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Frequency and prevalence of drug therapy related problems after hospitalization

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Abstract

Background: Drug-related problems (DRPs) are perceived to occur frequently when patients are discharged from the hospital. Drug-related problems (DRP) are "an event or circumstance involving drug therapy that actually or potentially interferes with the desired health outcome". Pharmacists influence health care outcomes through the identification and resolution of drug related problems (DRPs).

Aim and objectives: The study is aimed to assess the frequency and prevalence of drug therapy related problems in patients after hospitalization in Jayabharath Hospital, Nellore. To estimate the opportunities for pharmacist to provide pharmaceutical care. A probabilistic convenient sampling was done to estimate the frequency and prevalence of drug therapy related problems, patients those who are aged above 18 years of either sex were included. Pregnant patients, and those who are having a unwillingness to participate in study were excluded.

Methodology: This cross sectional study was conducted between December 2020 to May 2021 on patients who discharged to home from Jayabharath Hospital, Nellore . . Most of our study population were within the age group of 30 to 45years (33.33 %) followed by 60 to 75years (25.00 %).among the present study population most of them were married (83.3 %) and illiterates (62.5 %).

Results and Discussion: Nearly 50 drugs are responsible for drug related problems in the present study among those Phenytoin was found to be leading drug in relation to development of drug therapy related problems, Where as Nifedipine was found to be least problem producing drug in present study population.

Conclusion: Overall we found various kinds of drug therapy related problems, which implies there is a need of continuity of care even after discharge from the hospital.

Introduction

Pharmaceutical care

Pharmaceutical care is the responsible provision of drug therapy for the purpose of achieving definite outcomes that improve a patient's quality of life. It involves the process through which a pharmacist cooperates with a patient and other professionals in designing, implementing, and monitoring a therapeutic plan that

will produce specific therapeutic outcomes for the patient. This in turn involves three major functions:

- Identifying potential and actual drug-related problems;
- Resolving actual drug-related problems; and
- Preventing drug-related problems.

Pharmaceutical care is a necessary element of health care and should be integrated with other elements. Pharmaceutical care is, however, provided for the direct benefit of the patient, and the pharmacist is responsible directly to the patient for the quality of that care. The fundamental relationship in pharmaceutical care is a mutually beneficial exchange in which the patient grants authority to the provider, and the provider gives competence and commitment (accept responsibility) to the patient. The fundamental goals, processes, and relationships of pharmaceutical care exist regardless of practice setting [1]. Principles of Practice for Pharmaceutical Care:-A professional relationship:

Interaction between the pharmacist and the patient must occur to assure that a relationship based upon caring, trust, open communication, cooperation, and mutual decision-making is established and maintained. In this relationship, the pharmacist holds the patient's welfare paramount, maintains an appropriate attitude of caring for the patient's welfare, and uses all his/her professional knowledge and skills on the patient's behalf [2].

Maintenance and documentation of patient information:

Pharmacists must collect and/or generate subjective and objective information regarding the patient's general health and activity status, past medical history, medication history, social history, diet and exercise history, history of present illness, and economic situation. Sources of information may include, but are not limited to, the patient, medical charts and reports, direct patient interview by pharmacist, obtaining information from the patient's family or caregiver, insurer, and other healthcare providers including physicians, nurses, mid-level practitioners and other pharmacists [2].

Evaluation of patient medical information and development of drug therapy plan:

Based upon a thorough understanding of the patient and his/her condition or disease and its treatment, the pharmacist must, with the patient and with the patient's other healthcare providers as necessary, develop an outcomes-oriented drug therapy plan. The plan may have various components which address each of the patient's diseases or conditions. In designing the plan, the pharmacist must carefully consider the psycho-social aspects of the disease as well as the potential relationship between the cost and/or complexity of therapy and patient adherence. As one of the patient's advocates, the pharmacist assures the coordination of drug therapy with the patient's other healthcare providers and the patient [2].

Aim of the Study

To assess the frequency and prevalence of drug therapy related problems in patients after hospitalization.

Objective of the Study

To estimate the opportunities for the pharmacist to provide pharmaceutical care.

To develop new and improved strategies to prevent drug use and its consequences.

To develop new and improved treatments to help people with substance use disorders achieve and maintain a meaningful and sustained recovery.

To explain the importance of patient education about the disease, drugs, and highly possible DRPs.

Study Design

A cross-sectional observational study design.

Study Site

Our study was conducted at Jaya Bharath Hospital, Nellore.

Study Period

December 2020 to May 2021(6 months).

Study Subjects

Subjects who are suffering from adverse events after hospitalization.

Sample Size

Enrolled 100 Patients during these studies of which 72 are included with DRPS.

Study Material

- Individual Patient data collection form
- Patient informed consent form
- Patient counselling forms
- Patient’s case reports

Ethical Approval

Ethical committee clearance was obtained from institutional ethics committee permitted to perform the research and they permitted to continue the study.

Patient Enrolment

Patients are included in the study by taking prior permission from the patient by using the patient informed consent form.

Inclusion Criteria

Patients who are aged above 18 years of either sex were included in the study.

