Research Article
AMERICAN JOURNAL OF PHARMACY AND HEALTH RESEARCH
www.ajphr.com
2015, Volume 3, Issue 6
ISSN: 2321–3647(online)

Implementation of Clinical Pharmacists Activities in Identifying Drug Therapy Problems and Improving Medication Adherence to Provide Better Patient Care

Ravali Gundu*[1], Madhu Kandi[2], Anusha Yaruva[3]
1. 2-2-1164/1/1, Tilak Nagar, Hyderabad-44.
2. 17-3-306/3, Nanamiya Thota, Kareemabad, Warangal-02.
3. 24/7/56, Fathima Nagar, Hanumakonda-02.

ABSTRACT

The role of a clinical pharmacist is to maximize the clinical effects of medicines by ensuring the selection of the most effective drugs for each patient, minimizing adverse drug events by monitoring the drug therapy course of the patient and improving the patient's adherence with the drugs. To implement the clinical pharmacist activities in identifying drug therapy problems and improving medication adherence for a better patient care. The prospective observational study was conducted over a period of 6 months. The necessary data was collected from in-patient case notes, treatment charts, interview with patients or patient care givers and nursing staff. The collected data was analyzed to determine the patient drug therapy problems. This study was conducted in a tertiary care hospital for a period of 6 months. A total of 112 patients drug therapy were followed during the six months study period out of which 95 patients had drug therapy problems (DTPs). A total of 182 DTPs were identified in 95 patients, the frequency of DTPs was 1.9 percent per patient. Among 182 DTPs 102 (56%) were identified in males and 80 (43%) were identified in females. The identified DTPs are Adverse drug reactions 4 (2.19%), Interactions 118 (64.84%), Drug selection 56 (30.77%), Drug use 3 (1.65%), Monitoring 1 (0.55%) and Patient/Provider 12 (35.29%). In our study we have showed the importance of clinical pharmacy services in identifying drug therapy problems, so that they can be minimized to decrease the chances of morbid condition and improve better patient care.

Keywords: Clinical pharmacists, Drug Therapy Problems, medication adherence.

*Corresponding Author Email: Ravali309@gmail.com
Received 23 May 2015, Accepted 30 May 2015

Please cite this article as: Gundu R *et al.*, Implementation of Clinical Pharmacists Activities in Identifying Drug Therapy Problems and Improving Medication Adherence to Provide Better Patient Care. American Journal of Pharmacy & Health Research 2015.

INTRODUCTION

Clinical pharmacy is defined as the area of practice in which pharmacists provide patient care that optimizes medication therapy and promotes health, wellness and disease prevention[1]. Clinical pharmacy was also defined as those services provided by pharmacists in an attempt to promote rational drug therapy that is safe, appropriate and cost effective (Hughes 1998)[2]. The practice of clinical pharmacy embraces the concepts of both pharmaceutical care[3] and medicines management to optimize the desired outcomes of patient care[4] and it is most effective when it is practiced within a healthcare team in close collaboration with the medical and nursing professions[5].

The Role of a Clinical Pharmacist

The role of a clinical pharmacist is to maximize the clinical effects of medicines by ensuring the selection of the most effective drugs for each patient, minimizing adverse drug events by monitoring the drug therapy course of the patient and improving the patient's adherence with the drugs[6]. Clinical pharmacists also contribute to minimizing the costs of drug therapy and health care by providing cost effective alternatives[7]. Clinical pharmacists are uniquely trained in therapeutics and provide comprehensive drug management to patients and providers (includes physicians and additional members of the care team)[8]. The objective of prescribing drugs to the patients is either for prophylaxis or diagnosis of medical condition or treat a clinical condition. Drugs play an important role in management of the disease.[9]Drug therapy problem is defined as an event or circumstances involving drug treatment that interferes or potentially interferes with the patient achieving an optimum outcome of medical care[9]. Drug therapy problems are frequent and may result in reduced quality of life, and even morbidity and mortality. Despite excellent benefits and safety profile of most medication drug therapy problems pose a significant risk to patients, which adversely affect quality of life, increase hospitalization and overall health care cost[10]. An Indian study reported that the incidence of drug therapy problems was found to be greater than quoted as an average in developed countries[11]. Drug-therapy problems include medication errors (involving an error in the process of prescribing, dispensing, or administering a drug, whether there are adverse consequences or not) and adverse drug reactions (any response to a drug which is noxious and unintended, and which occurs at doses normally used in humans for prophylaxis, diagnosis or therapy of disease, or for the modification of physiological function)[9]. Increased use of medication and availability of new drug therapies potentially increase the risks of patient for iatrogenic adverse drug events in hospitals. Iatrogenic adverse events are important for

