

## A Study on Detection of Drug-Laboratory interactions in Dermatology, in a Tertiary Care Teaching Hospital

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**Abstract : Background:** An interaction is alleged to occur once the consequences of one drug is changed by the presence of another drug, herbal medicine, food, drink or by some environmental chemical agents. As per American psychological association drug interaction is defined as chemical or physiological reaction that can occur when two different drugs are taken together. **Objective:** This study was conducted for the detection of various drug interactions in dermatology in a tertiary care teaching hospital. **Methods:** An observational, prospective study was conducted for a period of six months (July 2017 to December 2017) among 108 patients in dermatology department of Santhiram Medical College and General Hospital, Nandyal. **Results:** A total of 108 patients were included in the study. Among them, 63 (58.3%) were males and 45(41.7%) were females. Of total 108 prescriptions, sever drug-drug interactions were present in 42 (38.9 %) prescriptions. Whereas, moderate drug-drug interactions were found in 14 (13%) and 52 prescriptions doesn't have drug-drug interactions respectively. The study found the associations of potential drug interactions with age, sex, number of drugs per prescription. There was a direct link between polypharmacy and occurrence of drug interactions. To lower the frequency of potential interactions it could be necessary to make a careful selection of therapeutic alternatives, and in cases without other options, patients should be continuously monitored to identify adverse events. **Conclusion:** we concluded that educational interventions can minimize the incidence of drug interactions.

**Key words :** Drug interactions, poly pharmacy, drug safety, Therapeutic outcome, Interventions.

## 1. Introduction:

An interaction is alleged to occur once the consequences of one drug is changed by the presence of another drug, herbal medicine, food, drink or by some environmental chemical agents<sup>(1)</sup>. As per APA drug interaction is defined as chemical or physiological reaction that can occur when two different drugs are taken together<sup>(2)</sup>. The pharmaceutical interactions that are of special interest to apply of medication are primarily in people who have negative effects for an organ. The danger that a pharmacological interaction can seem will increase as perform of the quantity of medicine administered to a patient at constant time. Additive effect is sometimes employed in those cases during which the combined impact of two medicines, acting by concurrent mechanism, is adequate that expected by straight forward addition. For instance, isobutyl phenyl propionic acid and paracetamol apparently act by concurrent mechanism and thus their combined analgesic impact is an additive impact<sup>(3)</sup>. Pharmacokinetic interactions could change the exposure to the drug inflicting an increasing impact, adverse impact or absence of impact. Pharmacokinetic interactions could involve absorption, distribution, transport, metabolism and excretion (renal or fecal) of the drug, Pharmacodynamics interactions occur once the impact of a drug is altered because of another drug with none alterations in pharmacokinetic. The Epidemiologic studies suggests that drug-drug interactions contribute to significant number of adverse events in hospitalized patients and estimated to account for 6-30% of all ADRs and significant Hospitalizations<sup>(4,5,6)</sup>. Interactions is additive once e.g. 2 medicine are is agonist of constant receptor, and concomitant use causes an exaggerated impact and conjointly an exaggerated risk of adverse impact one example of an additive pharmacodynamics interactions is concomitant use of MAO-inhibitors and Selective serotonin reuptake inhibitors(SSRIs), The marketplace for herbal medicines and supplements in the Western world has markedly exaggerated in recent years and not amazingly, reports of interactions with 'conventional' drugs have arisen<sup>(7)</sup>. This prospective study aimed to determine the prevalence of adverse drug interactions events associated polypharmacy. To categorize and classify the potential DI's as the major, moderate and minor. The studies show that doctors' knowledge of the potentially significant drug-drug interactions they prescribe is usually poor in clinical pharmacology as potentially dangerous drug interactions<sup>(8)</sup>. The ultimate need of the study is to assess whether drug therapy is rational or not and to detect the drug interactions, improving the drug safety access and therapeutic outcome in a tertiary care teaching hospital.

