

Identification of Drugs That Commonly Cause Drug Related Problems in Patients with Chronic Diseases - A Community Based Study in Dakshina Kannada

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ABSTRACT

Drug related problems (DRPs) are events concerned with drug therapy that may be actually or potentially harmful to a patient's health or which prevent the patient from optimally benefiting from the treatment. While considering a community setting, patients suffering from chronic illnesses usually have multiple diseases and hence tend to take more number of medications including over the counter medications. These patients may also have altered physiologies by virtue of their age or chronic disease. These factors along with the fact that these patients are responsible for their own medication make them disease more prone to drug related problems. There is a relative lack of data and inadequacy in the documentation of DRPs in the community setting which may be because of gaps in the continuity of pharmaceutical care. So a community based observational study was conducted in different places of Dakshina Kannada district to identify and assess the various drug related problems caused by commonly prescribed drugs based on Hepler -Strand classification for a duration of 6 months from October 2019 to March 2020 by enrolment of 150 patients diagnosed with any chronic disease. Medical information was collected using predesigned patient interview forms and data were analyzed and interpreted with the help of Microsoft Excel 2013. Hypertension (HTN), Diabetes Mellitus (DM) were the most commonly observed chronic

diseases. Out of the 121 DRPs identified, the most number of DRPs were found to occur with oral hypoglycemic agents followed by calcium channel blockers, angiotensin receptor blockers, thyroid hormones and bronchodilators. The study concluded that pharmacist interventions can play a major role in identification and assessment DRPs.

Keywords: Drug Related Problem, Chronic diseases, Community setting, Drug class

INTRODUCTION

Drug related problems (DRPs) are events concerned with drug therapy that may be actually or potentially harmful to a patient's health or which prevent the patient from optimally benefiting from the treatment. ^[1] DRPs can occur at any step of the treatment process, from prescribing, to transcribing, dispensing and drug use by the patient. ^[2] These problems affect the treatment outcomes of the patient and also decrease the probability of achieving the set therapeutic goals. Medication errors and adverse drug reactions (ADRs) are known to be the most common types of DRPs. Occurrence of DRPs during hospitalizations are associated with longer duration of hospital stay and consequently lead to increase in health-care costs. Improving the awareness regarding DRPs can help to

identify, resolve, and prevent potential DRPs and is a prerequisite for better patient care. [3]

Drug related problems are classified as per many different classification systems. These include, but are not limited to, American Society of Hospital Pharmacists (ASHP) Systems, Cipolle *et al.*, Granada consensus, Hepler/Strand, Pharmaceutical

Care Network Europe (PCNE) classification, Problem-Intervention Documentation (PI-Doc) and Westerlund classification. [4]

There are eight categories of DRPs according to Hepler and Strand classification, which are tabulated in table 1. [5]

TABLE 1: TYPES OF DRPs

DRPs	DESCRIPTION
Untreated Indication	The patient has a medical indication that calls for drug therapy but is not receiving a drug for the same.
Improper Drug Selection	The patient has an indication for a particular drug but is taking the wrong drug for it.
Sub-therapeutic Dosage	The patient has a medical condition that is being treated with the correct drug but with too little of it.
Failure to Receive Drugs	The patient has a condition by virtue of his or her not receiving a drug for pharmaceutical, psychological, sociological or economic reasons.
Over dosage	The patient has a medical problem that is being treated with the correct drug but with too much of it (may lead to toxicity).
Adverse Drug Reactions	The patient has a medical problem due to an Adverse Drug Reaction or adverse effect.
Drug Interactions	The patient has a medical problem that caused by a drug-drug, drug-food or drug-laboratory interaction.
Drug Use Without Indication	The patient is taking a drug for no medically valid indication.

As the number of available drugs increases, drug prescribing and use tend to become more complex, leading to a plethora of drug related problems (DRPs). [6] While considering a community setting, patients suffering from chronic illnesses usually have multiple diseases and hence tend to take more number of medications including over the counter medications. These patients may also have altered physiologies by virtue of their age or chronic disease. These factors make the patients suffering from chronic disease more prone to drug related problems. [7]

Drug complications reported by patients are common in the outpatient scenario and have more clinical significance for these patients. Patients may report more number of complications caused due to medications than are found in their medical records. Many of these drug complications may be preventable through implementation of preventative measures such as computerized prescription order entry and proper prescription guidelines. [8]

OBJECTIVES

To identify and assess the drugs which commonly cause drug related

problems (DRPs) in patients with chronic diseases.

MATERIALS AND METHODS

Study site: A community based observational study was carried out in different places of Dakshina Kannada district, Karnataka.

Study design: A community based observational study

Study period: The study was conducted for duration of 6 months from October 2019 to March 2020

Study sample size: 150 Patients

Ethical clearance: The study protocol was approved by the Institutional Ethics Committee (IEC) of Srinivas Institute of Medical Science and Research Centre (SIMS&RC), Mukka, Mangaluru.

