

## A SURVEY OF DRUG RELATED PROBLEMS IDENTIFIED BY COMMUNITY PHARMACY IN SOUTH INDIA

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### ABSTRACT

A drug-related problem (DRP) is defined as an event or circumstance that actually or potentially interferes with desired health outcomes. DRPs can lead to ineffective pharmacotherapy and may cause drug-related morbidity and mortality. Most DRPs are avoidable and community pharmacies are assuming an active role in preventing and solving DRPs. Patients who visited two- community pharmacy set up (branches of chain pharmacy) with prescriptions were included in the study after obtaining the consent. The objective of this study was to demonstrate that community pharmacists are willing and able to detect, solve and document DRPs in every day routine and also to categorize and analyze the different types of DRPs. The study was carried out for a period of nine months. 126 patients were selected from the two community pharmacies (61 from CP1 and 65 from CP2). The patient's data were collected with the help of a structured data entry format after getting their consent. Majority of the study population were from the late adulthood group (42.86%) and from young old group (22.22%). The commonly identified drug related problems in both community pharmacy 1 and 2 were drug interactions (76.84%) and wrong frequency (12.63%), over dose (4.21%), under dose (3.16%), therapeutic duplication (3.16%). The DRPs identified were categorized according to the PCNE classification of DRPs. The classification reveals that the problems were primarily categorized as dosing problems (20%), drug dosing problems (3.16%), and majority of interactions (76.84%). The above fact reveals that a pharmaceutical care program will definitely improve the outcomes of the therapy.

**Key words:** DRPs- Drug related problems, Quality of life, Pharmaceutical care.

### INTRODUCTION

Demographic and socioeconomic elements continue to exert increasing pressure on healthcare systems to develop new strategies for the efficient use of available healthcare resources. Savings plans that are expedient but do not diminish the quality of patient care are needed. In most countries, spending on prescription drugs is one of the most cost-intensive considerations for health insurance companies,<sup>3</sup> with escalating costs driven by the aging

population,<sup>3</sup> the growing number of people with chronic diseases, and the availability of new and expensive medications.<sup>4</sup>

DRPs can lead to ineffective pharmacotherapy and may cause drug-related morbidity and mortality. As the number and potency of available drugs increases, drug prescribing and use becomes more complex, leading to a variety of drug related problems.<sup>3</sup> The drug related problem could be anyone of these: untreated indication, improper drug

selection, sub-therapeutic dosage, failure to receive drugs, over-dosage, drug use without indication, inappropriate prescription, clinically relevant drug-drug interactions, non adherence, adverse drug reactions etc are common

The study was designed with the objectives to identify the spectrum of potential DRPs, in the prescriptions received at community pharmacies, to demonstrate that pharmacists are willing and able to detect, categorize, analyze and document DRPs in every day routine and Categorization of DRPs based on the PCNE classification.

### Material and methods

The protocol was accepted by Institutional Ethics Committee. It was a community study done in 2 community pharmacies of chain pharmacy of Pasumai Pharmacies India Pvt Ltd. It was performed using a questionnaire as a tool to collect data from patients. Prescriptions were collected and the data were obtained from the patients. Patients with prescriptions and showing willingness to participate were included to this study whereas Patients visiting the counters for OTC medications and patients not showing willingness to participate were excluded. Data were analysed through Identification and Categorization of drug related problems which were done according to the Pharmaceutical Care

Network Europe (PCNE) Classification of drug related problems.

### Results

A total of 126 patients were enrolled for the study. The study population includes 81 males and 45 females. On the basis of age majority of study population were from late adulthood group and from young old group. Major reasons for visit to the doctor were identified in the study population was Hypertension associated with other complications like joint pain, heart burn, peptic ulcer, fistula piles, etc (16.66%) followed by Diabetes mellitus (14.81%).

The Community pharmacy services offered in the pharmacies were Blood glucose level monitoring, Blood pressure monitoring, weight and height measurement. The study populations selected were categorized based on community pharmacy services provided to them in CP1 and CP2. Major community pharmacy services provided to them were blood glucose level check and blood pressure check (31.48%), blood pressure check alone (28.70%), and blood glucose level check alone (20.37%). The major categories of drugs prescribed for the study population were hypoglycemic drugs (78.70%), antihypertensive drugs (74.07%), and other drugs including antihyperlipidemics drugs (40.74%), vitamins and mineral supplement (33.33%), antiulcer (29.63%), etc.