## 2. Methodology:

A Prospective observational study which involves active methods that includes (Active looking of pharmacist to detect drug interactions) and passive methods (Encouraging prescribers to report drug interactions) was carried out in a Dermatology department of a Santhiram Medical College and General Hospital, for a period of seven months (July 2017 to December 2017). After the approval of Institutional Human Ethics Committee, at Santhiram Medical College and General Hospital, Nandyal this study was initiated. This study includes patients of all age groups and excludes patients with intentional or accidental poisoning and patient with drug abuse will be excluded from the study. The data was obtained from case sheets to detect drug interactions in patients who are admitted in inpatient wards. The data includes demographic details of patient, chief complaint, history of present illness, lab investigations, past medical conditions, medical or any potential allergic history, final diagnosis, day-wise medication therapy with their dose, frequency, route, duration of therapy and dosage-form details were collected in an individual proforma and analyzed for drug interactions. The patients' drug interactions were categorized based on severity (Moderate, Sever) and source of drug interactions are authenticated drug interaction checkers.

## Statistical analysis:

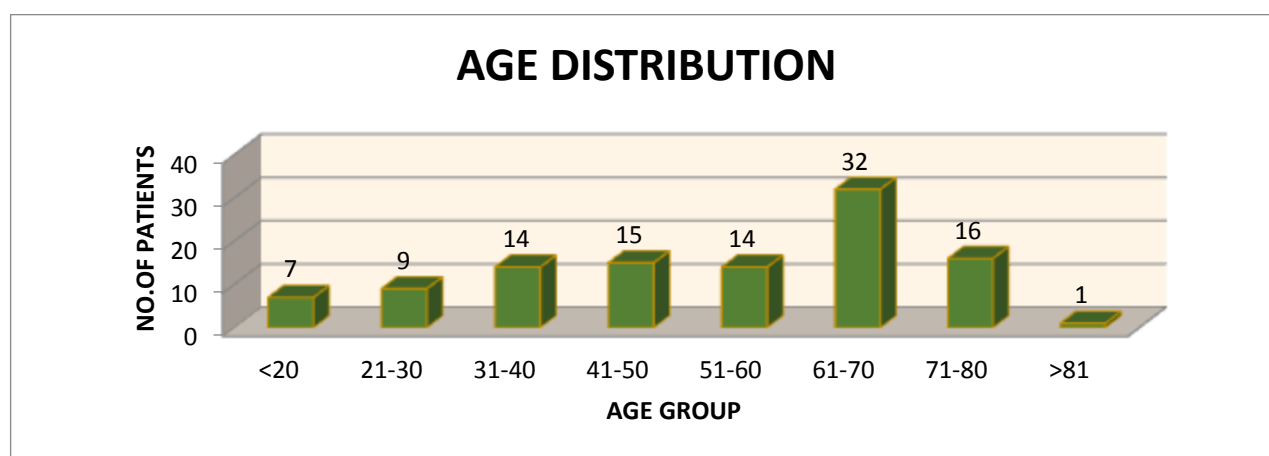
The results were tabulated and analyzed statistically by using SPSS (statistical package for social science) software version 22.0. Chi square test is used to compare the analyzed data and a value of  $p \leq 0.05$  is taken as statistical significance.

## 3. Results:

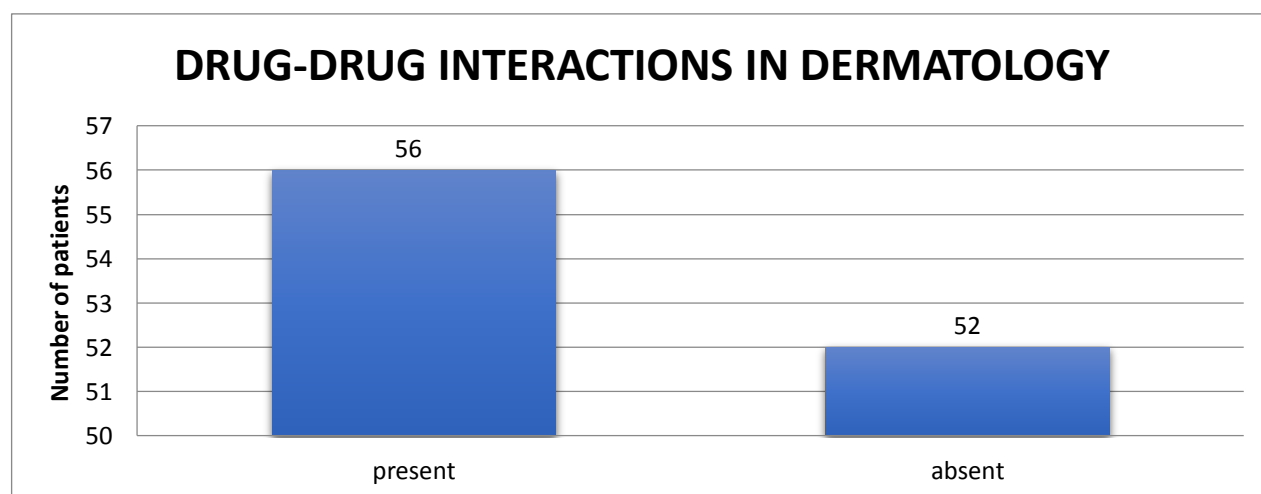
The prospective observational study was conducted for a period of six months from July to December 2017 inpatients in Dermatology department at a tertiary care teaching hospital, Nandyal.

