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Identification and Evaluation of Drug Related Problems in Medicine Ward at a Tertiary Care Teaching Hospital

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ABSTRACT

Drugs play a dual role in patients. They are intended to cure, prevent or diagnosesigns or symptoms of a disease and on the same side its improper use can cause drugrelated problems which lead to increased morbidity and mortality. A pharmacistin a hospital had a vital role to monitor the physician prescribed prescriptions fordrug related problems (DRP's). Objectives: To identify the drug related problems like ADR's, Drug Interactions(DI), Low dose (LD), High dose (HD), Treatment without indication (TWI)andUntreated indication (UI). To identify the patient demographic details. Materials and methods: ThePresent study is an observational prospective study done in a tertiary care hospital for a period of six months. Individual patient data withprescription content is collected every day in Medicinedepartment in a suitable data collection form. Ethical clearance is obtained fromthe ethical committee before the study commence. Results: In the total datacollection of 393 cases, 202 (51.3%) were males and 191 (48.6%) were females in which 388 DRP's were found. In that 30 ADR's, 239 DI, 27TWI, 47 UI, 20 HD, 25 LD are identified. Polypharmacy is also one of thereasons for drug related problems in the patients. Conclusion: Drug relatedproblems are one of the major problems seen in the hospital. The study suggests that the pharmacists and physicians need to work together to identify and resolve drug relatedproblems. Additional controlled studies are required to measure the effect of thisservice on health outcomes.

Keywords: ADR's, Drug Interactions (DI), Treatment without Indication (TWI), Untreatedindication (UI), Low dose (LD), High dose (HD), DRP's, pharmaceutical care services

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INTRODUCTION

Pharmacy has witnessed a gradual significant change over the past years worldwide. The traditional role of the pharmacist that involving the preparation, dispensing and selling medications is no longer adequate for the pharmacy profession to survive. [1]. Pharmaceutical care is a groundbreaking concept in the practice of pharmacy. It stipulates that all practitioners should assume responsibility for the outcomes of drug therapy in their patients. It encompasses a variety of services and functions, some new to pharmacy, others traditional which are determined and provided by the pharmacists serving individual patients. However pharmacists often fail to accept responsibility for this extent of care.[2] Pharmaceutical Care is a patient centered, outcome oriented pharmacy practice that requires the qualified pharmacist to work in concert with the patient and the patient's other healthcare providers to promote health, to prevent disease, and to assess, monitor, initiate, and modify medication use to assure that drug therapy regimens are safe and effective.[3]The goal of pharmaceutical care to improve an individual patient's quality of life through the achievement of definite (predefined), medication-related therapeutic outcomes.[5]

The outcomes are:

1. Cure of a patient's disease.
2. Elimination or reduction of a patient's symptomatology.
3. Arresting or slowing of a disease process.
4. Prevention of a disease or symptomatology

This, in turn, involves three major functions:

a. Identifying potential and actual medication-related problems,

b. Resolving actual medication-related problems, and

c. Preventing potential medication-related problems.[5]

Drug Related Problems

Drugs are the absolute therapeutic tools used in diseased conditions in hospitalized individuals. They are intended to cure, prevent or diagnose diseases, signs or symptoms, but the shadow side is that improper use can be the cause of patient morbidity and even mortality. While the interest in adverse drug reactions increased greatly after the thalidomide disaster only in recent years has attention shifted toward the problem of medication errors.[7]Over the last 40 years, advances in drug therapy has enhanced patient care but also led to a noticeable increase in the incidence of drug related problems (DRP's). According to Pharmaceutical Care Network Europe Foundation (PCNE) Drug-Related Problems are defined as "A Drug-Related Problem is an event or

circumstance involving drug therapy that actually or potentially interferes with desired health outcomes", and according National Coordination Council for Medication Error Reporting andPrevention (NCCMERP) medication errorsare defined as: "Any preventable event thatmay cause or lead to inappropriate medicationuse or patient harm while the medication is inthe control of healthcare professional, patientor consumer".Medication errors occur whena healthcare professional perform an act thatfails to achieve the intended goal or due toimperfect execution.

