting drug combinations at admission. The proportion of hospital admissions due to DDIs ranges from 0% to 3.8%. In inpatients, the risk of having potentially interacting drug combinations can additionally increase, because new drugs are often added to the existing drug therapy. Recent studies could show that 2.2-65.0% of inpatients may have one or more potential DDIs and that 41.1- 69.7% of patients have a potential interacting drug combination at discharge. In inpatients, drug modifications shortly before discharge may be of most importance to reduce DDIs because in general the clinical and therapeutic monitoring of patients after discharge significantly declines.

Key words: Drug interactions, In-patients, New drugs.

Introduction

Drug can be useful tools in the prevention and treatment of Symptoms and Diseases, but if not used properly, they may be Harmful and cause new symptoms (or) produce suboptimal effects [1]. Drug interaction are said to occur when pharmacologic activity of a drug altered by the concomitant use of another drug or by the presence of another drug or by the presence of food, drinks, or environmental chemicals [2].

Most drugs have multiple pharmacologic effects in patients, specially the newer, more complex drugs being marketed. Clinically significant drug interactions can occur when two or more drugs are taken in combination. The resulting pharmacological action (either potentiation or antagonism of the interacting drugs) can be lesser or greater than the total effects of the drugs individual actions [3]. A Drug-drug interaction represents a specific type of adverse drug reaction, and the risk of drug-interactions is proportional to the number of drugs taken. The elderly are at increased risk, as are patient with diseases that alter drug

metabolism (e.g. renal or liver disease) However, although potential drug- drug interactions may affect 40-65% of all hospitalized patients, the clinical consequences of these drug interactions are highly variable, and adverse effects rarely occur[4].

Recognizing drug interaction is a daily challenge for family physicians, and remembering all potential interaction has become virtually impossible. More than 30 medications are introduced each year, and physicians receive frequent mailings about discovered drug interactions. As a result, many physicians feel overwhelmed and question the safety of multiple drugs Regimens. Some drug interactions may seriously harm to the patients [5].

Clinical management of drug-drug interactions should includes monitoring of a patient's therapy and making appropriate adjustments in the drug regimen can reduce potentially significant drug interactions. Patients at high risk for drug interactions who also take drugs with a narrow therapeutic index should be monitored more closely for drug interactions, especially when a new drug is added or discontinued. Drug interactions will generally occur within a few days following a change in drug regimen. If two drugs have been identified as having high potential to interact and cause harm, the pharmacist can contact the patient's physician to obtain an order for another medication that will not cause the trouble some interaction. In some instances a patient's diet or lack of adherence to a specified diet may be part of the problem. These situations may require the assistance of a dietitian to resolve [6].

Materials and Methods

Site of study

The studies of Drug-Drug interactions in prescribed medications were carried out in S.K.Hospital, a multi-specialty hospital located at Anand, Gujarat, from November- 2008 to April- 2009. The hospital is unique and well known for its services to people who come from all over the district and various parts of the country.

Departments selected for study in the hospital

The departments selected for the study were inpatient department, which includes general, special and intensive care units. The reasons for selecting the departments were a combination of disorders, which compels the physician to prescribe more categories of drugs that leads to possibility of Drug interactions.

Consent from hospital authority

The protocol of the study, which includes the objectives, methodology etc., was submitted to the Managing Director of the hospital. The authorization from the Managing Director was procured on conducted with the expert guidance of clinical pharmacy professionals, senior and junior physicians of the departments selected for the study in the hospital. The author was permitted to utilize the hospital facilities to make a follow up prescription, in the selected departments. All the health care professionals were well informed through Managing Director official circular [Circular File No: SKH/DR/019/2008-09].

Study Design

Design of patient's profile format

A separate data entry format for incorporating inpatients details was designed. The format contains the details such as Name, Age, Gender, Date of Admission, and Reason for admission, Educational status, Social status, Food habits, Occupation, Diagnosis, and medication chart.

Collection of medication details
A regular ward round participation with chief, senior and junior physicians in General Medicine department in order to collect the medication details of inpatients who got admitted.

Data analysis
The data collected from the departments through the designed data entry format by the regular ward rounds were thoroughly assessed for the presence of Drug interactions. The assessments of Drug-drug interactions were mainly done with the help of various tools like Medscape drug interaction online checker, books and journals.

Results and Discussion

Drug - Drug Interaction Study
A total Number of 500 prescriptions were taken up and required information were collected by using standard Proforma. The collected information was analyzed and the following results were obtained.

Table – 1: Data Showing Patient's Sex Group Analysis

S.No	Sex	No. of patients	Percentage (%)
1.	Male	275	55
2.	Female	225	45

This analysis reveled that 55% were Male and 45% were Female

Table – 2: Data Showing Patient's Age Group Analysis

S. No	Age in years	No. of Prescriptions	Percentage (%)
1.	0-1	15	3
2.	1-10	50	10
3.	11-20	28	5.6
4.	21-30	42	8.4
5.	30-40	38	7.6
6.	41-50	75	15
7.	51-60	103	20.6
8.	61-70	75	15
9.	71-80	50	10
10.	81-90	22	4.4
11.	91-100	02	0.4

Out of 500 Patients, 20.6% were in the age group of 51-60 years of age, 15% were in 41-50 years of age and 15% were 61-70 years.

