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Research Letter

A study of medication-related problems in stroke patients: A need for pharmaceutical care

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ABSTRACT

Objective: The study was aimed to assess the incidence and characteristics of drug-related problems (DRPs).
Methods: A prospective, observational study was conducted among 133 patients with stroke disease who were aged 18 years or older and admitted to the general medicine ward. During the 6 months study period, the incidence of DRPs was identified using the Pharmaceutical Care Network Europe Foundation classification system, version 6.2.
Findings: A total of 133 patients were screened for DRPs. Among them, 120 patients have at least one DRP. A total of 254 DRPs were identified (on average, 2.015 DRPs per each patient case).
Conclusion: Increasing the evidence of the incidence of medication-related problems in tertiary care hospitals indicates the need for the establishment of a clinical pharmacist in hospital settings.

Keywords: Drug-related problems; incidence; pharmaceutical care; prospective study; stroke

INTRODUCTION

Drug therapy is getting more complex, thus making it more challenging for physicians to prescribe appropriate drug therapy. Accordingly, in clinical practice, a wide range of drug-related problems (DRPs) may rise; they are common in hospitalized patients and can result in patient morbidity and mortality and increased costs.[1,2] Identifying, preventing, and resolving DRPs are an important issue in the pharmaceutical care process.[1] DRP, defined as an event or circumstance that actually or potentially interferes with desired health outcomes, can lead to ineffective pharmacotherapy and may cause drug-related morbidity and mortality.[3]

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Pharmacists have paramount importance in identifying DRPs, treating actual DRPs, and preventing potential DRPs using methods of pharmaceutical care practices. An actual DRP is an event that has already been evident in a patient while potential DRP is an event that was not yet evident but it is likely to be evident in the patient if pharmacists do not make any appropriate interventions.[4]

Several studies revealed that patients suffering from a stroke are at high risk for the possible occurrence of DRPs due to polypharmacy, elderly age, and comorbidities. Hence, identifying DRPs are an important priority for healthcare professionals for improving the health-related quality of life in

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stroke patients.[5,6] The study was aimed to assess medication-related problems in stroke patients of general medicine.

METHODS

A prospective observational study was carried out for 6 months (from January 2014 to June 2014) in stroke patients admitted to the general medicine ward of Dr. Pinnamaneni Siddhartha Institute of Medical Sciences and Research Foundation, which is a 850 bedded tertiary care teaching hospital at Chinaoutpalli, Gannavaram, Andhra Pradesh (India). The study protocol was approved by institutional ethics committee of our institute (Protocol No.: KVSRSCOPS/IEC/2014/004).

Patients aged >18 years of either gender diagnosed with any stroke illness who admitted to inpatient ward of general medicine in the given study period were included. The exclusion criteria set as outpatients, pregnant patients, and pediatrics.

A total of 133 patients who met the inclusion criteria were recruited in the study. Patient demographics, disease-specific information such as reason for admission, medical history, and past medication history were collected in a specially designed data collection form. During the study period, patients were reviewed on a daily basis, and any change either in the drug chart or in the laboratory details was collected. The collected data were analyzed and interpreted for the assessment of DRPs using standard databases such as Micromedex® and Lexicomp®. The DRPs were categorized using Pharmaceutical Care Network Europe (PCNE) version 6.2 classification.[3,7]

RESULTS

A total of 133 patients were screened for DRPs. Among them, 120 patients have at least one DRP. A total of 254 DRPs were identified (on average, 2.015 DRPs per each patient). As per PCNE classification, the problems and the causes associated with the DRPs were categorized. The problem of the wrong effect of drug treatment was found to be the highest which accounted for 35.03% of DRPs followed by that of the suboptimal effect of drug treatment with 32.28%; the remaining data were presented in Table 1. Among different causes of DRPs that were identified during the study, the problems caused due to the requirement of the prophylactic drug were found to be the highest with 27.66% which is followed by problems caused due to inappropriate drug combination with 16.60%. The percentage of different causes of DRPs was mentioned in Table 2.

