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Assessment of Drug Related Problems in Patients Admitted to General Medicine Wards in Tertiary Care Hospital

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SHAHID ASHRAFUL TALUKDAR*[1], NISAR AHMED[1]

[1]Department of Clinical Pharmacy Farooqia College of Pharmacy, Mysore, Karnataka

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ABSTRACT

Objectives: Drug related problems (DRPs) are common in hospitalized patients and may lead to increase hospital stay, health care cost and augment the risk of morbidity and mortality. The objective of this study was to assess the drug related problems in patients admitted to general medicine units. **Methods:** A prospective, observational and interventional study was conducted in general medicine units for the period of 6 months and DRPs were identified and evaluated by referring standard textbooks and findings were discussed with the physicians to reduce DRPs. **Results:** The incidence of DRPs among hospitalized patients is associated with different reasons and risk factors. A total of 171 patients were enrolled, female 91 (53.22%) patients predominated over males 80 (46.78%) patients. DRP's were comparatively more in the age group of 61-70 i.e. 42 (24.56%) and followed by 51-60 i.e. 37(21.63%), due to aging-related physiological changes in the geriatric population is highly prone to DRPs when compared to adults. Most of the patients were suffering with cardiovascular ailments 68(39.7%) and out of which 56(39.7%) DRPs were identified. Among all drug class antibiotic were the top ranking drug classes involved in drug related problems (29.78%), in that majority DRP's was found as drug-interaction 16(11.3%), ADR 5(3.54%), drug used without indications 4(2.83%). DDI's was found to be 65(38%), in which mild DDI was 3(1.75%). **Conclusion:** The study concludes that involving clinical pharmacist services in patient care can significantly helps to identify, resolve, and prevent the DRP's in the hospital thereby enhancing the patient's outcomes.

INTRODUCTION

The main objective of medication use in any disease is to optimize drug therapy with minimum safety related problems within the framework of pharmaceutical care plan [1]. The goal of pharmaceutical care is to optimize the drug therapy, achieve positive clinical outcomes within realistic economic expenditures and improve patient's health related quality of life. In the case of most diseases, drug therapy will enhance health-related quality of life. However, inappropriate use of drugs may be harmful and lead to drug therapy problems [2]. In order to achieve a quality health care service inappropriate use of drugs that potentially lead to problems should be identified and corrected. The philosophy of optimizing the outcomes of pharmacotherapy and pharmaceutical care lead to the concept of drug related problems or DRPs, indicating some problem in the pharmacotherapy of the patient [3,4]. Drug related a problem (DRPs) is defined as an event that may potentially affect the health outcomes in the patients. DRPs can occur at all stages of the medication usage process starting from prescribing to dispensing stage. An infinite number of drug therapy problems exist because of the rapidly expanding array of drug products available, the growing number of diseases being recognized and diagnosed, and the growing number of patients entering the health care system [5]. All patient problems involving medications can be categorized into one of the seven types of drug related problems. These include unnecessary drug therapy, need for additional drug therapy, ineffective drug, dosage too low, adverse drug reaction, dosage too high and noncompliance [6].

Pharmacists can play an important role in identifying drug related problems (DRPs), resolving actual DRPs and preventing potential DRPs through pharmaceutical care practices. A number of actual DRPs can be resolved with patient counselling and through appropriate clinical pharmacy interventions. Increased knowledge about the nature and frequency of DRPs with feedback to pharmacy personnel, physicians, drug manufacturers, and patients would enhance the rational use of drugs. Studies have shown that majority (50-80%) of drug related problems can be prevented [7]. Data suggest that there is a significant need for the improvement in the use of drugs for hospitalized patients as medication related adverse events has been identified as contributing to negative clinical and economic outcomes including hospitalization and increased hospitalization costs. Our study was conducted to determine the incidence of DRPs in patients admitted to general medicine wards in tertiary care hospital and to recommend pharmacist interventions to resolve the actual DRPs [8].