Classification of DRP's

For the purpose of this study, we used DRP's as a general term for Actualor potential DRP's. We classified DRP's into 2 categories:

1. Drug use without indication
2. Untreated indication
3. Potentially improper drug selection
4. Potentially low dose
5. Potentially high dose
6. An actual or potential adverse drug reaction
7. An actual or potential drug interaction
8. Failure to receive medication and
9. Duplicate therapy.[8]

Identification of DRP's:

A 4-step process was utilized to identify DRP's:

1. Evaluation of computerized pharmacy-maintained patient profiles for medical diagnoses and comorbidities,
2. Analysis of clinical assessments documented in the pharmacy database,
3. Screening of past and present medication profiles, and
4. Pharmacist review of prescribed drug therapy for appropriateness.[9]

MATERIALS AND METHODOLOGY

Study Site

The study was conducted in Medicine department of Basaveshwara Medical College Hospital & Research Centre (BMCH & RC), Chitradurga.

Study Design

The study was designed primarily to investigate the occurrence or frequency of drug-related

problems (DRP's) in patients admitting to the Medicine department and also cases were analysed for interventions which was related to the observed DRP's. Thus the study can be described as a prospective observational study.

Study Period

The study conducted over a period of six months (i.e. 1 Jan 2013- 30 June 2013).

Study Subjects

All patients who admitted to the Medicine department of the hospital during a six month period from January to June 2013 will be eligible for enrollment. Patient who meets the following criteria will be enrolled.

A. Inclusion criteria

- Patients aged ≤ 80 years of both genders were included.
- Patient's admission more than 2 days in Medicine department.
- Admission or on treatment between Jan 2013 – June 2013.

B. Exclusion criteria

- Patient admission in other than Medicine (Male & Female) department.
- Patients who are treated from the outpatient departments, and who do not require hospital stay will be excluded from the study.

Study Procedure

Study started with informed consent process, patients were explained about objectives, benefits and risks associated with this study. Patients who satisfied with the study criteria were included into the study and collected patient's demographic details, clinical status, medical history, medication history and lab data will be documented in a suitably designed data collection form. A validated questionnaire will be given to the patient at baseline to assess their current health related quality of life. The data will be analyzed by using Microsoft Access in a computer. Data analysis has been presented in tabulated form.

RESULTS AND DISCUSSION

In recent years patient safety has become a major concern for health providers and medication management is one of its more relevant aspects. Polypharmacy is a ubiquitous problem plaguing nearly all health care systems. The present study is a prospective observational study carried out in an tertiary care hospital for a period of six months. We carried out a trust worth work on Drug Related Problems (DRP's), in which the data are collected in a suitable collection form in the medicine wards and were evaluated. A total of 393 patients aged ≤ 80 years of both genders