consideration because it cannot only prolong hospital stay but also increase patient health care expenditure. Therefore, it is important that all drug therapy problems resulting in serious injury are identified and then evaluated to provide a better patient care[12]. Drug therapy problems may arise at all stages of the medication process from prescription to follow-up of treatment. Most problems are centered on administration, dispensing and the patients' use of a medicinal product, but lack of follow-up and reassessment of medical treatment is also a major problem[8]. Several studies have shown that patients with polypharmacy, elderly age and comorbid conditions have increased risk for developing drug related problems. Drug therapy has become so difficult that no one professional is expected to optimize the drug therapy and control drug related problems alone[13]. Drug-related morbidity and mortality are often preventable, and pharmaceutical services can reduce the number of ADRs, the length of hospital stays, and the cost of care. Pharmacists must abandon factionalism and adopt patient-centered pharmaceutical care plan[3]. Many studies have shown that clinical pharmacists can effectively identify and prevent clinically significant drug-therapy problems[13]. Pharmacists' plays an important role identifying drug related problems and resolving actual drug related problems and preventing potential drug therapy problems through pharmaceutical care practices. A pro-active rather than a reactive approach on the part of the pharmacists seems prudent for obtaining most benefit. This includes participation of pharmacists in the ward rounds at the stage of ordering and prescribing where all types of drug related problems, including also potential problems, should be discussed[8]. Therefore implementation of clinical pharmacist activities in health care positively influence clinical practice. In a patient oriented service the clinical pharmacist activities include Patient medication history interview, Medication order review, Patient counseling regarding safe and rational use of drugs, Monitoring ADRs, Monitoring Drug Interactions, Therapeutic Drug Monitoring, Participating in ward rounds, Providing drug information at the drug information and poison information center, Monitoring contraindicating drugs, Dosage adjustments. This study is important because implementing clinical pharmacist activities was proven to improve medication adherence, while decreasing prescribing errors. Provision of clinical pharmacy services ensure that medication therapy is optimum, safe, cost-effective, individualized and helps in resolving drug therapy problems. Therefore clinical pharmacist activities can have a positive impact on reducing drug related errors in overall patient care. Safe and effective medicine use is the core business of clinical pharmacists. By working to ensure that medicine therapy is optimum, safe and cost-effective, the provision of clinical pharmacy services serves the interests of individual patients and also the wider community. India is a country with significant problems with

medication use, but until recently Indian pharmacist has not been educated for a patient-care role. The purpose of this study is to identify drug therapy problems and improve medication adherence by clinical pharmacist to provide better patient care in a tertiary care hospital.

