

**DRUG INTERACTION****Dr. Shamna M. S.\*<sup>1</sup> and Dr. Deepu S.<sup>2</sup>**<sup>1</sup>(Assistant Professor of Pharmacy, Govt. Medical College, Kottayam, India).<sup>2</sup>(Assistant Professor, Mar Dioscorus College of Pharmacy, Trivandrum, India).Article Received on  
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**\*Corresponding Author****Dr. Shamna M. S.**(Assistant Professor of  
Pharmacy, Govt. Medical  
College, Kottayam, India).**ABSTRACT**

An increasing number of drug related problems are caused by drug interactions. As a basis a drug interaction is a situation in which the effects of one drug are altered by the prior or concurrent administration of another drug. The survey was conducted in a community pharmacy situated in Ernakulam district, Kerala after getting a written consent from the patient. The study prescriptions comprised 50% pharmacokinetic interactions and 50% pharmaco-dynamic interactions. Drug interactions can have profound influence on the success of drug treatment and on the side effect profiles of many drugs.

The clinical significance of drug interactions can be variable. Clinical Pharmacists in every practice setting need to be vigilant in monitoring for potential drug interactions and advising patients regarding foods or beverages to avoid when taking certain medications.

**KEYWORDS:** Drug Interactions, Survey on Interaction of Drugs, Pharmacokinetic Interactions, Pharmacodynamic Interactions.

**INTRODUCTION**

Drug therapy becomes more complex as many individuals are on multiple drug therapy and administer many drugs during the same period of time. A closer monitoring and supervision of drug therapy is required so that drug related problems can be prevented or detected at an early stage. An increasing number of drug related problems are caused by drug interactions. As a basis a drug interaction is a situation in which the effects of one drug are altered by the prior or concurrent administration of another drug.

The concept of drug interaction is also extended to include situations where food or certain dietary items influence the activity of a drug or a drug causes alteration of diagnostic

laboratory test results. Exposure to environmental chemicals, alcohol and cigarette smoke may also modify drug responses and several such drug interactions have been recognized.

Numerous studies have demonstrated that many patients receive multiple drug therapy with agents of recognized potential for interaction. As the number of drugs in patient therapeutic regimen is increases, the greater is the risk of occurrence of drug interactions, but there are relatively few data on actual development of problems and the level of risk, attending use of given combination of drugs. Factors other than drug interaction are often attributed to altered response such as patient idiosyncrasy in the case of excessive response or tolerance in the case of deficient responses.

Recently a lot of attention has been focused on the phenomenon of drug interactions and information pertaining to its occurrence is so widely publicized that it has created drug interaction hysteria or a drug interaction anxiety syndrome.<sup>[1]</sup>

### ***Definition***

An interaction is said to occur when effect of one drug are altered by the co-administration of another drug, herbal medicine, food, drink and other additive or enhanced effect one or more drugs, antagonism of the effect of one or more drugs, or any other alteration in one or more drugs.

### ***Causes***

Accurate estimates of the incidence of drug interactions are difficult to obtain as published studies frequently use different criteria for defining a drug interaction and for distinguishing between clinically significant and non-significant interactions. Some of the early studies uncritically compared prescribed drugs with list of possible drug interaction without taking into account their potential clinical significance.<sup>[2]</sup>

In recent year there is an increasing evidence for drug interactions due to following reasons:

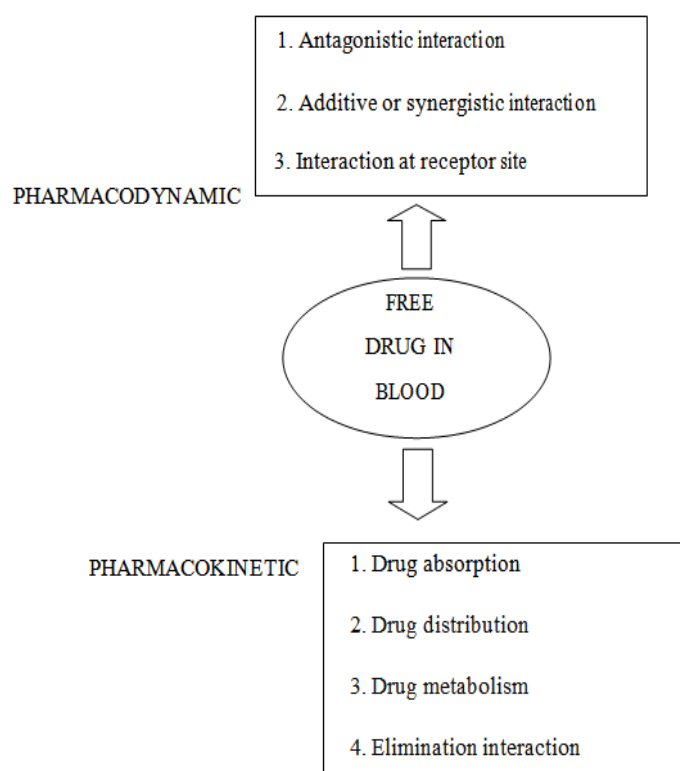
- Drug potency
- Patient consult several physicians.
- Concurrent use of prescription and non-prescription drugs.
- Patient non compliance.
- Drug abuse and misuse<sup>[3]</sup>

