

Research Article



Evaluation of Effective Pharmaceutical Care Interventions in the Identification and Resolution of Drug Related Problems in A Major Trauma Care Centre.

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ABSTRACT

Drug Related Problems are common in hospitalization where there are numerous changes in the dosage of the patient's medication. Pharmaceutical care is an emerging method for maximizing drug treatment, reducing drug related complications and enhancing patient quality of life. The aim of this study is to assess the impact of pharmaceutical care service in detecting and addressing Drug Related Problems in a major trauma care center. The Prospective Interventional hospital study was conducted in 1000 patients who were admitted to medical wards from February to July 2018. The clinical pharmacist has compiled and analyzed data on drug use. Drug Related problems have been identified, analyzed and documented according to PCNE (Pharmaceutical Care Network Europe) V8.02 criteria. PCNE V 8.02 formulated pharmaceutical care plans proposed interventions. 627 Drug Related Problems were identified among 1000 inpatients and interventions were made at prescriber, patient and in drug level. 345 out of 350 potential problems were prevented as a result of the interventions and 268 out of 277 actual problems were resolved. The clinical pharmacists have been involved in dose adjustment, monitoring, evaluation of drug discontinuation, drug substitution and additional therapy, patient counselling, increased dose and reference to prescriber. The evaluation and execution of pharmaceutical care services has a positive impact among the study patients in reducing Drug Related Problems. To the benefit of patients, pharmaceutical care service must be replicated to all other hospitals.

Keywords: Drug Related Problems, Pharmaceutical care Network Europe, Clinical pharmacist, Intervention, Actual Drug related problem, Potential Drug related problem, Pharmaceutical Care.

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INTRODUCTION

Pharmaceutical care is the responsible provision of drug therapy with the aim of achieving definite outcomes that improve quality of life in patients¹. It involves a process where a clinical pharmacist co-operates with a patient and other health care professionals in the design, implementation and monitoring of a therapeutic plan that will produce definite outcomes for the patient.² The main purpose of the procedure is to create, execute and track a therapeutic plan/ establish, execute and monitor the therapeutic plan³. A Drug Related Problem is defined as any incident or condition involving drug treatment that interferes or potentially interferes with the patient achieving the desired outcome of medical care.⁴ DRPs may contribute to decreased quality of life, increased hospital stay, overall increase health costs and even increase risk

of morbidity and mortality.⁵⁻⁷ Clinical pharmacists can play a significant role in this. Actual DRPs are events that have already taken place in patients, whereas a potential DRP is an event that is likely to develop if clinical pharmacists do not take appropriate measures.

Implementation of pharmaceutical care services in patient care showed improvement in medication adherence to medication, with reduced prescribing errors. Providing pharmaceutical care services, a more optimal, safe, cost effective and individualized treatment can be given, thereby solving drug related problems.⁸

MATERIALS AND METHODS

Study design and population

For a period of 6 months from 1 February 2018 to 31 July 2018, a prospective interventional study was conducted in Ganga Medical Center, Coimbatore. The total number of patients who participated in the study was 1000. The study included surgical in-patients, male as well as female. Pregnant women, outpatients and those with psychiatric illness were excluded. From admission to discharge all patients who met the inclusion criteria were followed during the research. The data were collected using a well-structured form of data collection that includes demographics of patients, diagnosis, problems



with drug selection, dose related problems, possible drug interactions, adverse drug reactions and other events related to medication. The patient's case sheets were periodically checked and all the drug related problems found had been reported in the data collection method intended for this research.

DRPs were categorized using the PCNE classification (V8.02)⁹ as actual and potential DRPs. This classification of PCNE was categorized into problems, causes, planned interventions, acceptance and status of DRP. Pharmaceutical care has been applied by providing information related to the drug, illness and diet. Naranjo Scale analysed and reported ADRs.

Data analysis

The data gathered have been updated in spreadsheets using Microsoft Office Excel 2013. DRPs have been identified, assessed and recorded according to the criteria PCNE (Pharmaceutical Care Network Europe) V8.02.

RESULTS AND DISCUSSION

Characteristics of study population

A total of 1000 patients from various orthopaedic departments such as trauma, plastic, spine, arthroplasty, arthroscopy in a trauma care center were analysed during the study. Out of the 1000, 627 were found to have drug related problems of which 410 (65.39%) and 217 (34.60%) were seen in males and females respectively. Most DRPs occurred in the age group of 61- 70 years. Gender and age wise distribution are listed in Table 1.

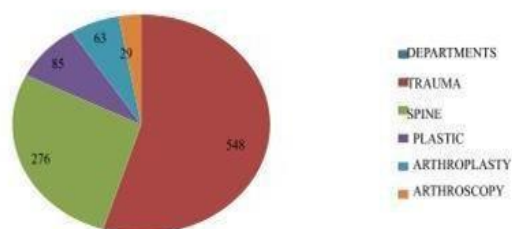
Table 1: Demographic data.