(Male & Female) admitted to the Medicine (Male & Female) department were enrolled for the study. Total number of cases in respective department is depicted in table 1.The study is carried out for a period of six months. The inflow of Male medicine ward is 1080 patients during the study period. The large amount of DRP's identified in our study reflects the chosen definition of DRP's, which includes potential as well as actual DRP's. We would argue that a potential problem should be regarded as a DRP because, if not dealt with properly, it will frequently cause negative outcomes. In Table.2 and Figure 1 Gender wise distribution of data shows that total number of Male patients included in study were 202 (51.3%) and 191 (48.6%) females respectively.Many studies have shown that a large proportion of DRP's causing hospital admissions are preventable, which emphasizes the need to take potential DRP's into consideration when evaluating drug regimens. The definition of drug-related problems (DRP's) has been widely discussed but, as yet, international agreement has not been achieved.In the study conducted by Kevin *et al* [8]on the prevalence and predictors of medication related problems,the total patients are 142, in that males are 34 (23.9%) and females are 108(76.1%). Our study main purpose is to determine the drug Related problems a pharmaceutical care service like ADR's, drug interactions,Treatment without indication,Untreated Indication,High Dose and Low Dose.All the data collected is evaluated and analysed for any drug related problems. Total Number of cases collected per month according to department wise is depicted in Table.3 and figure 2.During the study period in total of 393 patients, among which 388 drug related problems were found (Table.4& Figure 3). The adverse drug reactions in Medicine department are 30. The number of drug interactions found in Medicine department were 239.Whereas the number of treatment without indication situation were 27. Coming to untreated indication are 47.High doses were 20 and low dose 25 respectively. When reviewing the indication for drug therapy, it is important to consider whether the indication may be an unrecognized adverse drug reaction. It is also important to ensure that the most appropriate drug has choosen to treat the medical condition of the patient.Harminder Singh *et al* [15],conducted a study on the incidence and nature of drug related problems on hospital admission in a tertiary health care hospital.A total of 3560 patients' records were analyzed and out of them 118 patients hospitalization was due to DRP.ADR's are more prevalent found in the Medicine department. Among 30 adverse drug reactions, (Table.5) most frequent ADR's were identified in patients prescribed with Beta – lactam antibiotics 6 followed by NSAIDs 5 , anti - TB agents 5 and least were found in anti - malarials 1, anti - retroviral drugs 1 , anti - cancer drugs 1 respectively. The table below shows the identified cases with adverse drug reactions. Anne J. Leenertse*et al* [14], conducted a study on

frequency and Risk factors for preventable medication-related Hospital Admissions.All 17059 cases were screened of which 714 were medication related hospital admission in which 332 were potentially preventable admissions, which is 2.6% of all unplanned admissions, 52 were the ADR's, 49.4% was females. In the present study the total ADR's found are 30 out of 393 cases.A total number of 45 cases are with High and Low dosage errors (Table 6 and 7). Deriphylline, Ranitidine were found more prevalent with low dosage and ofloxacin dominants in high dosage. In total of 393 cases, 27 are treatment without indication and untreated indications were 47 identified respectively (Table:8 & Figure:5). In our study around 239 drug interactions were found in 393 cases in Medicine (Male & Female) department. We have been categorized the drug interactions into 3 types based on the significance such as Non-significant (Minor), significant and serious. The most common drug interaction (Table.9) were found to be between Ceftriaxone + Diclofenac 64 followed by Metronidazole + Diclofenac 22.It was observed that, (Table-10) among 393 cases 141 cases are with minor polypharmacy and 252 cases with major polypharmacy. Another study by *RainuKaushal MD* [16]done on adverse drug events,hereviewed 10,778 medication orders and found 616 medication errors (5.7%), 115 potential ADEs (1.1%), and 26 ADEs (0.24%). Of the 26 ADEs, 5 (19%) were preventable. While the preventable ADE rate was similar to that of a previous adult hospital study, the potential ADE rate was 3 times higher. Most potential ADEs occurred at the stage of drug ordering (79%) and involved incorrect dosing (34%).Among the 393 cases 257DRP's were observed during the study. Whereas in the cases without DRP's were identified are 136 respectively in Table 11. The following tables and figures represents the DRP's in medicine department based on the cases.

Table-1: Total number of cases collected (N=393) in Medicine department

Department	Number of cases collected
Medicine	393

Table-2: Gender wise distribution of data

Gender	No. of Patients	Total
Male	202	202 (51.4%)
Female	191	191 (48.6%)
Total	393	393

