



IDENTIFICATION OF MAJOR DRUG - DRUG INTERACTIONS AT TERTIARY CARE HOSPITAL

V. S. Swathi*	Assistant Professor, Vignan Institute of Pharmaceutical Technology, Duvvada, Visakhapatnam *Corresponding Author
B. Lavanya	B.Pharmacy IV year, Vignan Institute of Pharmaceutical Technology, Duvvada, Visakhapatnam
B. Spandana	B.Pharmacy IV year, Vignan Institute of Pharmaceutical Technology, Duvvada, Visakhapatnam
M. Yamini	B.Pharmacy IV year, Vignan Institute of Pharmaceutical Technology, Duvvada, Visakhapatnam

ABSTRACT A drug- drug interaction is a clinical event where effect of one drug is altered by other drug when administered concomitantly. Many drug-drug interactions cause late adverse drug reactions which may lead to misinterpretation as new disease condition which further worsens the condition. Drug-drug interactions can be identified with the help of computer softwares. We conducted the prospective observational study in Tertiary care hospital. The duration of study is from November 2018 to February 2019. We took data from 122 patients during this study period. During 3 months of study, 122 prescriptions are analysed, out of which 52% are males and 70% are females, patients under the age group of 20 to 49 are (n=73) more in number followed by the age group of 50 to 79 are (n=41) and the least age group is identified as below 20 (n=8). Most of the people are identified with Cholelithiasis (n=9). Some of them are identified with Acute Appendicitis, followed by Acute Ischemic Stroke, Inguinal Hernia, Acute Pancreatitis and Dengue. , the major drug interactions are identified from different data bases. A total of 22 major drug interactions are identified. Out of these 14 interactions are found in Micromedex, 11 interactions are found in Medscape and 6 are found in Drugs.com. Drug- Drug interactions are common drug related problems which will affect safety and efficacy of the patient but they are generally neglected in health care scenario. Review of prescription using softwares by a pharmacist may decrease chance of drug related problems.

KEYWORDS : Drug drug interaction, Drug related problem, Adverse drug reaction, Safety, Softwares, Intervention

INTRODUCTION

A drug- drug interaction is a clinical event where effect of one drug is altered by other drug when administered concomitantly^[1]. Drug Interactions may lead to beneficial or harmful effects. Beneficial effects are like to treat concomitant disease, to enhance therapeutic effect of other drug and to reduce adverse events of other drugs^[2]. Harmful effects are unwanted, noxious and life threatening effects which increase economic burden on patients^[3]. Many drug-drug interactions cause late adverse drug reactions which may lead to misinterpretation as new disease condition which further worsens the condition. Adverse drug reactions can be caused by interaction of two or more drugs^[4]. Elders are more prone to get drug- drug interactions due to their altered pharmacokinetics and pharmacodynamics^[4, 5]. There is direct relationship between number of drugs consumed by person and occurrence of drug- drug interactions^[6]. Based on mode of action drug-drug interactions are divided into three types, those are pharmacodynamic, pharmacokinetic and pharmaceutical interactions. In pharmacodynamic interactions, one drug will change the effect of other drug such as synergism, additive effect and antagonism. In pharmacokinetic interactions, one drug may change the effect of other drug by altering absorption, distribution, metabolism and excretion. In pharmaceutical interactions, physical or chemical incompatibility occurs in between drugs^[5]. Drug drug interactions are identified with the help of computer softwares^[7]. But we have to select those softwares carefully based on validity and reliability^[8]. In absence of computer softwares we can use textbooks to check drug drug interactions^[9]. In most of the countries drug- drug interactions are one of the important medical services to improve health care^[10]. In one study, out of 25% of drug related problems, 8% of problems are due to drug- drug interactions^[11]. Only clinically significant major drug- drug reactions need intervention like avoiding interacting drug or changing the route or changing the dose^[12].