**Table No 1.Age wise distribution of patients.**

sl.no	Age(years)	No of Patients	Percent (%)
1	<20	7	6.5
2	21-30	9	8.3
3	31-40	14	13.0
4	41-50	15	13.9
5	51-60	14	13.0
6	61-70	32	29.6
7	71-80	16	14.8
8	81-90	1	0.9
9	Total	108	100

**Figure No. 1: Age wise distribution of patients in Dermatology.**

We divided patients according to age group in that 61-70 years of age group were more 32(29.6%) followed by 71-80 i.e. 16(14.8%) , 15(13.9%), 14(13.0%), 14(13.0%), 9(8.3%), 7(6.5%), 1(0.9%) are seen in 71-50, 41-50, 51-60, 31-40, 21-30, <20, >81 years of age of patients respectively. We can infer that Drug-Drug interactions are more in the 61-70 years age group patients inDermatology.

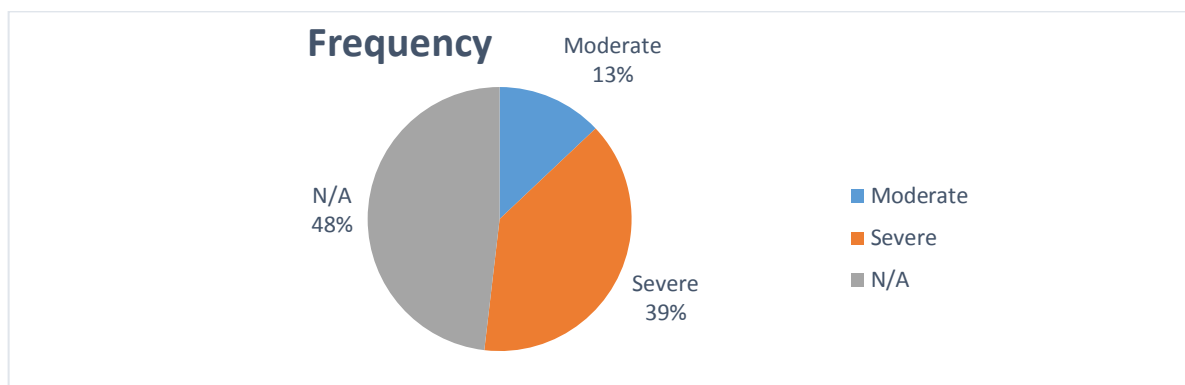
**Figure no 2: Drug-drug interactions in dermatology**

Among 108 prescriptions, 56(51.9%) prescriptions have Drug-Drug interactions, 52 (48.1%) prescriptions do not have Drug-Drug interactions in dermatology.

**Table No 2: Severity of drug-drug interactions in Dermatology**

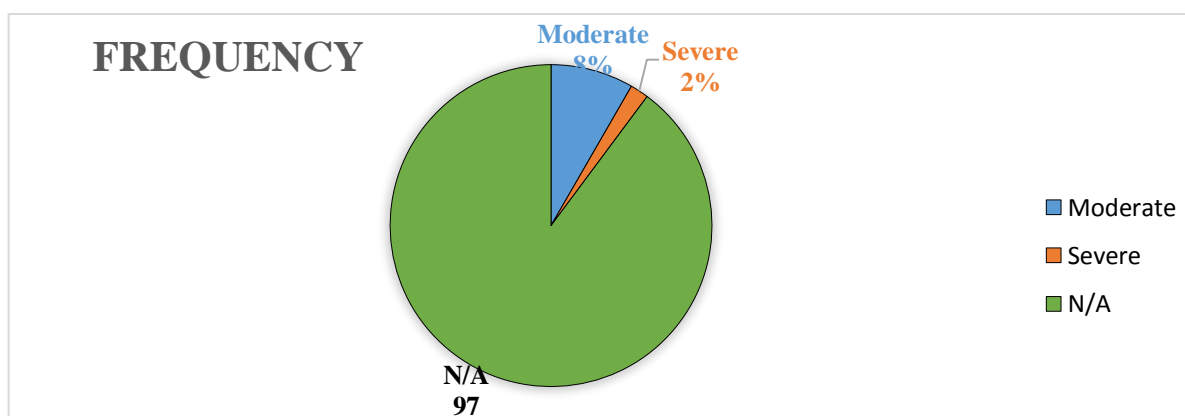
Sl. No	Seriousness	Frequency	Percent
1	Moderate	14	13
2	Severe	42	38.9
3	N/A	52	48.1
4	Total	108	100.0