**Table 1: Number of prescriptions with number of drugs**

Number of prescriptions with	CP1 (n=52)	CP2 (n=56)	Overall % of patients (n=52+56=108)
	% of patients	% of patients	
1 drug	3.85 (2)	-	1.85 (2)
2 drugs	9.62 (5)	17.86(10)	13.89 (15)
3 drugs	28.84 (15)	21.42 (12)	25.0 (27)
4 drugs	23.08 (12)	21.42 (12)	22.22 (24)
5 drugs	19.23(10)	25.0(13)	21.30 (23)
6 drugs	3.85 (2)	8.93 (5)	6.49 (7)
7 drugs	5.77 (3)	5.36 (3)	5.55 (6)
8 drugs	3.85 (2)	-	1.85 (2)
9 drugs	1.92 (1)	-	0.92 (1)
12 drugs	-	1.78 (1)	0.92 (1)

About 98% of prescriptions included had more than 1 drug prescribed, which clearly gives the picture of polypharmacy especially about 68% had a minimum of 3-5

DRPs/prescription, and the age of the population was also late adulthood. The drugs prescribed in community pharmacies were given in graph 1.

Prevalence: The number of DRPs identified per patient or prescription in the overall study population was 0.88(95) and in CP1 it was 0.98(51) and 0.78(46) in CP2. It shows that the prevalence of DRPs were more in CP1.

Drug-Related Problems Identified :The prescriptions collected at the counters were analyzed and the number of DRPs were

calculated, and it revealed that 69.44%(75) of prescription had DRPs which can be further categorized based on other parameters. In the total drug-related problems an overall 76.84 % were found to be interactions, 12.63% were wrong frequency, 4.21% were over doses, 3.16% were under doses and 3.16%, were therapeutic duplication.

**Table 2: Total Drug-Related Problems Identified**

DRP type	CP1	CP2	Overall
	Percentage of DRPs(n=51)	Percentage of DRPs(n=44)	Percentage of patients (n=95)
Drug interactions	78.43 ( 40)	75.0 ( 33)	76.84 ( 73)
Wrong frequency	9.80 ( 5)	15.9 ( 7)	12.63 ( 12)
Over dose	5.88 ( 3)	2.27 ( 1)	4.21 ( 4)
Under dose	1.96 ( 1)	4.54 ( 2)	3.16 ( 3)
Therapeutic duplication	3.92 ( 2)	2.27 ( 1)	3.16 ( 3)

Drug interactions

The majorities of DRPs were drug interactions and were due to NSAIDs Vs Antihypertensives (10.5%),

hydrochlorthiazide vs oral hypoglycemics (7.36%) which were observed in both community pharmacies.

**Table 3: Drug Interactions commonly observed in both CP1 & CP2**

Interacting drugs	Effect	CP1	CP2	Overall
		% of DRPs (n=51)	% of DRPs (n=44)	% of DRPs (n=95)
NSAIDs vs antihypertensive	Decreased antihypertensive effect	15.69 ( 8)	4.54 ( 2)	10.5 ( 10)
Hydrochlorthiazide vs oral hypoglycaemic	Decreased oral hypoglycaemic effect	7.84 ( 4)	6.81 ( 3)	7.36 ( 7)
Beta blockers vs oral hypoglycemics	Altered blood glucose level	1.96 ( 1)	9.09 ( 4)	5.26 ( 5)
Metformin vs amlodipine	Compete for elimination of amlodipine	1.96 ( 1)	9.09 ( 4)	5.26 ( 5)
NSAIDs vs glimepride	Increased hypoglycemic	1.96 ( 1)	4.54 ( 2)	3.16 ( 3)
Beta blockers vs etophylline	Antagonist effect with etophylline	1.96 ( 1)	4.54 ( 2)	3.16 ( 3)
Beta blockers vs theophylline	Antagonist effect with theophylline	1.96 ( 1)	4.54 ( 2)	3.16 ( 3)
Colchicines vs atorvastatin	Additive toxicity	1.96 ( 1)	6.81( 3)	3.16 ( 3)

Drug	Frequency of administration		CP1	CP2	Overall
	Actual	Prescribed	% of DRPs (n=51)	% of DRPs (n=44)	% of DRPs (n=95)
Valsartan	Od	Bd	1.96 ( 1)	-	1.05 ( 1)
Pantoprazole	Od	Bd	3.92 ( 2)	4.54 ( 2)	4.21 ( 4)
Metformin	Bd	Od	3.92 ( 2)	2.27 ( 1)	3.16 ( 3)
Betahistine	Oid	Bd	-	2.27 ( 1)	1.05 ( 1)
Levocetirizine	Od	Bd	-	4.54 ( 2)	2.15 ( 2)
Acarbose	Tid	Bd	-	2.27 ( 1)	1.05 ( 1)

Over dose: Study also identified 3 over dose cases as DRPs with Torsamide (overall 3.16%), and with Pioglitazone (overall 1.05%).