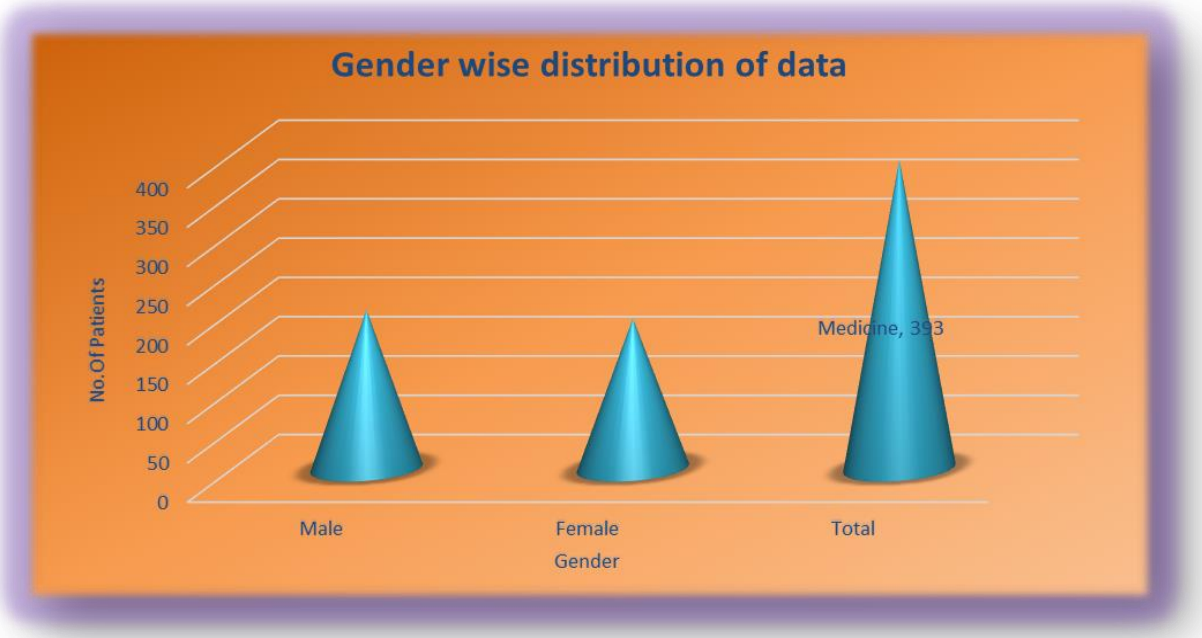

Figure 1: Gender wise distribution of data

Table-3: Number of cases collected per Month in Medicine Department

Months	No. of Cases
January	112
February	111
March	36
April	68
May	37
June	29

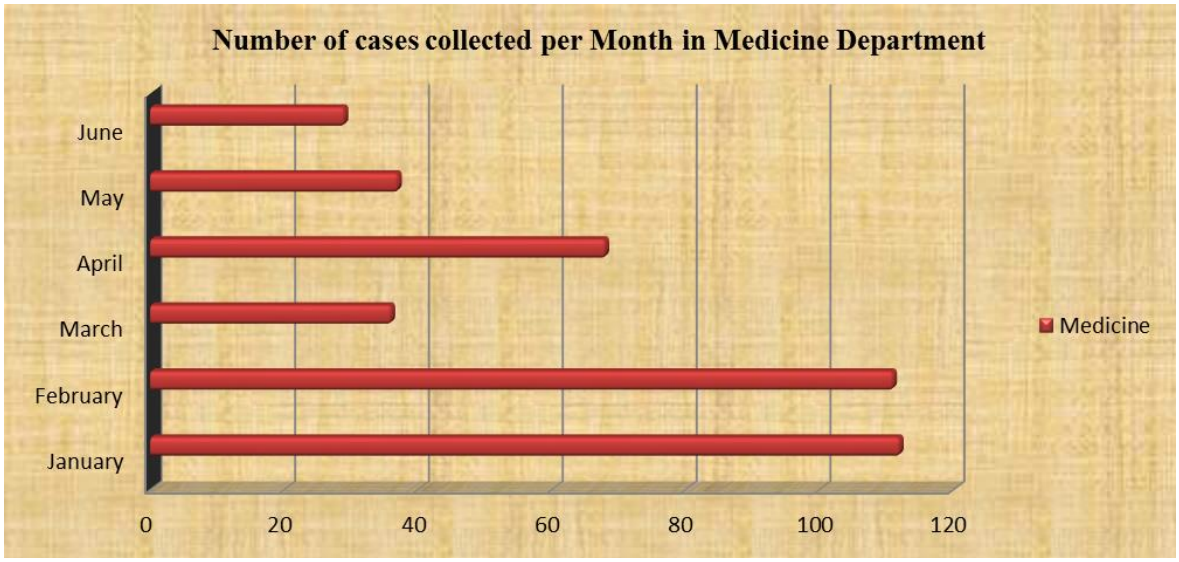

Figure 2: Number of cases collected per Month in Medicine Department

Table-4: Total DRP's in Medicine Department

Department	No. of cases	ADR	DI	TWI	UI	HD	LD	Total DRP's
Medicine	393	**30** (7.73%)	**239** (61.59%)	27 (6.95%)	**47** (12.11%)	20 (5.15%)	**25** (6.44%)	388