MATERIALS AND METHOD

The present study can be described as both a clinical study and prospective study conducted for the period of 6 months duration in Acute Medical Care unit of 300 bed South Indian tertiary care hospitals. This study was approved and cleared by the Institutional Human Ethical Committee (IHEC). A suitable data collection form was designed to collect, document and analyze the data. Informed consent form was also incorporated in the DCF. Data collection form included the provision for collection of information related to demographic details of patient (name, age, and sex) and family history, past medical history, smoking and alcohol history, date of admission, date of discharge, reasons for admission, diagnosis and co-morbid conditions, medications used during the hospital stay including name of the drug, route, frequency of administration, laboratory details, and drug interactions. It also includes information on untreated indication, drug use without indication, failure to receive drugs, drug duplication, non-drug therapy indicated, contraindicating drugs, and medication adherence. ADR assessment form, patient counseling form, and morisky 8-item questionnaire was also attached to the Data Collection Form. Demographics and clinical data were collected for all the patients meeting the inclusion\ criteria and the treatment initiated was analyzed on daily basis. The data was collected from patient case note, patient laboratory data, treatment chart, nurse notes. The literature supporting the study was collected from different sources like micromedex drug information database, various websites like pub med, science direct, DOAJ, Medline, Google scholar, Blackwell synergy, Springer etc. Naranjo algorithm was used for causality assessment of ADRs identified and morisky scale for measuring medication adherence.

RESULTS AND DISCUSSION

The study was conducted in tertiary care hospitals for a period of 6 months. The demographic details, clinical details, therapy given, types of DTPs were analyzed from the data collected. A total of 112 patients drug therapy were followed during the six months study period out of which 95 (84.82%) patients had drug therapy problems (DTPs). Among 95 patients 52 (54.73%) patients were males and 43 (45.27%) patients were females. Majority of patients were in the age group of 50 to 60 years. The age group of 41- 70 years patients had more DTPs compared to age groups of 10-40 and above 70 years. The demographic details of the patients are summarized in

Table 1. Among the study population, 10% of patients were diagnosed to have one co-morbidity and 38% of patients were with two co-morbidities and 24% were having 3 co-morbidities and 28% percent of patients were not having any co-morbidity.

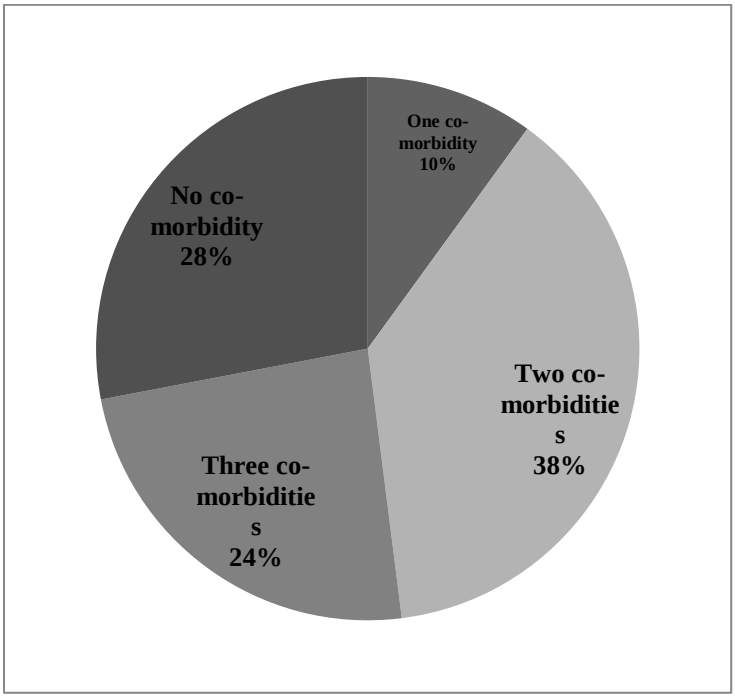

Figure 1: Percentage of Patients with Co-morbidities

A total of 182 DTPs were identified in 95 patients, the frequency of DTPs was 1.9 percent per patient. Among 182 DTPs 102 (56%) were identified in males and 80 (43%) were identified in females.