METHODS

This was a prospective observational study, the patients who were satisfying the inclusion criteria were enrolled in to the study after obtaining their written consent. This study was conducted for a period of 6 month from October 2017 to April 2018 at medicine department of Pharmacy practice CSI Holdsworth Memorial Hospital Mysore, which is 320-bedded tertiary care hospital. The study was approved by Institutional Ethical Committee of the hospital and written consent was taken from patients.

A suitably designed patient data collection form used to record all relevant data for intervention such as patient demographic details, complains on admission, past medication and medical history, social history, history of allergy, diagnosis, laboratory data, drug treatment charts(like drug prescribed, doses, route of administration, frequency, duration of treatment), progress report, discharge medication, and follow up notes etc. was collected from inpatients case sheets(case records, medication chart and laboratory reports etc). The data collected was screened for Drug related Problems (DRPs) (such as inappropriate drug selection, compliance, untreated condition, drug use, interaction, ADRs etc) and followed. A type of DRPs identified was then recorded in the DRPs record from suitably designed for the study and the referral was made for the consulting physician regarding issues in patients' drug therapy problems.

DRPs were identified and evaluated by referring standard textbooks [Drug interaction facts-5, Roger Walker, WHO- Naranjo's Casuality assessment, Herfindal Gourley, etc] and findings were discussed with the physicians to reduce DRPs.

Descriptive and inferential statistical analysis has been carried out in the present study. Results on continuous measurements are presented on Mean ±SD and results on categorical measurements are presented in Number (%). The Statistical software namely Graph pad prism (version 5) was used for the analysis of the data and Microsoft word and Excel have been used to generate graphs, tables etc.

RESULTS AND DISCUSSION

Around 200 patients were approached and informed about the study; only 171 patients gave consent and participated. The demographic details of study subjects are given in table 1. In this study, the age groups of reported DRP's were comparatively more in the age group of

61-70 i.e. 42 (24.56%) and followed by 51-60 i.e. 37 (21.63%), due to ageing related physiological changes in the geriatric population is highly prone to DRPs when compared to adults. This finding was similar to Koh Y et al. study where they reported 58.2% of geriatric patients (patients more than 65 years old) in their study [9]. In contrast to this study Bhagavathula AS et al. reported majority of patients 114 (44.5%) were in the age group of 18-35 years [10].

Table 1: Demographic details of study subject (n=171)

Demographic variables Age in years	No. of patients	Percentage (%)
20-30	31	18.12
31-40	10	5.8
41-50	33	19.29
51-60	37	21.63
61-70	42	24.56
71-80	16	9.4
81-90	2	1.2
Gender		
Male	80	46.78
Female	91	53.22

In gender wise distribution, females participants were high 91(53.22%), compared to males 80(46.78%). Although the difference was marginal, this reason may be female patients, being generally lighter in weight and smaller in build than their male counterparts but usually receiving the same drug doses, had been demonstrated to be more prone to DRPs. The study finding is similar to the Bhagavathula AS et al study, where they reported higher number of female participants in their study i.e. 144 (56.2%) [10].

Most of the patients were suffering with cardiovascular disease 68(39.7%) and out of which 56(39.7%) DRPs were identified. Amongst which most of the patients were suffering with Ischemic heart diseases, followed by other ailments like Hypertension, Miocardial infraction, Dilated Cardiomyopathy and Unstable Angina etc.

Cardiovascular disorders were followed by endocrine disorders 21(12.3%) like diabetes mellitus and hypothyroidism which was further followed by pulmonary disorders 22(12.9%) like COPD, asthma and pulmonary infections 13(7.6%) like tuberculosis also there were a certain degree of patients suffering with CNS disorders 9(5.3%) like epilepsy and parkinsonism. Among cardiovascular disorders, 22(15.5%) of DRPs were identified (table 2).