Table 1: Classification of drug-related problems as per Pharmaceutical Care Network Europe Foundation classification system version 6.2

PCNE code	Detailed classification	*n* (%)
P1	Treatment effectiveness	202 (79.53)
P1.1	No effect of drug treatment/therapy failure	-
P1.2	Effect of drug treatment not optimal	82 (32.28)
P1.3	Wrong effect of drug treatment	89 (35.03)
P1.4	Untreated indication	31 (12.20)
P2	Adverse reactions	6 (2.36)
P2.1	Adverse drug event (nonallergic)	6 (2.36)
P2.2	Adverse drug event (allergic)	-
P2.3	Toxic adverse-drug-event	-
P3	Treatment costs	10 (3.94)
P3.1	Drug treatment more costly than necessary	-
P3.2	Unnecessary drug-treatment	10 (3.93)
P4	Others	36 (14.17)
P4.1	Patient dissatisfied with therapy despite optimal clinical and economic treatment	-
P4.2	Further clarification necessary	36 (14.17)
Total		254 (100)

PCNE=Pharmaceutical Care Network Europe

DISCUSSION

A total of 254 DRPs were detected in 120 patients, with an average incidence rate of 2.015 DRPs per patient. This finding is in agreement with a recent study with an almost equivalent sample size (193), which also used the PCNE classification system, who reported 2.2 ± 1.6 per patient.[8] The incidence of DRPs was high (36.36%) among the patients aged between 51 and 60 years regarding the number of drugs; patients receiving 6–10 drugs were found to have more DRPs (59.39%). This observation was supported by a national survey of pharmacy practice in hospital settings.[9]

The frequency of causes in Chan e*t al.* (2014) was higher in comparison to the number of causes identified in our study. This discrepancy of results mainly attributed to the reason that most of the problems identified were matched with the one most relevant cause rather than several causes. According to Arauz-Pacheco *et al*. and Joint National Committee-8 classification, angiotensin-converting enzyme inhibitors are preferred over calcium channel blockers in stroke patients with hypertension.[10,11] The proportion of DRPs observed in this study was not in line with other similar studies.[12-14]

Growing evidence of the incidence of medication-related problems in tertiary care hospitals indicates the need for the establishment of clinical pharmacist position in hospital settings.

Table 2: Causes of drug-related problems as per Pharmaceutical Care Network Europe classification system version 6.2

PCNE code	Detailed classification	*n* (%)
C1	Drug selection	194 (76.38)
C1.1	Inappropriate drug (including contraindicated)	42 (16.60)
C1.2	No indication for drug	-
C1.3	Inappropriate combination of drugs, or drugs and food	37 (14.62)
C1.4	Inappropriate duplication of therapeutic group or active ingredient	10 (3.93)
C1.5	Indication for drug treatment not noticed	31 (12.25)
C1.6	Too many drugs prescribed for indication	1 (0.39)
C1.7	More cost-effective drug available	-
C1.8	Synergistic/preventive drug required and not given	70 (27.66)
C1.9	New indication for drug treatment presented	4 (1.58)
C2	Drug form	-
C2.1	Inappropriate drug form	-
C3	Dose selection	20 (7.87)
C3.1	Drug dose too low	15 (5.92)
C3.2	Drug dose too high	5 (1.97)
C3.3	Dosage regimen not frequent enough	-
C3.4	Dosage regimen too frequent	-
C3.5	No therapeutic drug monitoring	-
C3.6	Pharmacokinetic problem requiring dose adjustment	-
C3.7	Deterioration/improvement of disease state requiring dose adjustment	-
C4	Treatment duration	1 (0.39)
C4.1	Duration of treatment too short	1 (0.39)
C4.2	Duration of treatment too long	-
C5	Drug use process	1 (0.39)
C5.1	Inappropriate timing of administration and/or dosing intervals	1 (0.39)
C5.2	Drug underused/under-administered (deliberately)	-
C5.3	Drug overused/over-administered (deliberately)	-
C6	Logistics	37 (14.57)
C6.1	Prescribed drug not available	-
C6.2	Prescribing error (necessary information missing)	37 (14.57)
C7	Patient	1 (0.39)
C7.1	Patient forgets to use/take drug	1 (0.39)
C7.2	Patient uses unnecessary drug	-
C7.3	Patient takes food that interacts	-
C7.4	Patient stored drug inappropriately	-
C8	Other	-
C8.1	Other cause; specify	-
C8.2	No obvious cause	-
Total		254 (100)

PCNE=Pharmaceutical Care Network Europe

AUTHORS' CONTRIBUTION

Viswa Srujani Kanagara, Annapareddy Anusha, Bhukya Srinivasa Rao played key role in acquisition of data from clinical records. Siva Reddy Challa initiated idea of work and prepared the manuscript. Krishna Sri Nalla and Raja Sree Gadde has analyzed the data and prepared the tables.

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Conflicts of interest

There are no conflicts of interest.

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