Table 1: Demographic Details of the Patients

Patient characteristics	number (n=95)
Age (years)	
10-20	9 (9.47%)
21-30	8 (8.42%)
31-40	11 (11.57%)
41-50	16 (16.84%)
51-60	23 (24.2%)
61-70	17 (17.8%)
71-80	11 (11.5%)
Sex	
Male	52(54.73%)
Female	43(45.27%)

The identified DTPs are Interactions - 118 (64.84%), Drug selection - 56 (30.77%), Drug use - 3 (1.65%), Adverse drug reactions - 4 (2.19%), Monitoring - 1 (0.55%) and Patient/Provider - 12 (35.29%). The drug therapy problems are summarized in Table 2.

Table 2 : The drug therapy problems

Clinical Pharmacist Activities	No.	Total
Drug Interactions		
a) Serious interaction	15	118
b) Significant interaction	69	(64.84%)
c) Minor interaction	34	
Drug selection		
a) Indication without drug (Drug needed but not prescribed).	21	56
b) Drug without indication (Drug prescribed not needed).	33	(30.77%)
c) Drug Duplication	01	
d) Contraindication	01	
Drug Use		
a) Wrong dose taken/ administered	00	03
b) Wrong drug taken/administered	00	(1.65%)
c) Failure to receive drug (Drug not taken)	00	
d) Incorrect administration	00	
e) Frequency inappropriate	03	
Adverse drug reactions		
a) Allergic reaction	01	04
b) Side effects	03	(2.19%)
Monitoring		
a) Laboratory monitoring	01	01
b) Non-laboratory monitoring	00	(0.55%)
Patient or provider		
a) Patients with Poor adherence	34	12
b) Patients with Improved Adherence	12	(35.29%)

Drug Therapy Problems are relatively common in hospitalized patients and can result in patient morbidity mortality and increased treatment costs[15]. The number of drugs used and the number of clinical/pharmacological risk factors significantly and independently influenced the risk for DTPs. In India, clinical pharmacy service is an emerging discipline. Clinical pharmacy service is to optimize the patient outcomes by working in concordance with prescriber and patient to achieve the best possible equality use of medicines. Research studies have shown that the clinical pharmacy activities reduce the drug related problems relating to hospitalization (m.sonal sekhar, c. adheena mary p.g.anju), probability of readmission and total cost of drug therapy (Viktil k k). The aim of this study was to optimize the drug therapy and to improve medication adherence by providing clinical pharmacy services and patient counseling. Medicine department was selected for the study because patients in medicine unit are frequently prescribed a large number of drugs and having variety of diseases. Through these clinical pharmacy services, pharmacists have identified 182 drug therapy problems among 95 patients. Out of which 118 are drug interactions, 56 are drug selection (drug without indication. Indication without drug, drug duplication and

contraindicated drug), 4 adverse drug reactions and 35.29% of patients have showed improved medication adherence through patient counseling. The total number of DTPs, were obtained more in male population. This observation is supported with the demographic reports of the study conducted by Ganachari M S et al[7], cited a predominance in male gender over female gender. Another study conducted by Madhan Ramesh et al[10] has shown similar predominance of males over females. The incidence of drug related problems were high (58.84%) in patients aged between 41-70 years, where as age group of 10- 40 years was found to be (29.46%) and the patients above 70 years of age were (11.57%) which is similar to the study conducted by Madhan Ramesh et al[10]which shows more DRPsin patients aged between 41-60 years. This can be attributed to the fact that more number of patients visited the hospital during the study period was ranged between 41-70 years of age group. Most of the DTPs observed in the study resulted from the drug interactions (64.84%), inappropriate drug selection pattern (30.77%) which constituted more of the 'drug prescribed not needed' 33,followed by 'drug needed not prescribed' 21,'drug duplication' 4, and 'contraindication' 1, and then adverse drug reactions. This observation is supported with the study conducted by Yvonne Koh in which potential drug-drug interactions accounted for a substantial amount of potential drug toxicity (34.8%) [15] this study is contrasted with the study conducted by H.A.M. Vinks found that the most frequently occurring potential DTP were drug use without indications. Drug use without indication was defined if the indication for certain prescription was disputable or not evidence-based anymore.[15] and Madhan Ramesh et al, in which drug use without indication accounted for highest. The high incidence of inappropriate drug selection may be attributed to lack of standard treatment protocol in the hospital, poor history taking etc. Clinical pharmacists have identified 118 (64.84%) drug interactions in a tertiary care hospital. Out of which serious drug interactions are found to be 15 (12.71%), significant are 69 (58.47%), minor are 34 (28.81%) and found that drug interactions are more common drug therapy problems compare to others and these are more in patients of age 60 -70 years who are taking multiple drugs to treat disease and their co morbid conditions. In this 6 months study during drug selection process pharmacists have identified 56 (30.77%) patients with improper drug selection out of which 21 were indication without drug, 33 were drug without indication, one drug duplication and one contraindicating drugs. In a German study, conducted by Langerbake C et al[16], 'drug use without indication' was found to be second highest which is comparable with our results. The study conducted by Madhan Ramesh et al[10] has also shown a high incidence (18%) of drug use without indication. Probable reasons for this DRPs may be due to prophylactic reasons or lack of therapeutic guidelines in the hospital indicating a