### Classification

1. Pharmacokinetic interaction.
2. Pharmacodynamic interaction.
3. Drug food interaction.
4. Drug herb interaction.

### Mechanism of drug interaction

Drug interactions are conventionally discussed according to the mechanism involved. This mechanism can be conveniently divided into those with pharmacokinetic basis and those with pharmacodynamic basis. Drug interaction often involve more than one mechanism.<sup>[4]</sup>



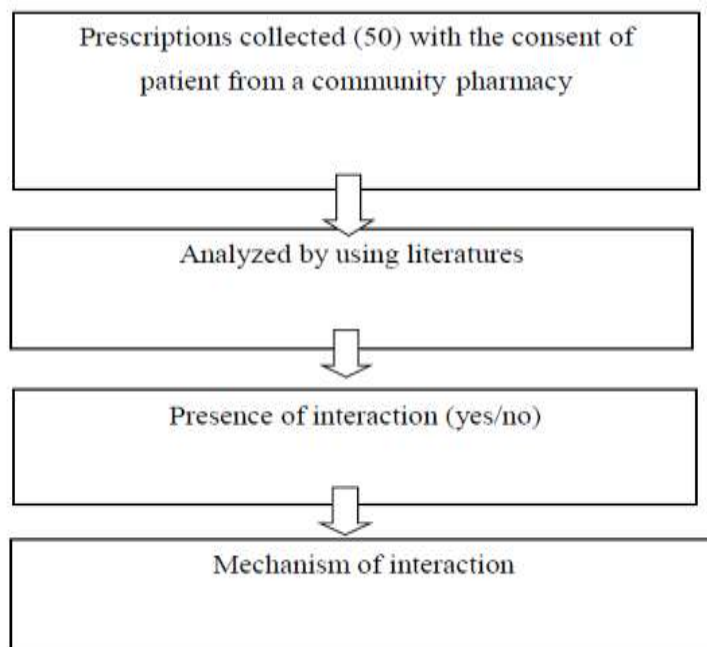
**Fig 1: Mechanism of drug interaction.**<sup>[5]</sup>

### OBJECTIVES

- To study about drug interaction.
- To prepare a survey report of commonly seen prescriptions from a community pharmacy to detect drug interaction.

## METHODS

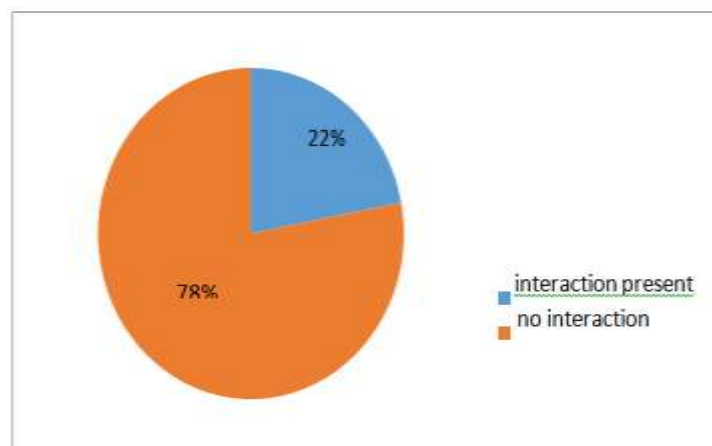
A simple survey method was used in this study. The survey was conducted in a community pharmacy situated in Ernakulam district, Kerala after getting a written consent from the patient. The identities of patients and prescribers had been kept confidential. The survey was carried out for 3 months from 2016 January to 2016 march, during evening time. Number of samples collected was 50 and analysis was carried out by referring literatures.



**Fig 2: Flowchart representation of methodology.**

## RESULTS

A total of 50 prescriptions were analyzed during the study period, of which 11 (22%) prescriptions showed 14 drug interactions.