Exclusion Criteria

The patients with pregnancy and lactation.
Patients who are unwilling to participate in the study.

Study Procedure

- A cross-sectional observational study was conducted in December 2020 and May 2021 in Jayabharath Hospital, Nellore, India. This study was approved by the Institution Review Boards of Jayabharat Hospital, Nellore, India. All the subjects were data obtained from the medical record department of Jayabharath Hospital, Nellore.
- Subjects without pregnancy, of any gender who are suffering from adverse reactions. Who I underuse of medication, drug duplication, drug-drug interactions, therapy failure, practical problems of administrating doses, and missing doses were included in the study. Totally 100 patients with the above reasons were included in the study remaining are excluded.

Results

The demographic details are presented in Table I. It shows that most of the people in the present study were within the age group of 30 to 45years (33.33 %) followed by 60 to 75years (25.00%).among the present study population most of them were married (86.11%), salaried (33.33%), illiterates (97.64 %), less than medications taken (58.33%) and hospitalized in past year patients are (81.94%) The present study comprises of more than 40 % of patients with more than or equal to five medications and also around 80% of patients are having a history of the previous hospitalization.

Table I: Demographic characteristics of the study subjects

S. No	Characteristics details	Number of subjects N=72 (%)
1	**Age:**	
	18 – 30 years	10(13.88)
	30 – 45 years	30(33.33)
	45 – 60 years	14(19.44)
	60 – 75 years	18(25.00).
2	**Marital status:**	
	Married	62(86.11)
	Unmarried	10(13.88)
	Divorced	00(00.00)
	Widowed	00(00.00)
3	**Occupation:**	
	Business	18(25.00)
	Farmer	16(19.44)
	salaried	24(33.33)
	Daily wager	12(13.88)
	Student	2(2.16)
4	**Educational status:**	
	Illiterate	68(97.64)
	Primary school	0
	High school	1(1.38)
	Inter	3(4.16)
	Degree	0
5	**No. of medications:**	
	Less than five	42(58.33)
	More than five	30(41.66)
6	**Hospitalized in the past year:**	
	Hospitalized	59(81.94)
	Non hospitalized	0
	Unavailable	13(18.05)

Various kinds of drug therapy-related problems are described in Table II and their Frequency and prevalence were detailed in Table III. We found drug-drug interactions are the most frequent kind of drug-related problems, which included only one interaction (37.5%) and more than one interaction per patient (62.5%). Additive toxicity was found to be the second-highest25 %) of the drug-related problem she present study subjects, and we do not fondly any drug-related problems related to the Duration of therapy.

Table II: Classification of drug therapy-related problems

Types of drug-related problems
1. Uncertainty and lack of knowledge. 2. Underuseuse of medication. 3. Overuseuse of medication. 4. Other dosage problems. 5. Drug duplication. 6. Drug-Drugrug interactions. 7. Therapy failure. 8. Side effect. 9. Difficulty swallowing/difficulty in dosage. 10. Practical problems of administering the dose. 11. Language difficulty/understanding disability. 12. Prescribing errors such as incorrect or omitted data on prescribing drugs. 13. Other problems such as wrong indications and contraindications. 14. 14. Missing doses.

Table III. Frequency and prevalence of drug related problems:

S.No	Drug related problemcategory	No. of Patients withat least one DRP (%)	No. of Patients with more than one DRP (%)
1	Therapeutic Duplication	8(11.11)	4(5.55)
2	Dosage form problems	2(2.77)	1(1.38)
3	Untreated indication	6(8.33)	2(2.77)
4	Duration of therapy	0(0.00)	0(0.00)
5	Drug - Drug interactions	27(37.50)	45(62.50)
6	Additive toxicity	12(16.66)	18(25.00)
7	Non adherence	2(2.77)	1(1.38)
8	Treatment of noindication	1(1.38)	10(13.99)
9	Subtherapeutic dose	0(0.00)	1(1.38)
10	Improper drug selection	8(11.11)	3(4.16)

Table IV: explains Drug-Drug interactions (140.44) and adverse drug reactions (122.33) are the most commonly found Drug-related problems which are clinically significant and even considered prime criteria to resolve the issue according to Beer's criteria. Social history, recreational drug use, and adverse drug reactions make the drug therapy-related problems to be more severe.