need for the initiation of clinical pharmacy services and development of therapeutic guidelines. Adverse drug reactions (2.19%) identified by the clinical pharmacists in the hospital increase the financial burden besides the undesirable clinical consequences of the patient. In this present study majority of the adverse drug reaction occur in the age of 60 -69 years, age is the major risk factor for developing DTPs, the association between polypharmacy and incidence of ADR was studied and documented. Clinical pharmacists found that majority of the adverse drug reaction found are mild in severity. In this study majority of patients belong to 60 -69 years that developed ADR. This is consistent with the study conducted by Yvonne koh – seven fold increase in occurrence of adverse drug reaction with age 60-69 years.[14] The causality of ADR was identified, assessed and documented. Majority of the adverse drug reactions are possible on Naranjo scale. Majority of DTPs identified by the clinical pharmacists in the hospital is mainly due to the lack of therapeutic guidelines indicating the need for development of clinical pharmacy services and therapeutic guidelines. Adherence to therapies is a primary determinant of treatment success. Failure to adherence is a serious problem which not only affects the patient but also the health care system. In this present study clinical pharmacist found that among 112 patients, 12 patients are with low adherence followed by 22 with medium adherence and 78 with high adherence. Clinical pharmacists play an important role in counseling the patients to improve their medication adherence. In 34 poor adherent patients 12 (35.29%) patients showed improved medication adherence. Patient counseling have a positive impact in improving patient outcomes, adherence to therapy, changes in patient behavior that contributes to better Outcomes. The overall observation made from this study was clinical pharmacists are an integral part of health care team and have a great responsibility in identifying and minimizing drug related problems, monitoring patients for DRPs will decrease the chance of morbidities and contribute for improved patient care and improve overall quality of the patient. Our study, implementation of clinical pharmacist activities in tertiary hospitals showed the importance of clinical pharmacy services in identifying drug therapy problems, so that they can be minimized to decrease the chances of morbid condition and improve better patient care. The drug therapy problems identified are 1.9% per patient, drug interactions are common drug related problems followed by drug without indication, indication without drug and adverse drug reaction. Apart from identification of drug therapy problems clinical pharmacists also plays an important role in collecting medication history interview during ward rounds and identifies the possible risk factors for the disease. Patient counseling were intended to improve adherence and maintaining quality of life. Pharmacists, being active member play an important role in providing patient

counseling to improve the adherence and compliance. Moreover the patient counseling by pharmacist can improve the quality of patient care and can reduce the burden of the doctor to spend more time on examination.