Among 108 prescriptions, 42(38.9%) prescriptions may have severe Drug-Drug interactions and 14 (13 %) prescriptions may have moderate Drug-Drug interactions in Dermatology.

**Figure no 3: Severity of drug interactions in Dermatology****Table No 3: Severity of Drug-laboratory interactions in Dermatology**

Sl.No		Frequency	Percent
1	Moderate	9	8.3
2	Severe	2	1.9
3	N/A	97	89.8
4	Total	108	100.0

Among 108 prescriptions, 9 (8.3%) prescriptions may have moderate, 2 (1.9%) prescriptions has severe Drug-Laboratory interactions and 97 (89.8%) prescriptions don't have Drug-Laboratory interactions in Dermatology.

**Figure 4: Severity of drug-laboratory interactions in Dermatology**

#### 4. Discussion:

Drug interaction is a medical issue whether it is used to reduce or facilitate the effect of drugs and cause side effects in patients receiving multiple drug therapy<sup>(1)</sup>. ADRs are mainly caused due to the drug-drug interactions which mostly come from the case reports and case series<sup>(9)</sup>. This study included 108 patients from the Dermatology department of inpatients in a tertiary care teaching hospital. Parameters like old age, gender, poly pharmacy, genetic factors, pharmacokinetic factors and co-morbid conditions were mainstay for data collection process. Drug-drug interactions usually having a specific time course i.e. onset and duration this makes them more predictable and preventable than ADRs<sup>(10)</sup>. These parameters were isomeric with that of the five articles (i.e.) collected from standard journals concluding drug interaction patterns in patients.

Among all those 108 patients collected for the study, the incidence of interactions with respective to age were observed more in 61 – 80 years age group accounting to 42.59% followed by 41 – 60 years of age group accounting to 25%. Comparing to other studies we also observed an increase in the number of potential drug-drug interactions with age<sup>(11, 12, 13)</sup>. The more number of interactions were found in age group of 61 – 80 years age group due to factors relating to human physiology changes with age may affect the interaction of drugs and polypharmacy is another reason that accounts for the increased number of interactions in the patients.

Based on literature data to improve pharmacotherapy outcomes owing to interactions developing and implementation of educational interventions are best choice to avoid drug interactions<sup>(14, 15)</sup>. We found the incidence of potential drug-drug interaction was higher in the age group of 61-80 years age group. Where as in the other studies we also observed an increase in the number of potential drug-drug interaction with age. Similarly a study from Sweden reported 31% of the drug-drug interactions in elderly patients with similar results of our study<sup>(16)</sup>. The systematic approach on drug therapy can result in a more appropriate drug use in elderly<sup>(17)</sup>. This is because elderly patients use more medications as part of normal drug regimen the present study observed that poly pharmacy was common (7.85 drugs per prescription). Our study population included both critically ill and elderly patients. Elderly patients require a greater number of drugs. We found 54.62% of the potential drug interactions to be major severity type. Moderately severity type account for 55.38% of drug interactions. Our values are higher than the findings reported from a study conducted in the US, which reported 7.3% of major drug-drug interactions in a surgical intensive care unit<sup>(18)</sup>.

#### 5. Conclusion:

The study found the associations of potential drug interactions with age, sex, number of drugs per prescription. There was a direct link between polypharmacy and occurrence of drug interactions. To lower the frequency of potential interactions it could be necessary to make a careful selection of therapeutic alternatives, and in cases without other options, patients should be continuously monitored to identify adverse events. The study concluded that educational interventions can minimize the incidence of drug interactions.

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