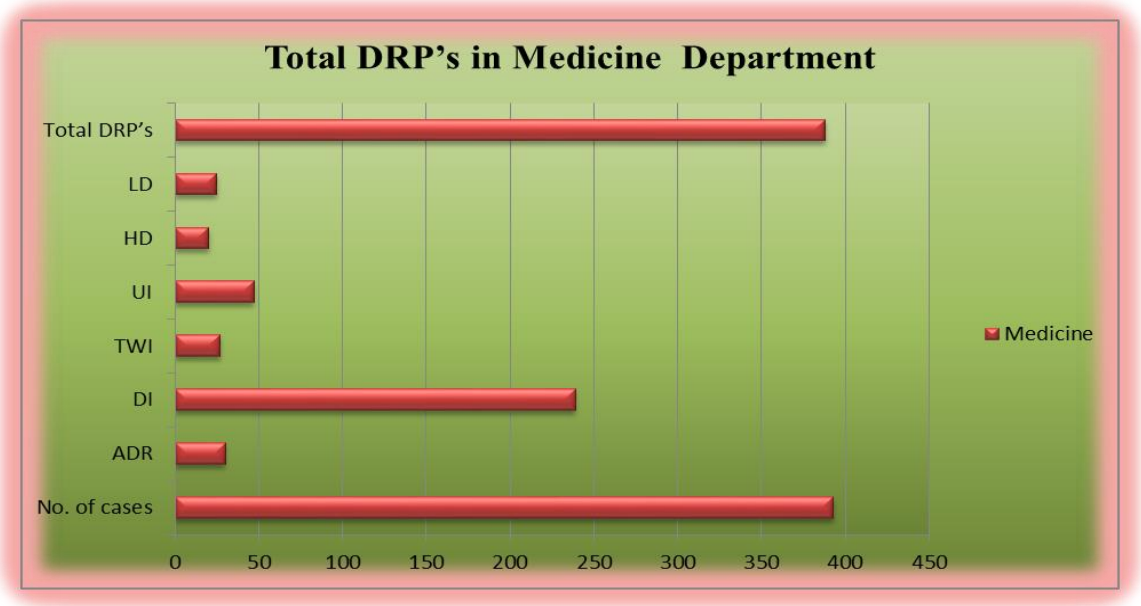

Figure 3: Total DRP's in Medicine Department

Table-5:Identified cases of ADR's

Sl. No.	Drug class	Drugs	Manifestations of ADR's	Number of Patients
1	NSAIDs	Diclofenac	Abdominal pain	2
			Vomiting	3
2	Analgesics/antipyretics	Paracetamol	Burning sensation of stomach	1
			vomiting	2
3	Beta lactam antibiotics	Ceftriaxone	Rashes	2
		Cefotaxime	Leucopenia	1
		Penicillin	Rashes	1
		Piperacillin + tazobactam	Anaphylactic reaction	1
			Rashes	1
4	Diuretics	Furosemide	Hyperglycemia	2
		Acetazolamide	Abdominal pain	1
5	Antimalarial	Lumefantrine + artemether	Dizziness	1
6	Aminoglycosides	Linezolid	Breathlessness Headache	2
7	Anti-retroviral	Zidovudin	Anemia	1
8	Anti-cancer	Methotrexate	Vomiting	1
9	Anti-diabetics	Metformin	Metallic taste	1
		Insulin	Hypoglycemia	2