Table IV. Drug therapy problems according to Beers criteria

S.No	Type of drug therapy problems	Outcome of problem		Priority of problem			Severity of problem		
		Clinical	Non clinical	Primary	Secondary	Tertiary	Minor	Moderate	Major
1	Untreated indication	8(11.33)	2(2.77)	2(2.77)	3(4.16)	6(8.33)	6(8.33)	3(4.16)	2(2.77)
2	Improper drug selection	10(13.99)	4(5.55)	4(5.55)	2(2.77)	8(11.33)	8(11.33)	2(2.77)	4(5.55)
3	Sub therapeutic dose	1(1.38)	0	0	1(1.38)	0	0	1(1.38)	0
4	Over dose	1(1.38)	0	0	0	1(1.38)	1(1.38)	0	0
5	Adverse drug reaction	86(119.55)	2(2.77)	21(29.16)	67(93.05)	1(1.38)	1(1.38)	67(93.05)	21(29.16)
6	Drug drug interaction	141(139.5)	1(1.38)	42(58.33)	81(112.5)	18(25.0)	18(25.0)	81(112.5)	42(58.33)
7	Non adherence	1(1.38)	3(4.16)	0	2(2.77)	2(2.77)	2(2.77)	2(2.77)	0
8	No indication	12(16.66)	2(2.77)	3(4.16)	4(5.55)	5(6.94)	5(6.94)	4(5.55)	3(4.16)
9	Social, recreational drug use	30(41.55)	0	27(37.5)	3(4.16)	0	0	3(4.16)	27(37.5)
10	Patient knowledge on drug therapy	0	12(16.66)	0	0	12(16.66)	12(16.66)	0	0

Table V. Shows various drugs responsible for the drug-related problems in the present study population. Nearly 50 drugs are responsible for drug-related problems in the present study among those Phenytoin was found to be the leading drug in relation to the development of drug therapy related problems, Whereas Nifedipine was found to be least problem-producing drug the in the present study population.

Table V. Drugs implicated for problems

Drugs	Number = (%)
Amoxicillin	10(22.72)
Amikacin	5(11.36)
Ceftriaxone	7(15.90)
Doxycycline	4(9.09)
Erythromycin	3(6.81)
Vancomycin	2(4.54)
Azithromycin	8(18.18)
Ciprofloxacin	4(9.09)
Furosemide	7(15.90)
Spiranolactone	3(6.81)
Digoxin	2(4.54)
Atorvastatin	5(11.36)
Amlodipine	6(13.63)
Simvastatin	2(4.54)
Nifedipine	1(2.27)
Lisinopril	3(6.81)
Ramipril	9(20.54)

Propronolol	8(18.18)
Atenolol	6(13.63)
Rifampicin	12(27.27)
Isoniazid	11(25.0)
Ranitidine	16(36.36)
Phenytoin	21(47.72)
Carbamazepine	12(27.27)
Valproic acid	7(15.90)
Diazepam	18(40.90)
Fluoxetine	12(27.27)
Clomipramine	8(18.18)
Trazadone	6(13.63)
Amitryptalin	2(4.54)
Tramadol	5(11.36)
Salbutamol	6(13.63)
Terbutaline	4(9.09)
Prednisolone	9(20.54)
Aspirin	8(18.18)
Celecoxib	6(13.63)
Metformin	9(20.54)
Glimepramide	12(27.27)
Omeprazole	8(18.18)
Paracetamol	16(36.36)
Ibuprofen	6(13.63)
Diclofenac	5(11.63)
Cetrizine	6(13.63)

Discussion

The present study shows that DRPs among patients discharged from the hospital 93.7% of patients in this study reported DRPs. Although most DRPs do not seem to have direct clinical complications, they could lead to patient education nonadherence which is another drug therapy-related problem that affects the patient's psychology to avoid the medications in near future [45]. The present study results show that there is a huge number of drug-related problems which implies that there is a need for care by health care professionals even after hospitalization, preferably by pharmacists to prevent or resolve those drug-related problems, this confirms discharged patients are an important target group for pharmacy interventions [46]. In a study, the medication review performed by the pharmacists resulted in 476 identified DRPs of which the most common was adverse drug reaction (119.8%), commonly caused by a dose that was too high and not adjusted to the patient's physical status and elimination capacity. The second most common DRP was the need for additional drug therapy and unnecessary drug therapy (86%). 44 But in our study we observed Drug-Drug interactions and adverse drug reactions as the most common drug therapy problems (219.15) [45-47]. Several authors have reported that a follow-up home visit by a pharmacist had no benefit for patients who had been discharged from hospital. It is difficult to reconcile those data with data illustrating the benefit of medication-related support during the discharge period, but those trials were less focused on identifying and resolving drug-related problems or that the support was not received early enough after the time of discharge. However, these contradictory data represent an opportunity for further investigation into what so the test of the best support for patients with their medication therapy can be provided by pharmacists after discharge from acute care [48-51]. Varying distributions of DRPs in relation to different types of drugs have been reported in previous studies. But in the present study gastrointestinal drugs and central nervous system drugs were highly involved. Our finding shows that the number of new drugs, continued drugs, and changes in dosage at discharge is independently associated with the occurrence of DRPs which is similar to the results of other hospital-based studies.46.In a previous study, 12% of all visits to the emergency department were due to adverse drug events; 68% of these adverse events were considered preventable in both of the studies. A consultation with a pharmacist after discharge from the hospital presents an opportunity for these errors to be identified and recommendations to be made. It also provides an opportunity to improve patients' knowledge of their medications [50].

Conclusion

Overall we found various kinds of drug therapy-related problems, which implies there is a need of continuity of care even after discharge from the hospital. Preferably pharmacist's intervention will be useful to reduce these problems, which clearly shows a greater opportunity for pharmacists to provide pharmaceutical care to the patients who are discharged from the hospital.

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