Some of the drug drug interactions which are observed in previous studies are^[13]:

1. Loop diuretic and warfarin leads to increase risk of bleeding
2. Angiotensin converting enzyme inhibitor and Aldosterone antagonist increases risk of hyperkalemia
3. Omeprazole and clopidogrel increases risk of thrombosis
4. Warfarin with statin increases risk of bleeding and rhabdomyolysis

In our study, we want to identify major drug drug interactions from prescription of in patients using different databases like Micromedex, Medscape and Drugs.Com.

METHODOLOGY

Study Type: We conducted the prospective observational study in Tertiary care hospital

Study Duration: The duration of study is from November 2018 to February 2019

Study Population: We took data from 122 patients during this study period

Study Location: We selected tertiary care hospital (VIMS), Hanumanthawaka as our study location

Inclusive Criteria: We took only In-Patients with different diagnosis which includes geriatrics and paediatrics

Exclusive Criteria: We excluded outpatients, I.C.U patients, emergency department patients, pregnancy patients in our study

Data Collection: We collected data by using case collection form which contains following Details:

- Name
- Age
- Gender
- I.PNo
- Date of admission
- Date of discharge
- Chief complaints
- History of present illness
- Past medical history
- Past medication
- Family history
- Social habits
- Physical examination
- Systemic examination
- Lab investigations
- Diagnosis
- Current prescription

- Discharge medication

Data Entry: Collected data is entered in excel sheet

Data Analysis: Data is been analysed by using clinical SAS.9.2 software

Data Presentation: Data is been presented in the form of tables, graphs, with the help of Excel sheet.

Study Procedure:

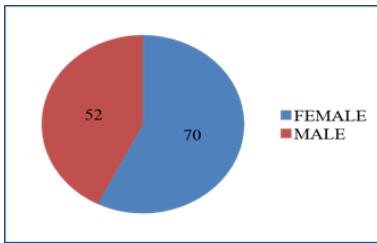
Data is collected from patient's case records and medical history and entered in self prepared case collection form.

Plan of Study:

1. All data entered in excel sheets
2. Drug interactions are checked by using different software's like Micromedex, Medscape, Drugs.com.
3. Based on the severity, drugs interactions are differentiated into Major, Moderate and Minor and mechanism of interaction is mentioned
4. Result analysis is done by using clinical SAS 9.2.
5. Based on the result analysis the above data is represented in the form of tables and graphs.

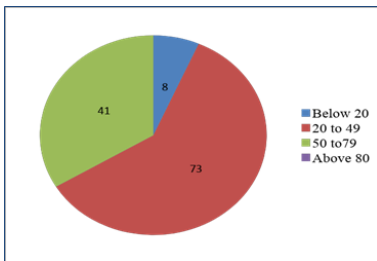
RESULTS AND DISCUSSION

Figure1. Sex wise distribution of Patients



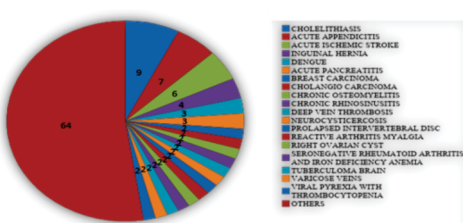
During 3 months of study, 122 prescriptions are analysed, Out of which 52% are males and 70% are females, where as in the study conducted by Kalamurthy 54.2% are males and 45.8% are females.

Figure 2: Age wise distribution of Patients



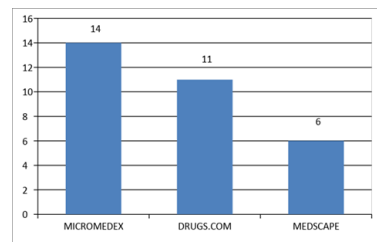
Among the 122 patients, patients under the age group of 20 to 49 are (n=73) more in number followed by the age group of 50 to 79 are (n=41) and the least age group are identified as below 20 (n=8), where as in the study conducted by Kalamurthy, majority of the patients are in the age group of 51 – 60 years (n=34).