10	Anti-TB drugs	Isoniazid	Rashes	1
		Pyrazinamide	Nausea, Visual disturbances	1
		Ethambutol	Vomiting, Heavy headedness	2
		Isoniazid + Pyrazinamide + Ethambutol	Jaundice	1

Table-6: Department V/S HDand LD

Department	Total number of cases	HD	LD
Medicine	112	20	25

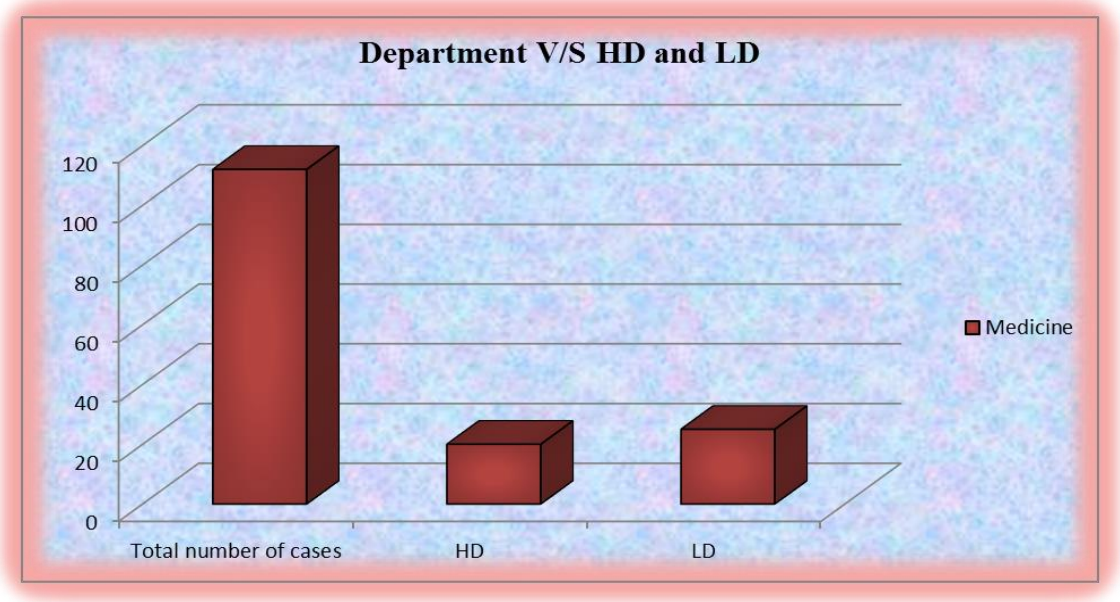

Figure 4: Department V/S HD and LD

Table-7: Drugs with HD and LD in Medicine department

Department	Drug name	Number of HD	Number of LD
Medicine	Deriphylline (Etophylline + theophylline)	1	5
	Ondansetron	0	4
	Dicyclomine	0	1
	Amikacin	3	0
	Levofloxacin	3	0
	Norfloxacin	2	0
	Ofloxacin	4	0
	Cefotaxime	3	1
	Ceftriaxone	0	1
	Paracetamol	2	3
	Camyloffin	0	1
	Salbutamol	2	0
	Hyoscine	0	4
	Ranitidine	0	5