Inclusion criteria: Patients aged 18 years and above who were willing to participate in the study, who were diagnosed with any chronic disease and who were not pregnant or lactating.

Exclusion criteria: Patients aged below 18 years, patients who were not willing to participate in the study, patients diagnosed with acute illnesses, patients with psychiatric illnesses, pregnant and lactating women.

Source of data: The data for study was taken by reviewing prescriptions, physician notes of patients with chronic diseases and medical information provided by the patients. Data collected included patient's demographic data, personal history, medical and medication history, current diagnosis and drug therapy details, and any problems observed by the patient during the course of treatment.

Sampling method: Medical information of patients (male and female) diagnosed with any chronic diseases and participated in this community based study from October 2019 to March 2020 was obtained from different parts of Dakshina Kannada. A total of 150 patients met the selection criteria.

Materials used: Data was collected using a structured patient interview form to document demographic details, medical and medication history, personal history, allergic history, diagnosis, treatment including drug, dose, frequency, route of administration and problems associated with therapy.

Study method: Ethical committee approval was obtained before starting of this study.

Patient interview form was designed as per need of the study. The data was collected from the homes of patients via interview using patient interview forms. The data included patient demographic data, personal history, medical and medication history, current diagnosis and drug therapy details, and any problems observed by the patient during the course of treatment. Drug Related Problems were identified by investigators and were analyzed. All the data was kept confidential.

Data analysis: Data was collected and analyzed with the help of Microsoft Excel 2013.

RESULTS

In the sample size of 150 patients, over 60 chronic diseases were identified. Among these 150 patients, 121 DRPs were identified in 82 patients. These DRPs were classified according to the Helper-Strand classification. The total no. of DRPs excluding those belonging to the categories 'Untreated indication' and 'Improper drug selection' were found to be 108.

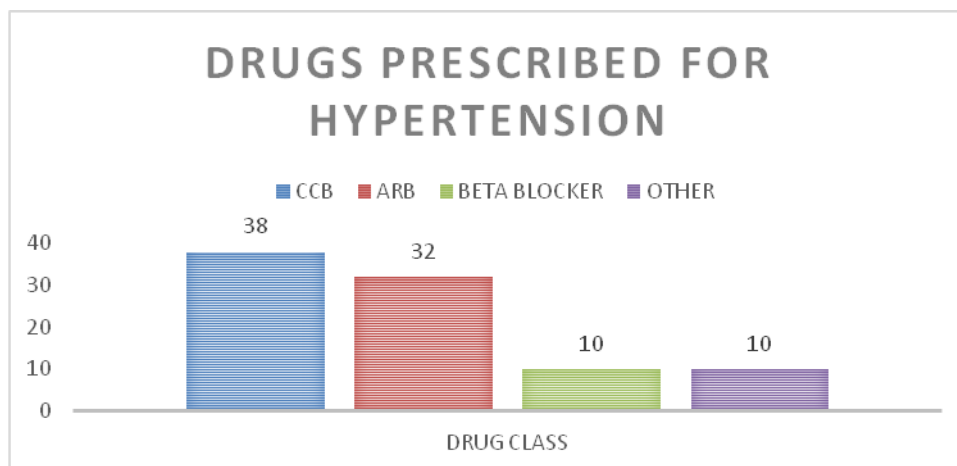


Figure. 1: Drugs commonly prescribed for HTN

Hypertension (HTN), Diabetes Mellitus (DM) were the most commonly observed chronic diseases. The most commonly prescribed drugs for HTN were found to be calcium channel blockers, angiotensin receptor blockers and beta adrenergic blockers (Figure 1). The most commonly prescribed drugs for DM were metformin and glimepiride for Type 2 and insulin for type 1. (Figure 2)

Upon assessing the DRPs with respect to the class of drug they were associated with, the most number of DRPs were found to occur with oral hypoglycemic agents followed by calcium channel blockers, angiotensin receptor blockers, thyroid hormones, bronchodilators and others.

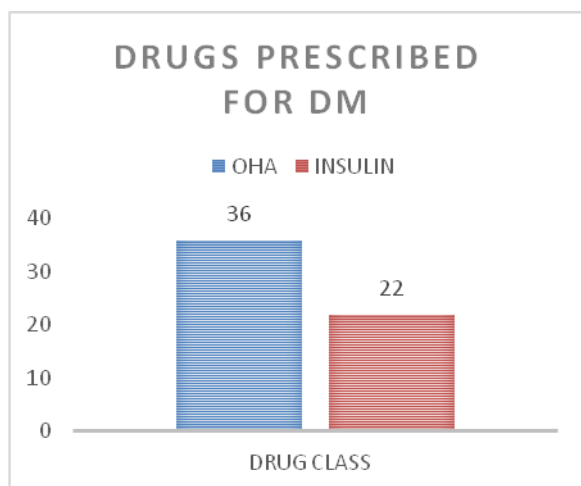


Figure. 2: Drugs commonly prescribed for DM

The number of DRPs according to the drug class associated with them is given in Table 2.