**Fig 3: Presence of drug interaction.**

The study prescriptions comprised 50% pharmacokinetic interactions and 50% pharmacodynamic interactions. This study showed a difference within the pharmacokinetic interactions, where drug interaction due to altered absorption occurred most often (35.8%) followed by metabolism related drug interaction (14.2%). No distribution and elimination related interactions were noted. In pharmacodynamic interaction, 35.8% is due to additive effect and 14.2% is due to antagonistic effect.

**Table 2: Categorization of drug interaction based on mechanism.**

Mechanism	Number of interactions	Percentage
Pharmacokinetic interactions	7	50
Absorption	5	35.8
Distribution	0	0
Metabolism	2	14.2
Excretion	0	0
Pharmacodynamic interactions	7	50
Additive effect	5	35.8
Antagonistic effect	2	14.2

### ROLE OF CLINICAL PHARMACIST

All pharmacists working in a clinical setting, whether dispensing medicine or advice, require a well knowledge regarding drug interaction to prevent harm to patients from medicine combinations. This is an area in which Clinical pharmacist's expertise is valued by other health professionals and where a pharmacist knowledge of Clinical Pharmacy (Pharmacy Practice) can be recognized and appreciated.

Pharmacist plays a valuable role in screening for interactions and advising on management when interactions occur. This may be at the patient's bedside, as part of the dispensing or during the sale of nonprescription medicine. Pharmacist has written many of the key texts and references on drug interactions and has documented many previously unrecognized interactions in the medical literature. A role of current and emerging importance is the detection of interactions between medicines and other pharmacologically active therapies, such as herbal and alternative remedies. Pharmacists, especially those practicing in India, are well placed to contribute significantly to the development of this knowledge.<sup>[11]</sup>

Pharmacists, however, often are in a position to effectively monitor for drug interactions. Since 70-80% of patients receiving prescribed medications use a single pharmacy for all prescriptions.<sup>[12,13]</sup> Pharmacist have the opportunity as well as the training to detect the possible interactions and prevent their occurrence. For prescription medication, a pharmacist

typically is the patient's final contact with the health care system before therapy initiated. Also patient requiring continuing medication therapy often visit their pharmacist for refills of prescriptions more frequently than they visit their physicians.

For a Clinical pharmacist to monitor for drug interactions, an accurate chronological record of each of the patient's medications is needed. They were details regarding each medication, its strength, the direction for its use, and the name of the prescriber. With this patient medication profile, the pharmacist can review the patient's active medication orders in order to search for other drug with which the new medication might interact. If a potential interaction is detected, the clinical pharmacist can evaluate its significance and, if necessary, take measures to prevent its occurrence. In many instance the pharmacist will need to contact patient's physician about the problem to determine if an alternative treatment strategy is desirable.

Although the potential contribution of clinical pharmacist in reducing the occurrence of drug interaction is widely recognized, many pharmacist still do not actively monitor for possible interactions. The three primary factors as influencing this aspect of pharmacist behavior: attitude toward the importance of drug interaction detection, level of technical knowledge of drug interaction and the difficulty associated with monitoring and detection process.

The clinical role of the pharmacist has been emphasized in recent years. While the importance of the pharmacist's role in preventing drug interactions is recognized by the pharmacist and medical professions, this role is still not accepted by all practicing pharmacist. It might be expected that pharmacist who recognize interaction detection as important aspect of their professional responsibilities would be more likely to perform the monitoring and detection function.<sup>[14,15]</sup>

The pharmacist will have the knowledge of all potentially interacting drug combinations that exist. Reports of newly identified interactions among both new and existing medications are published frequently. Pharmacist must not only be aware that a specific interaction can occur; they must also be able to judge the clinical significance of the interaction in specific situation.<sup>[16]</sup>

The third factor believed to influence individual pharmacist behaviour in drug interaction detection is the difficulty and time experienced and maintaining records, checking these records when prescriptions are filled, and following up with prescribers when appropriate.<sup>[17]</sup>