Table-8: Department V/S TWI and UI

Department	Total number of cases	TWI	UI
Medicine	112	27	47

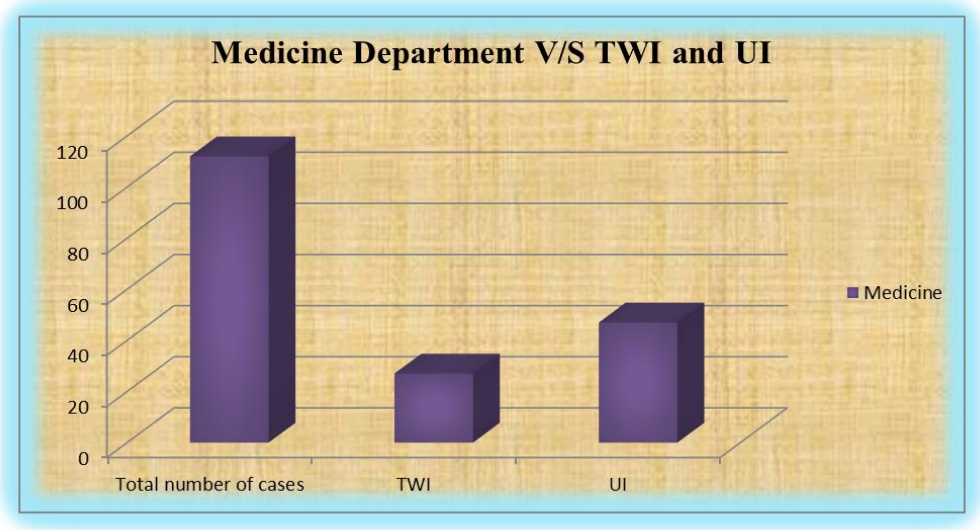

Figure 5: Medicine Department V/S TWI and UI

Table-9: Department V/S Drug interactions

Department	Total number of cases	Non-significant (Minor)	Significant	Serious
Medicine	112	106	95	38

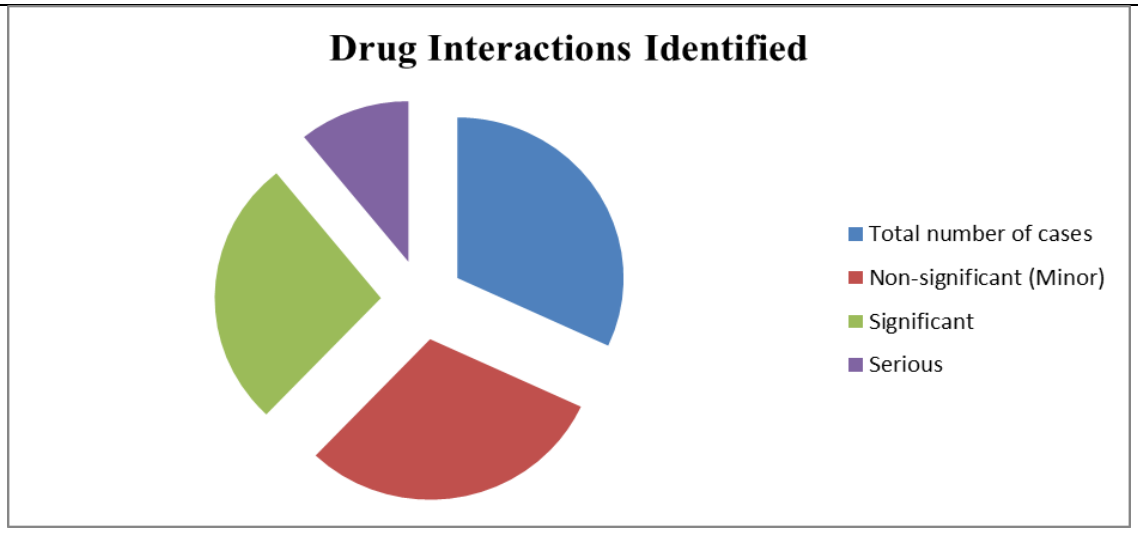

Figure 6: Departments V/S Drug interaction

Table-10: Polypharmacy V/S Medicine Department

Department	Cases with Minor Polypharmacy (2-4 drugs)	Cases with Major Polypharmacy (≥ 5 drugs)
Medicine	141	252