This study also revealed that a more aged persons were suffering from various types of Diseases, so the prescription of Multiple disease containing more than five to seven drugs in a single prescriptions, along with multiple combination. It was concluded that more drugs prescribed in their prescriptions, having more chances of occurring drug interaction.

Table–3: Data Showing Number of Prescription with Drug Interactions

S. No	Prescriptions	Number	Percentage (%)
1	Prescriptions with drug interactions	213	42.6
2	Prescriptions without drug interactions	287	57.4

The overall analysis of total prescription (500) shows that 42.6% having drug interactions and 57.4% having no drug interaction.

Table – 4: Data Showing Types of Drug Interactions

S.No	Type of Drug Interaction	Total	Percentage (%)
1	Moderate	155	72.77
2	Severe	55	25.82
3	Contraindicated	3	1.40

Out of 500 prescriptions, the Moderate drug interactions were 72.77%, severe were 25.82% and contraindication were 1.40%. The major types were Moderate type of drug interactions.

Table – 5: Data Showing Number of Drug Interaction Prescription in Various Diseases

S.No	Disease	No. Of Prescriptions with Drug interactions	Percentage (%)
1.	Poison	02	0.93
2.	Cancer	15	7.04
3.	Gastro intestinal tract system	20	9.38
4.	Renal failure	13	6.10
5.	Central Nervous system	20	9.38

6.	Cardio vascular system	22	10.32
7.	Respiratory system	37	17.37
8.	Diabetes mellitus	47	22.06
9.	Tuberculosis + Meningitis	12	5.63
10.	Others	25	11.73

This study shows that Major number of prescriptions with drug interaction were found in Diabetes Mellitus 22.06%, followed by Respiratory systems 17.37%, Cardio-vascular system 10.32%, Gastrointestinal 9.38%, Central Nervous system 9.38%, Cancer 7.04%, Renal failure 6.10%,Tuberculosis with Meningitis 5.63% and Poison 0.93%.

Table – 6: Data Showing Number of Drug Interaction Prescription in Each Disease

S.No	Disease	Total No. Of Prescriptions	Total No. Of Drug interaction	Percentage (%)
1.	Poison	18	02	11.11
2.	Cancer	50	15	30.00
3.	Gastro intestinal tract system	68	20	29.41
4.	Renal failure	23	13	56.52
5.	Central Nervous system	35	20	57.14
6.	Cardio vascular system	50	22	44.00
7.	Respiratory system	77	37	48.05
8.	Diabetes mellitus	92	47	51.08
9.	Tuberculosis + Meningitis	17	12	70.58
10.	Others	70	25	35.71
	Total	500	213	----

An attempt was made to analyze the number of prescription according to their disease found in Drug interactions. The study shows 70.58% (12) of prescription having Drug interactions

in Tuberculosis with Meningitis out of 17 prescription followed by 57.14% (20) out of 35 prescription in Central Nervous system, 56.52% (13) out of 23 prescription in Renal failure, 51.08% (47) out of 92 prescription in Diabetes Mellitus, 48.05% (37) out of 77 prescription in Respiratory system and 44% (22) out of 50 prescription in Cardiovascular system was found.

Conclusion

A total number of 500 prescriptions were taken up and required information was collected by using standard proforma. The collected information was analyzed. This study was concluded as follows.

Male patients were 55% and Female patients were 45%.The number of patient's between the ages 51-60 years (20.6%) were more. Out of 500 prescription, 42.6% of prescription containing Drug-Drug interactions. Moderate drug interactions were found in 72.77%, Severe were 25.82% and contraindicated were 1.40%.Major Number of prescriptions with Drug interactions was found in Diabetes mellitus (22.06%).

Many drug interactions can be avoided or managed safely from the Pharmacist side by Assessing possible drug interaction in case of multiple Therapies, Providing patient counseling on the use of prescription and nonprescription medication, disease state(s), and the safety of concurrent use of herbal products. Preventing and / or managing drug interactions will be more likely to occur when the pharmacist takes time and utilizes and adequate patient data base. In addition, with the patient's permission, the pharmacist may call the physician to get essential monitoring information, such as results of recent lab tests or a complete list of medical diagnoses apart from Educating healthcare professionals about the importance of drug interactions, Conducting workshop, Conferences, Seminars on drug interactions for health care professionals to prevent the DDIs, reduce the hospitalization of the patient and cost of therapy.

References

[1] Johnson JA; Bootman JL. *Arch. Intern. Med.*, **1995**, 155, 1949-56.
[2] Ivan H Stockely. Drug interaction, 5th ed., Pharmaceutical press, Nottingham, **2000**; pp. 1-13.
[3] Chales H.Brown.*US Pharmacist.*, **2002**, 25, 7.
[4] Bente Glintborg; S E Andrersan. *Euro. J. Clin. Pharmacology*, **2005**, 61,675-681.
[5] Paul W Ament; John G Bertolino; James L Liszewski. *American Family Physician*, **2000**, 61, 1745-54.
[6] Chales H Brown. *US Pharmacist*, **2002**, 25, 9.