Pharmacist in every practice setting need to be vigilant in monitoring for potential drug interactions and advising patients regarding their medication. It is imperative for pharmacist to keep up-to-date on potential drug interactions of medications, especially today's new drugs, so that they may counsel properly. In providing drug information to patients, pharmacist often discuss potential side effects and how the medication should be taken.<sup>[18]</sup> It is important to provide information to patients on when to take their medication. Consequences of drug interaction may include therapeutic failure or toxicity. Food may also affect the bioavailability, metabolism and excretion of certain medication. The patient may experience an adverse side effect, toxicity or may not receive the full therapeutic benefit of medication.<sup>[19]</sup> The Joint Commission on the Accreditation of Healthcare Organizations requires that a patient's medication profile include potential drug interaction, that the pharmacist call the prescriber whenever the potential for a drug interaction exists and document the communication and follow up action on the prescription or order form, and that patient be given instructions and counseling regarding the potential for interactions before their discharge from the hospital. Elderly patients may be at a greater risk for drug interactions because they typically consume more medications for their chronic medical conditions or multiple disorders.<sup>[20]</sup>

As seen through various studies and the basic concept of pharmaceutical care, a Clinical pharmacist plays a pivotal role in the identification, detection, prevention, and management of drug-drug interactions. Pharmacist can carry out such activities in inpatient setting, while taking part in viewing chart during ward rounds, and during medication therapy management and while dealing with prescriptions.<sup>[21]</sup> Since pharmacists have a vast knowledge on drugs and therapeutics, their ability to discover and deal with interactions is quite important.<sup>[22]</sup>

### ***Strategies for reducing drug interaction***

1. A fundamental step in reducing drug interaction is for physicians and other health care providers to be familiar with the medication that are available to treat their patients
2. Maintain up-to-date references of current medications and have those references available at the time the drug is prescribed.
3. Understand the patient's condition and diagnosis and indication for the medication considered, including all alternative therapies.

4. Consider conditions that may affect the efficacy of the medication, such as dosages, routes of administration, patient weight, renal and hepatic functioning, and other important patient characteristics such as pregnancy.
5. Understand the potential interactions between newly prescribe medication and other medication already being used by the patient, including non-prescribed medications and supplements, as well as therapies being considered.
6. Recognize the patient risk of high-alert medications, those drugs that bear a heightened risk of causing significant patient harm if there is an error in the medication use process.<sup>[23]</sup>

### ***Counselling and guidance about drug interaction***

The following information can be given to the patients while dispensing the medicine.<sup>[24]</sup>

- Read the prescription label on the container. If you do not understand something or think you need more information ask your Physician or Clinical Pharmacist.
- Read directions, warning and interaction precaution printed on all medication labels and package inserts. Even over the counter medication can cause problems.
- Take medication with a full glass of water.
- Do not take vitamin pills at the same time you take medication. Vitamins and minerals can interact with some drugs.
- Never take medication with alcoholic drinks.
- Be sure to tell your physician and pharmacist about all medications you are taking, both prescription and non-prescription.

### ***Precaution to be taken***

- Medication need to be taken at different times relative to meals.
- Consult a physician when health problems persist.
- During pregnancy and nursing always consult a physician or pharmacist before taking any medication. Drugs taken by the mother may affect the infant.
- Check with a doctor or pharmacist for the proper way and time to take medication.<sup>[25]</sup>

The interactions are not always detrimental to therapy but can in some cases be used to improve drug absorption or to minimize adverse effects. These interactions have received more attention recently. As new drug approvals occur with ever increasing speed, there is



lesser information available about their adverse effects and interactions when the drug reaches the market.<sup>[26]</sup>

## CONCLUSION

- Drug interactions can have profound influence on the success of drug treatment and on the side effect profiles of many drugs. The clinical significance of drug interactions can be variable.
- Some foods greatly affect drug therapy, resulting in serious side effects, toxicity or therapeutic failure.
- The interaction may have a beneficial effect by increasing drug efficacy or diminishing potential side effects. The interactions are not always detrimental to therapy, but can in some cases be used to improve drug absorption or to minimize adverse effects. These interactions have received more attention recently, especially drug interactions with grapefruit juice.
- As new drug approvals occur with ever increasing speed, there is less information available about their adverse effects and interactions when the drugs reach the market. Pharmacists in every practice setting need to be vigilant in monitoring for potential drug interactions and advising patients regarding foods or beverages to avoid when taking certain medications.
- It is imperative for pharmacists to keep up-to-date on potential knowledge on interactions of medications, especially today's new drugs, so that they may counsel properly to the patients.
- It is found that clinical pharmacist's contribution may have reduced the identified drug interaction. Moreover, the pharmacist management might have enabled greater familiarity of physicians regarding clinically relevant drug interactions, optimizing the quality of prescriptions.
- The Clinical pharmacist promote health, preventing and monitoring adverse events, intervening and contributing for pharmacotherapy effectiveness and patient safety by involved in drug interaction studies.

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