CONCLUSION

As the patients in medicine units have a range of diseases and are frequently prescribed with large number of drugs. Clinical pharmacy services helps in monitoring of drug therapy in this area which may benefit patients. This study had presented a pattern of findings of drug therapy problems identified by the clinical pharmacist, which suggests that a few types of drugs and errors constitute a substantial proportion of clinical pharmacist interventions. Knowledge of the most frequent DTPs could significantly increase the efficiency of clinical pharmacist interventions. This study showed that the Clinical pharmacist services in drug therapy helped in identifying and preventing drug therapy problems.

ACKNOWLEDGEMENT

First and foremost, we must acknowledge and thank the almighty for blessing, protecting and guiding me throughout this period. We could never have accomplished this without the faith we have in the almighty. This dissertation would not have been possible without the guidance and the help of several individuals who in one way or another contributed and extended their valuable assistance in the preparation and completion of this study. It gives us great pleasure in expressing our gratitude to all those people who have supported us and had their contributions in making this thesis possible.

REFERENCES

1. American College of Clinical Pharmacy. The definition of clinical pharmacy. Pharmacotherapy 2008; 28: 816–817.
2. Hughes J, Donnelly R and James-Chargilaou G. *Clinical Pharmacy: A Practical Approach.* The Society of Hospital Pharmacists of Australia 1998.
3. Hepler C, Strand L. Opportunities and responsibilities in pharmaceutical care. Am J Hosp Pharm 1990; 47: 533–543.
4. Audit Commission. A Spoonful of Sugar – Medicines Management in NHS Hospitals. London: Audit Commission, 2001.
5. G Parthasarathi, Karin Nyfort-Hansen, Milap Nahata. A textbook of Clinical Pharmacy Practice Essential Concepts and Skills
6. The European Society of Clinical Pharmacy, 2007

7. Cipolle *et al*. Introduction to Health Care Delivery. A Premier for Pharmacists Drug Therapy Problems, 1998; page no.73
8. Ganachari M S, Mahendra Kumar B J, Shashikala C Wali and Fibin Assessment of Drug Therapy Interventions by Clinical Pharmacist. August 2010; Vol: 3; Issue: 3; 22 -28
9. Ramesh A, Celin, Seuma Assessment of drug related problems in stroke patients admitted to south Indian tertiary care teaching. Indian journal of pharmacy practice. August 2012; vol: 5; Issue :4; 28-33
10. Alagiriswami B, Ramesh M, Parthasarathi G, Basavanagowdappa H. A study of Clinical pharmacists initiated changes in drug therapy in a Teaching Hospital, ijopp2009 Jan:1(2):36-45
11. Parthasarathi G, Ramesh M, Kumar JK, Madaki S. Assessment of drug related problems and clinical pharmacists' interventions in an Indian teaching hospital. J. Pharm. Prac. Res. 2003;33:272-74.
12. Einarson TR. Drug related hospital admissions. Annals.Pharmacother.1993:27(7):832-MS,
13. Bond CA, Raehl CL, Franke T. Medication Errors in United States Hospitals. Pharmacother. 2001; 21(9):1023-36.
14. Van Den Bemt PM, Egberts TC, De Jong-Van Den Berg LT, Brouwers JR. Drug-Related Problems in Hospitalised Patients. Drug. Saf. 2000;22(4):321-33.
15. Yvonne Koh, Fatimah Bte Moideen Kutty, and Shu Chuen Li. Drug-related problems in hospitalized patients on polypharmacy: the influence of age and gender. Therapeutics and Clinical Risk Management 2005:1(1)39-48
16. Thijs H. A. M. Vinks, Fred H. P de Koning, Ton M. de Lange and Toine C. G. Egberts Identification of potential drug-related problems in the elderly: the role of community pharmacist. Pharm World Sci 2006; 28 (1): 33-8
17. Chumney EC, Robinson LC. The Effects of Pharmacists Interventions on Patients with Polypharmacy. Pharmacy Practice 2006; 4(3);103-9