Under dose: In our study there were 3 under dose as DRPs (Table 4)

**Table 4: Under dose**

Drug	Dose		CP1	CP2	Overall
	Actual	Prescribed	% of DRPs (n=51)	% of DRPs (n=44)	% of DRPs (n=95)
Enalapril	5mg	2.5mg	1.96 (1)	-	1.05 (1)
Losartan	25-100mg/day	20mg	-	2.27 (1)	1.05 (1)
Isosorbide mononitrate	20mg bd/day	10mg	-	2.27 (1)	1.05 (1)

Wrong frequency:

Drug	Frequency of administration		CP1	CP2	Overall
	Actual	Prescribed	% of DRPs (n=51)	% of DRPs (n=44)	% of DRPs (n=95)
Valsartan	Od	Bd	1.96 (1)	-	1.05 (1)
Pantoprazole	Od	Bd	3.92 (2)	4.54 (2)	4.21 (4)
Metformin	Bd	Od	3.92 (2)	2.27 (1)	3.16 (3)
Betahistine	Qid	Bd	-	2.27 (1)	1.05 (1)
Levocetirizine	Od	Bd	-	4.54 (2)	2.15 (2)
Acarbose	Tid	Bd	-	2.27 (1)	1.05 (1)

Therapeutic duplication: Study identified 3 therapeutic duplication as DRPs which includes Metformin duplication (overall 1.05%).

DRPs classified according to the PCNE classification: Majority of the DRPs coming

under the problem primary domain, interaction (overall 76.84%). Primary domain drug choice problem (overall 3.16%) and dosing problem (overall 20.0%) were also contributed to the total number of DRPs (Table 5).

**Table 5: DRPs classified according to the PCNE classification : Problems**

	Primary domain	Secondary domain	CP1	CP2	Overall
			% of DRPs (n=51)	% of DRPs (n=44)	% of DRPs (n=95)
Problems	Dosing problem	Drug dose too low	1.96 (1)	4.54 (2)	3.16 (3)
		Drug dose too high	5.88 (3)	2.27 (1)	4.21 (4)
		Duration of treatment short	3.92 (2)	6.81 (3)	5.26 (5)
		Duration of treatment long	5.88 (3)	9.09 (4)	7.36 (7)
	Drug choice problem	Inappropriate duplication	3.92 (2)	2.27 (1)	3.16 (3)
	Interaction	Potential interactions	78.43 (40)	75.0 (33)	76.84 (73)

Causes: Causes were also classified according to the PCNE classification (Table 6)

Table 6

	Primary Domain	Secondary domain	CP 1	CP 2	Overall
			% of DRPs (n=51)	% of DRPs (n=44)	% of DRPs (n=95)
Causes	Drug/Dose selection	Inappropriate drug selection	3.92 ( 2 )	2.27 ( 1 )	3.16 ( 3 )
		Inappropriate dosage selection	17.65 ( 9 )	22.72 (10)	20.0 ( 19 )
		Pharmacokinetic problems, incl. ageing/deterioration in organ function and interactions	78.43 ( 40 )	75.0 ( 33 )	76.84 (73)

## DISCUSSION

The variance of DRP occurrence within individual community pharmacies could be justified by the community pharmacies' specific engagement and/or the variability of individual assessment of a problem as drug related. However, community pharmacies indicated that operational time constraints pre underreporting is probably high, with the actual number of DRPs being much higher than indicated in our study.

The scenario of the DRPs was not as expected, the number of DRPs identified in the current study was only 95. potential drug interactions were found to be most common DRPs, among the 108 prescriptions. As no intervention were provided to any of the DRPs cases, because the practice setting dose not permit to do so. However a proper and systematic approach in providing intervention may bring down to the number of DRPs per patient (0.88). The results of the study were not in accordance with the studies describing DRPs. Polypharmacy has been linked to heightened risk of a detrimental health outcome.

DRPs were reported most often in conjunction with the use of NSAIDs, cardiovascular drugs, and insulin. These data were similar to those found in a literature of international studies concerning drug-related visits to an emergency department and the finding that NSAIDs and cardiovascular agents are most often involved in severe drug-drug interactions.<sup>1</sup> The most frequently reported DRPs were drug-drug interactions (76.84 %).

Community pharmacist play a crucial role in Indian health sector owing to their large number as compared people with that of the hospital pharmacist. Present study has been carried out with objectives to know facts like, pharmacist's involvement in patient counseling and pharmacists willingness and abilities to detect, solve and document DRPs in every day routine and to categorize and analyze the different types of DRPs detected in community pharmacies.

Limitations of the study :As a practice setup, it dose not permit to provide any advisory intervention, because any such intervention has to be reported to the prescribed physician. Also the time constraint as the patients were not ready when they have been questioned by the pharmacist and provision of pharmaceutical care in the pharmacy selected for the study were only in the form of patient counseling.

## Conclusion

To demonstrate the pharmacist's role in ensuring safe and efficient use of medicines in daily practice in the community pharmacy setting, the primary objective of this study was to identify the spectrum of DRPs dealt with in community pharmacies.

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