Figure 3. Diagnosis wise distribution of Patients



Among all the prescriptions, most of the people are identified with Chololithiasis (n=9). Some of them are identified with Acute Appendicitis, followed by Acute Ischemic Stroke, Inguinal Hernia, Acute Pancreatitis and Dengue, where as in the study conducted by Legese Chelkebaa most patients are diagnosed with one or more cardiovascular diseases such as Heart failure, Hypertension, Ischemic heart diseases or Arrhythmia

Figure 4. Frequency of major drug - drug interactions



Among 122 prescriptions, the major drug interactions were identified from different data bases. A total of 22 major drug interactions were identified. Out of these 14 interactions are found in Micromedex, 11 interactions are found in Medscape and 6 are found in Drugs.com, which is similar to the study conducted by Patricia where Forty-four DDIs were classified as major in at least one database analyzed, among which 30 were listed in the Micromedex database, 26 were listed in the Drugs.com database and 14 were listed in the LexiComp database.

The major drug drug interactions are assessed using Micromedex, Medscape , Drugs .com databases and the drug drug interactions identified are :

- Amitriptyline and Ondansetron
- Alprazolam and Tramadol
- Ciprofloxacin and Tramadol
- Ciprofloxacin and Ondansetron
- Clopidogrel and Enoxaparin
- Chlordiazepoxide and Tramadol
- Diclofenac and Metoprolol
- Ondansetron and Tramadol

Which is similar to the study conducted by Kalamurthy , where major interactions drugs are:

- Rabeprazole and Clopidogrel
- Enalapril and Spironolactone
- Ciprofloxacin and Tramadol

Table1: Identified major drug- drug interactions

Interaction	Mechanism	Micromedex	Medscape	Drugs.com
Amitriptyline and Ondansetron	QT prolongation	Y	Y	Y
Alprazolam and Tramadol	Respiratory and CNS depression	Y	N	Y
Ciprofloxacin and Tramadol	Respiratory depression	Y	N	Y
Ciprofloxacin and Ondansetron	QT prolongation	Y	Y	N
Clopidogrel and Enoxaparin	Bleeding	Y	N	Y
Chlordiazepoxide and Tramadol	CNS depression	Y	N	Y
Diclofenac and Metoprolol	Increases serum potassium levels	N	Y	Y
Ondansetron and Tramadol	Serotonin syndrome	Y	N	Y
Aspirin and Clopidogrel	Bleeding	Y	N	N
Acenocoumarol and Enoxaparin	Bleeding	Y	N	N
Atenolol and Losartan	Increases serum potassium levels	N	Y	N
Aspirin and Enoxaparin	Bleeding	N	N	Y
Atenolol and Alprazolam	Lowering of BP and heart rate	N	N	Y
Alprazolam and Pentazocin	CNS side effects	N	N	Y
Ciprofloxacin and Metronidazole	QT prolongation	Y	N	N

Ciprofloxacin and Metformin	Hypo glycaemia or Hyperglycaemia	Y	N	N
Ceftriaxone and Calcium	Precipitation in lungs and kidneys	N	Y	N
Diclofenac and Furosemide	Nephrotoxicity	Y	N	N
Metronidazole and Ondansetron	QT prolongation	Y	N	N
Metronidazole and Ofloxacin	QT prolongation	Y	N	N
Niacin and Atorvastatin	Rhabdomyolysis	N	Y	N
Pentazocin and Ondansetron	Serotonin syndrome	N	N	Y

CONCLUSION

Drug- Drug interactions are common drug related problems which will affect safety and efficacy of the patient but they are generally neglected in health care scenario due to lack of time, lack of pharmacists during drug selection and patient's co morbid conditions. A series of major interactions can be checked using standard, valid softwares and we can find risk to the patients due to drugs. It is the sole responsibility of the pharmacist to identify these interactions and prevent them by taking necessary precautions and reduce the chance of drug related problems. Hence the pharmacist participation in the multidisciplinary healthcare team can improve the treatment to hospitalized patients and promote drug safety.

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