Table 2: Patients distribution in various disorders

Diagnosis	Total patients	Percentage (%	DRP's identified (%)
Cardiovascular disorders	68	39.7	56 (39.7)
Endocrine disorders	28	16.3	22 (15.6)
Pulmonary disorders	23	13.5	22 (15.6)
Pulmonary infections	10	5.8	10 (7.0)
Gastrointestinal disorders and infections	07	4.0	6 (4.3)
Poisoning	07	4.0	4 (2.8)
UTI and Renal disorders	05	2.9	5 (3.5)
CNS disorders	12	7.0	7 (5.0)
Others	11	6.4	9 (3.5)
Total	171	100	141 (100%)

Antibiotic, anti-hypertensive, analgesics, corticosteroids and central nervous system (CNS) drugs were common drug classes involved in DRPs. Among all drug class antibiotic were the top ranking drug classes involved in drug related problems (29.78%), in that majority DRP's was found as drug-interaction 16(11.3%), ADR 5(3.54%), drug used without indications 4(2.83%). The second class of drugs used was Analgesics 24(17.02%), in that majority DRP's was found as drug-interaction 8(5.68%), ADR 3(2.12%) and drug used without indications 2(2.12%). Vasodilator (Nitrates) showed 2(1.41%) of drug-interaction, 2(1.41%) of ADR and 1(0.7%) of polypharmacy. In anti-diabetic drug, 8(5.68%) of DRPs was found, among which drug-interaction was 3(2.12%), ADR's was 1(0.7%) and overdose was 1(0.7%). Drug acting on GI system 6(2.83%), in that drug-interaction 2(1.41%), ADR's 2(1.41%), drug used without indications 1(0.7%). When the incidence of ADRs were observed it was found that a small proportion of study population suffered from ADRs associated with their therapy however the severity of ADRs was moderate and easily manageable. Results are showed in figure 1.

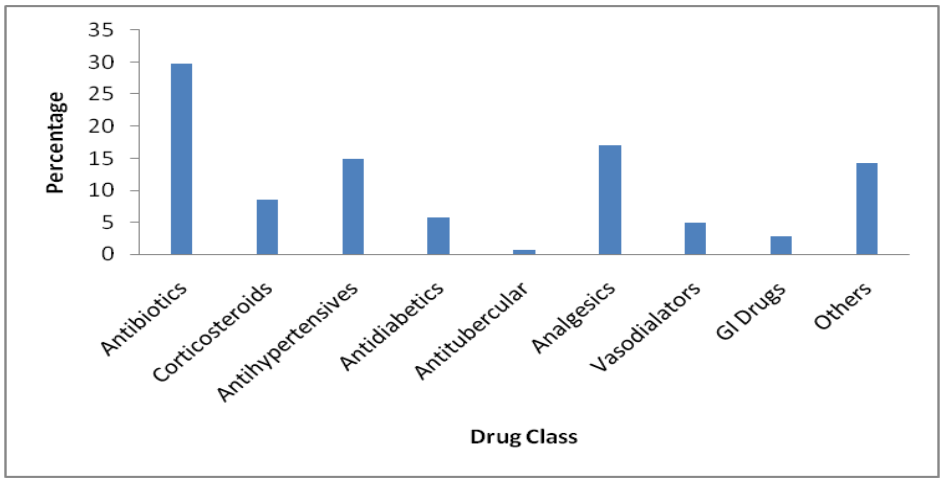

Fig. 1: Drug related problems related to therapeutic class of drug

Various classes of drugs involved in ADR are Antihypertensive like Amlodipine induced GI-disturbance. NSAID (Ibuprofen) induced GI irritation and abdominal pain. Antibiotics (ciprofloxacin) induced diarrhea and Antibacterial (Levofloxacin) induced Headache. Antidiabetics (Glybencamide) induced sweating. Proton pump inhibitors (Rabeprazole) cause Headache. RNTCP-CAT.3 causes vomiting. Anticoagulant (Heparin) cause oral cavity bleeding. It is clearly shown that from some classes of drugs induce drug related problems. Results are showed in table 3.