Sex	Total No. of Cases (N=627)	Percentage (%)
Male	410	65.59
Female	217	34.60
Age group		
18-30	122	19.45
31-50	138	22.00
51-70	260	41.46
>70	107	17.06

Incidence of Drug Related Problems

Total occurrence of drug related problems between different departments are outlined in Figure 1. Majority of drug related problems were from the trauma section. Being a major trauma care centre, more cases with road traffic accidents, traumatic car crash injuries, gunshot wounds, major burns, serious falls etc. were admitted.

INCIDENCE OF DRPs AMONG VARIOUS DEPARTMENTS



Classification of Drug Related Problems

627 drug related problems found have been listed on the basis of the PCNE V8.02 criteria which is shown in Table 2-6.

The most common type of problem among 627 DRPs was found to be unclear problems/complaints (61.4%) which required patient counseling followed by poor treatment effectiveness (27.27%). Due to lack of awareness among

the patients (49.76%), the majority of DRP was found to be poor compliance followed by improper drug selection (22.56%) and dose selection (16.58%). Interventions were performed from which 320 (32%) of interventions were performed by patients, caregivers or relatives which was basically patient counselling. Acceptance rates of intervention was highest at prescriber level 610 (61.0%). Most of the problems were partially solved in the case of DRP status 320 (32.0%).

Evaluation of pharmaceutical care interventions

627 interventions have been conducted and recorded in this report. Of those, 315 were related to drug therapy and 312 involved educational provisions. By the end of the study, 55.02% of potential DRP and 44.17% of the actual DRP were involved in the interventions. All of the health education initiatives we've created have been welcomed and adopted by the patients. Many actual and potential DRP remained unresolved or not stopped from doing so. The resolution and prevention of these DRPs required modification in the drug regimen which was solely based on a medical decision. Problems with drug therapy addressed and prevented are illustrated in Figure 2.

This study prevented 350 potential DRPs and resolved 277 actual DRPs.



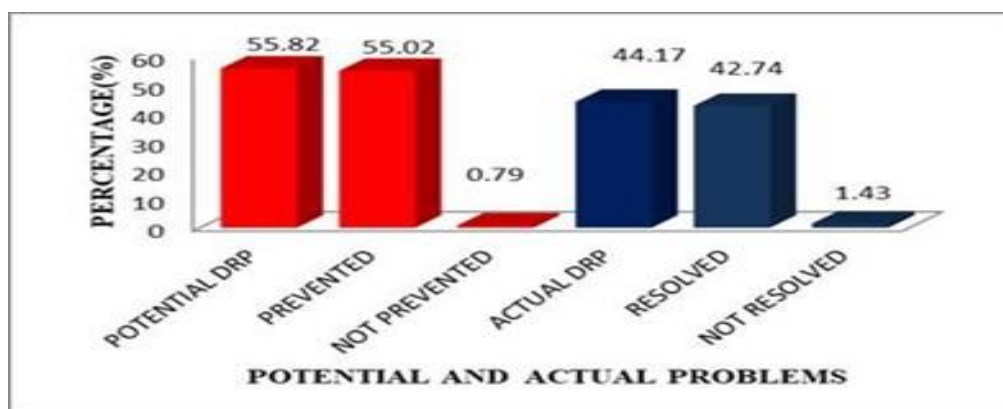


Figure 2: Quantitative distribution of Drug related problems Resolved and Prevented.

Table 2: Problems

Code	Problems	Total no. cases	Percentage (%)
P1	Treatment effectiveness	171	27.27
P1.1	No effect of drug treatment	9	1.43
P1.2	Effect of drug treatment not Optimum	152	24.24
P1.3	Untreated symptoms/indications	10	1.59
P2	Treatment safety	57	9.09
P2.1	Adverse drug event (possibly) Occurring	57	9.09
P3	Others	399	63.95
P3.1	Problems with cost effectiveness of the treatment	2	0.3
P3.2	Unnecessary drug treatment	12	1.9
P3.3	Unclear problem/complaint	385	61.4

Table 3: Causes

Code	Causes	Total No. Cases	Percentage (%)
C1	Drug selection	141	22.56
C1.1	In appropriate drug according to guideline/formulary	23	3.67
C1.2.	Inappropriate drug	95	15.15
C1.3	No indication of drug	0	0
C1.4	Inappropriate combination of drug	0	0
C1.5	Inappropriate duplication of therapeutic group	10	1.59
C1.6	No drug treatment in spite of existing indication	9	1.43
C1.7	Too many drugs	4	0.63
C2	Drug form	0	0
C2.1	Inappropriate drug form	0	0
C3	Dose selection	104	16.58
C3.1	Drug dose too low	4	0.63
C3.2	Drug dose too high	26	4.14
C3.3	Dosage regimen not frequent enough	2	0.31
C3.4	Dosage regimen too frequent	10	1.59
C3.5	Dose timing instructions wrong, unclear and missing	62	9.88
C4	Treatment duration	1	0.159
C4.1	Duration of treatment too short	0	0
C4.2	Duration of treatment too long	1	0.159
C5	Dispensing	39	6.22