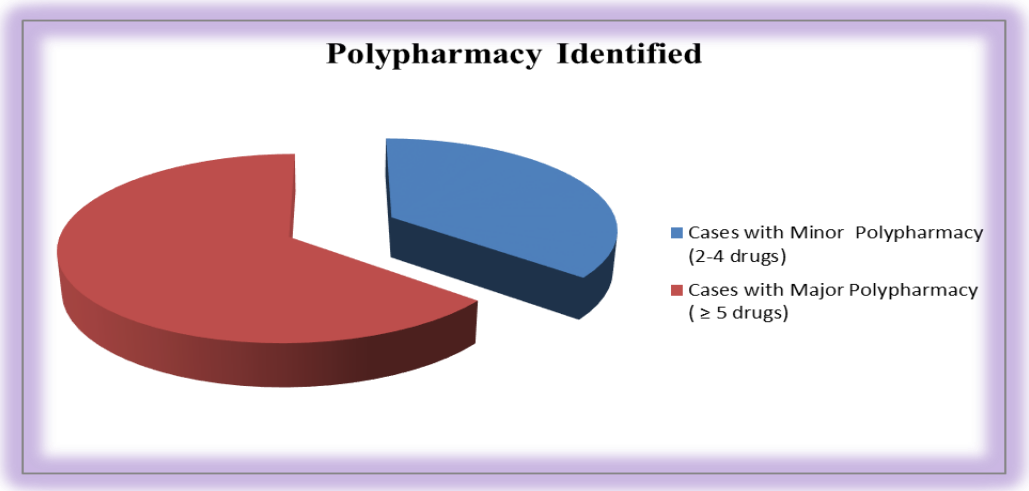

Figure 7: Polypharmacy V/S Department

Table-11: Cases with and without DRP's in Medicine department

Departments	Cases with DRP's	Cases without DRP's	Total cases
Female Medicine	144 (131.4)	57 (69.5)	201
Male Medicine	113 (125.5)	79 (66.4)	192
Total Cases	257	136	393

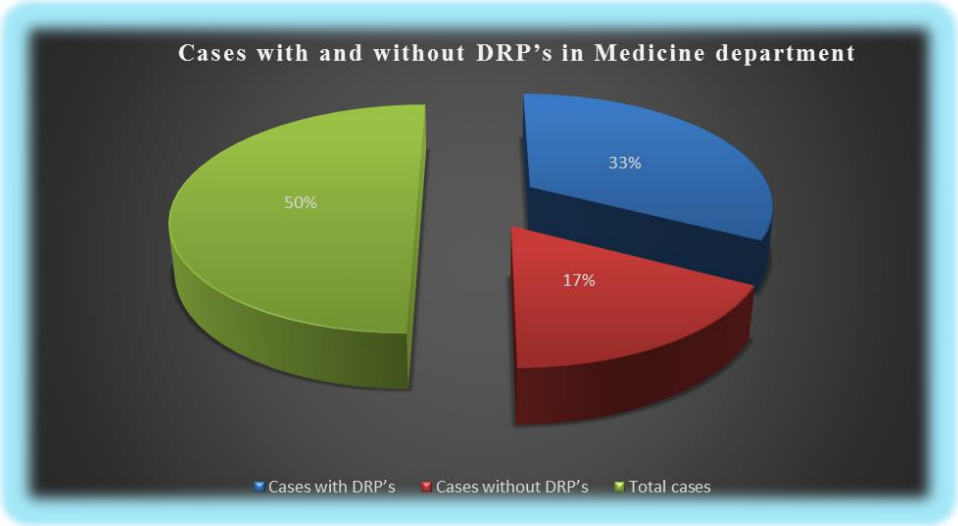

Figure 8: Cases with and without DRP's in Medicine department

CONCLUSION

In the study we identified a high incidence of drug-related problems among people receiving treatment. Drug related problems (DRP's) like Adverse Drug Reactions (ADR's),drug interactions, prescription errors were evaluated well in the study. Out of 393 patient prescriptions, 388 dug related problems have been found out. In that 30ADR's and 239 Drug interactions had seen in Medicine department respectively. For every problem which arised during therapy for an individual depends (or) relies on one perfect reason behind. The role of a

pharmacist in a hospital is a very crucial one which depends on the pharmaceutical services provided by them. The study suggests that pharmacists and general practicioners (physicians) can work together to identify and resolve drug - related problems. Given the significant cost and disease burden posed by ADRs, this form of collaboration addresses an important public health need. Additional controlled studies are required to measure the effect of this service on health outcomes.

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