This data was further broken down to assess the number of each type of DRP associated with a particular drug class as depicted in Table 3.

TABLE 2: NO. OF DRPS VERSUS DRUG CLASS

DRUG CLASS	DRP
Oral hypoglycemic agents	16
Calcium channel blockers	15
Angiotensin receptor blockers	9
Thyroid hormones	8
Bronchodilators	7
Antiplatelet agents	6
Insulin	6
Non-steroidal anti-inflammatory agents	5
Beta adrenergic blockers	5
Gastroprotectives	5
Antiparkinsonian agents	4
Statins	4
Other Antihypertensive agents	3
Multivitamins and supplements	3
Antibiotics	3
Others	10

TABLE 3: TYPES OF DRPS SEEN IN EACH DRUG CLASS

DRUG CLASS	TYPE OF DRP
Oral hypoglycemic agents	Adverse Drug Reactions (9) Failure to Receive Drugs (3) Drug Interactions (3) Over dosage (1)
Calcium channel blockers	Adverse Drug Reactions (8) Failure to Receive Drugs (4) Drug Interactions (2)
Angiotensin receptor blockers	Adverse Drug Reactions (5) Failure to Receive Drugs (3) Drug Interactions (1)
Thyroid hormones	Adverse Drug Reactions (7) Drug Interactions (1)
Bronchodilators	Drug Interactions (4) Drug Use Without Indication (2) Sub-therapeutic Dosage (1)
Antiplatelet agents	Adverse Drug Reactions (4) Drug Interactions (2)
Insulin	Adverse Drug Reactions (5) Drug Interactions (1)
Non-steroidal anti-inflammatory agents	Adverse Drug Reactions (3) Over dosage (1) Sub-therapeutic Dosage (1)
Beta adrenergic blockers	Adverse Drug Reactions (2) Failure to Receive Drugs (1) Drug Interactions (1) Over dosage (1)
Gastroprotectives	Adverse Drug Reactions (2) Drug Interactions (2) Over dosage (1)
Antiparkinsonian agents	Adverse Drug Reactions (1) Drug Interactions (3)
Statins	Adverse Drug Reactions (2) Drug Interactions (2)
Other Antihypertensive agents	Adverse Drug Reactions (1) Drug Interactions (2)
Multivitamins and supplements	Adverse Drug Reactions (2) Sub-therapeutic Dosage (1)
Antibiotics	Adverse Drug Reactions (3)
Others	Adverse Drug Reactions (3) Drug Interactions (4) Over dosage (2) Drug Use Without Indication (1)

DISCUSSION

Drug related problems are often seen in chronic diseases. Patients dealing with multiple chronic conditions are burdened with their treatment regimen because they are often required to engage in a complex range of self-care activities in order to maintain their health together with their long term treatment.^[9] Along with this, patients suffering from chronic diseases usually have multiple diseases and take more number of medications including non-prescription medications in community settings. However it is found that there is a relative lack of quality information and inadequate documentation about Drug Related Problems (DRPs) in the community setting. Contrary to inpatients, outpatients are responsible for both procuring and administering their own medications and hence the process is a lot less controlled than the process in an inpatient scenario.^[10] At the present stage of India's healthcare scenario, chronic diseases contribute to about 53% of deaths and 44% of disability-adjusted life-years lost. Cardiovascular diseases and diabetes mellitus are highly prevalent especially in urban areas.^[11] Hypertension (HTN) and Type 2 diabetes mellitus (DM) are the most prevalent chronic non-communicable diseases and multifactorial disorders which affect both the developed as well as developing countries, including India. Although DM and HTN are not the leading causes of death, which include cancer and stroke, these two diseases draw concern due to their increasing trends.^[12] More the number of chronic diseases, more the people exposed to drugs and consequently more the number of DRPs associated with these drugs. In the study conducted by Wisent M M *et al.*, Antidiabetic drugs were found to be more associated with drug-related problems.^[13] Similarly in the study conducted by Savitha RS, Ramesh M, Shetty MS, Kiran KK, the most common drug classes involved included oral antidiabetic drugs.^[14] In the study conducted by Hsu WT, Shen LJ, Lee CM, which was a hospital based study in

cardiovascular patients, the drugs most frequently causing a DRP included angiotensin-converting enzyme inhibitors / angiotensin II receptor blockers, and β -blockers.^[15] All these findings are similar to those in the present study.

CONCLUSION

Based on the study criteria all DRPs in patients with chronic diseases were identified. The DRPs identified were classified according to the Hepler and Strand classification. The commonly occurring chronic diseases and drug classes commonly associated with DRPs were identified. The most number of DRPs were found to occur with oral hypoglycemic agents followed by calcium channel blockers, angiotensin receptor blockers, thyroid hormones, bronchodilators and others.

Merits of the Study

This study was carried out in a community setting rather than hospital setting.

As studies conducted on drug related problems in community setting are very few in number, the present study can be considered as a novel one.

Limitations of the Study

Small sample size.

Bias in the information provided by the patient may be present.

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