Table 3: Details of drugs causing ADRs Causality Assessment Scale

Sl. No.	Drugs	Types of ADRs	
1.	Rabeprazole	Headache	Probable
2.	Metronidazole	Headache	Possible
3.	Atropine	Tachycardia	Possible
4.	Trental	Nausea	Definite
5.	Glibenclamide	Sweating	Probable
6.	Streptokinase	Oral cavity bleeding	Possible
7.	Lamivadine	Nausea	Possible
8.	Heparin	Bleeding	Definite
9.	Duonil	GI-disturbance	Possible
10.	Levothyroxine	Headache	Unlikely
11.	Divalproex sodium	Abdominal pain	Probable
12.	Tramadol	GI-disturbance	Possible
13.	Amlodipine	GI-disturbance	Probable
14.	Aldactone	Vomiting	Definite
15.	Pralidoxine	Increased BP	Unlikely
16.	Levofloxacin	Nausea	Possible
17.	Theophylline	Vomiting	Probable
18.	Ibuprofen	GI-disturbance	Probable
19.	Cremeffin	Vomiting	Unlikely

Adverse drug reaction was also observed and monitored. Among 171 patients, 29(16.96%) cases of ADR were reported, out of which 4(2.33%) was Definite, 12(7.01%) was Possible, 9(5.26%) was Probable and 4(2.33%) was Unlikely ADR associated with the drug molecule. These results are higher to the Rashed AN et al. findings, where they reported 3.0% (95% CI, 1.3-5.1%) of ADR in their study [11]. The major ADR found in this study was the patient suffering from Jaundice (Hepatitis-E virus) and the Bilirubin range is up to 28.5 in the third day of the treatment, the physician suggest that tablet-Trental 400mg (Pentoxifylline), after starting these tablet the patient got nausea, body itching, vomiting. After the clinical pharmacist identified the physician accepted and stopped the tablet-Trental 400mg (Pentoxifylline).

When the significance level of DRPs was observed, it was found that most of the DRPs were mild 42(29.78%) and moderate 99(70.22%) in nature posing no major threat to the patients overall quality of life. However, the result of this study was higher compared with a similar study done in Jimma, Ethiopia in which a single DRP was identified in 97 (37.7%) of patients [9].

A majority of the physicians accepted the intervention made by clinical pharmacist. Which shows an increasing confidence of physicians in the clinical pharmacist and this add up an added responsibility in the shoulders of clinical pharmacist to find and help in eradication of DRPs, it was observed through this study that drugs were altered, dosage were adjusted and even the drugs were stopped after a timely intervention by clinical pharmacist.

The acceptance rate of clinical pharmacist recommendation and change in drug therapy was found to be 105(74.46%), out of which 39(27.65%) of drug therapy was changed, 28.36% dose decreased, 13(9.21%) dose increased and 16(11.34%) of drugs were stopped. During this study, majority of the cases regarding discussion about patient's drug therapy problems, physician gave the opinion that the suggestion provided was too helpful, in regards of updating their knowledge for better patients care and reducing prescribing errors. The physician well appreciated the services provided by the clinical pharmacist's intervention (table 4). DRPs were also evaluated using some standard reference books. Among them Micromedix 52(36.87%) followed by Drug interaction facts-5 34(24.11%), Roger Walker 30(21.27%), Herfindal 9(6.38%) and WHO- Naranjo's causality assessment 16(11.34%) identified DRPS.

Table 4: Different types of DRP's accepted by physician

Types of DRP's	No. of patients	%
Drug interactions	29	27.61
ADR	62	59.04
Drug duplication	1	0.95
Drug use without Indication	3	2.85
Subtherapeutic dose	5	2.9
Low dose	1	0.95
Over dose	1	0.95
Incompatibility	3	2.85
Total	105	74.46

CONCLUSION

Drug-related problems (DRPs) are events involving drug therapy that actually or potentially interfere with desired health outcomes. DRPs are prevalent and cause considerable patient morbidity and mortality, as well as increased healthcare cost. Drugs are important in prevention and treatment of disease and health complaints. The increasing number of available drugs and its users, as well as more complex drug regimens, leads to more side effects and drug interactions, which needs complicated follow up. This can lead to substantial morbidity and mortality, as well as increased health care expenditure, which in turn affect both patients and society.

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