C5.1	Prescribed drug not available	3	0.47
C5.2	Necessary information not provided	33	5.26
C5.3	Wrong drug, strength or dosage advised (OTC)	0	0
C5.4	Wrong drug/strength dispensed	3	0.47
C6	Drug use process	29	4.62
C6.1	Inappropriate Timing of administration and/or dosing intervals	5	0.79
C6.2	Drug under administered	16	2.55
C6.3	Drug over administered	5	0.79
C6.4	Drug not administered at all	1	0.159
C6.5	Wrong drug administered	2	0.31
C6.6	Drug administered via wrong route	0	0
C7	Patient related	1	0.159
C7.1	Patient uses/ takes less drug than prescribed or does not take the drug at all	1	0.159
C7.2	Patient uses/ takes more drug than prescribed	0	0
C7.3	Patient abuses drug	0	0
C7.4	Patient uses unnecessary drug	0	0
C7.5	Patient takes food that interacts	0	0
C7.6	Patient stores drug inappropriately	0	0

Table 4: Planned Interventions.

Code	Planned Interventions	Total No. Cases	Percentage (%)
I1	At prescriber level	293	46.73
I1.1	Prescriber informed only	77	12.28
I1.2	Prescriber asked for information	6	0.95
I1.3	Information proposed to prescriber	138	22
I1.4	Intervention discussed with prescriber	72	11.48
I2	At patient level	320	51.03
I2.1	Patient (drug) counseling	288	45.93
I2.2	Written information provided	12	1.91
I2.3	Patient referred to the prescriber	0	0
I2.4	Spoken to family member	20	3.18
I3	At drug level	57	9.09
I3.1	Drug changed to	15	2.39
I2.4	Spoken to family member	20	3.18
I3	At drug level	57	9.09
I3.1	Drug changed to	15	2.39
I3.2	Dosage changed to	2	0.31
I3.3	Formulation changed to	0	0
I3.4	Instructions for use changed to	2	0.31
I3.5	Drug stopped	35	5.58
I3.6	New drug started	3	0.47
I4	Other intervention/ activity	26	4.14
I4.1	Other intervention (specify)	6	0.96
I4.2	Side effects reported to authorities	20	3.18

Table 5: Acceptance of DRP

Code	Implementation	Total No. Of Cases (N=627)	Percentage (%)
A1	Intervention accepted	610	97.28
A1.1	Intervention accepted and fully implemented	271	43.22
A1.2	Intervention accepted partially	23	3.66
A1.3	Implemented Intervention accepted, but not	2	0.31
A1.4	Implemented Intervention accepted, Implementation unknown	314	50.07
A2	Intervention not accepted	12	1.91
A2.1	Intervention not accepted; not feasible	0	0
A2.2	Intervention not accepted, no agreement	0	0

Table 6: Status of DRP

Code	Outcome of The Interventions	Total No. of Cases(N=627)	Percentage (%)
O0	Not known	13	2.07
O0.1	Problems status unknown	13	2.07
O1	Solved	280	44.65
O1.1	Problem totally solved	280	44.65
O2	Partially solved	320	51.03
O2.1	Problem partially solved	320	51.03
O3	Not solved	14	2.23
O3.1	Problem not solved, lack of cooperation of patient	2	0.31
O3.2	Problem not solved, lack of cooperation of prescriber	9	1.43
O3.3	Problem not solved, intervention not effective	3	0.47
O3.4	No need or possibility to solve the problem	0	0

CONCLUSION

The overall observation through this study was that by systematically implementing the pharmaceutical care process, the clinical pharmacist has a greater responsibility in preventing and minimizing drug related problems. This may potentially reduce the unnecessary hospital stay, readmission, laboratory monitoring and drug expenditure on drugs.

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Abbreviations

PCNE: Pharmaceutical Care Network Europe; **DRP:** Drug Related Problem.

Summary

The present study was conducted to assess the effect of pharmaceutical care service on the identification and resolution of Drug Related Problems in a major trauma care centre. Drug related problems can be minimized by educating the physicians, nurses and other healthcare professionals on appropriate reporting of medication

errors, monitoring of adverse reactions, drug interactions etc. The study highlights a potential opportunity in the pharmaceutical care process for the clinical pharmacist.

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