

## Drug Therapy Problems: A Review of Literature

Languluri Reddenna<sup>1\*</sup>, Sree Nagavalli K<sup>2</sup>

<sup>1</sup> Department of Pharmacy Practice,

Rajiv Gandhi Institute of Medical Sciences, Kadapa, Andhra Pradesh, India-516003

<sup>2</sup> Department of Pharmacy Practice,

S.J.M College of Pharmacy, Chitradurga, Karnataka, India-577502

\*reddennapharmd@gmail.com



### ABSTRACT

The improper use of drugs can lead to patient morbidity and even mortality. Drug therapy problems are the clinical territory of the pharmaceutical care practitioner and the resolution of identifying drug therapy problems help patients to achieve their goals of therapy and understand the best possible outcomes from drug therapy. To identify, resolve and prevention of drug therapy problems, the practitioner must understand how patients with drug therapy problems present in the clinical setting. Stating the problem and identifying the cause requires involves clinical judgment by the practitioner. All patient problems involving medications can be categorized into seven types. These include all side effects, toxic reactions, treatment failures, or the need for additive, synergistic, or preventive medications, as well as noncompliance. During 2002, there were 3.3 billion prescriptions dispensed from community pharmacies throughout the United States and over 44,000 hospitalized patients die each year resulting from medical errors. Recent research, on drug-related problems and adverse drug reactions has identified several categories of risk factors that may be used to identify patients who are susceptible to drug related problems and adverse drug reactions. It is essential that practitioners who intend to provide pharmaceutical care understand the descriptions and identification of each type of drug therapy problem as well as their common causes. Continuous referral to the seven categories of drug therapy problems ensures that a consistent, rational, comprehensive, and effective care plan can be established for even the most complicated patient.

**Key words:** Drug, drug therapy problems, over dosage, drug- drug interaction, adverse drug events

### INTRODUCTION

Drug therapy problems are the clinical territory of the pharmaceutical care practitioner and the resolution of identifying drug therapy problems help patients to achieve their goals of therapy and understand the best possible outcomes from drug therapy. The identification of drug therapy problems is precisely part of the assessment process and signifies the accurately sole contribution made by pharmaceutical care practitioners. <sup>[1]</sup> A drug therapy problem is any undesirable event experienced by a patient

which involves, or is suspected to involve, drug therapy, and that interferes with the desired goals of therapy. Drug therapy problems represent the foremost responsibility of the pharmaceutical care practitioner. A drug therapy problem is a clinical problem and it must be identified, resolved in a method similar to other clinical problems. Every health care practitioner is responsible for helping patients with problems that require a certain level of professional complexity to identify, prevent, or resolve. <sup>[2]</sup> Drugs are a dualistic therapeutic tool.

A drug can be defined as any substance or product that is used to modify or explore physiological systems or pathological states for the benefit of the recipient.<sup>[3]</sup> The improper use of drugs can lead to patient morbidity and even mortality. In general, problems related to the use of approved drugs can be summarized with the term “Drug-Related Problems”.<sup>[4]</sup> When reviewing a patient's drug therapy, one of the main objectives is to identify and resolve any drug-related problems.<sup>[5]</sup> In 2003, 13.7% of the total population in the Netherlands over 65 years of age and the proportion of older adults are estimated to increase (18.2%) in 2020. A survey in Indonesia showed that 78 % of elderly suffered up to four medical illnesses, 38 % of them had 6 diseases more and 13 % suffered more than eight diseases.<sup>[6]</sup>

Stating the problem and identifying the cause requires clinical judgment by the practitioner. No other practitioner can identify and resolve drug therapy problems as regularly and systematically as the pharmaceutical care practitioner because there is only the practitioner's clinical judgment and rationale for the decision. All patient problems involving medications can be categorized into seven types. These include all side effects, toxic reactions, treatment failures, or the need for additive, synergistic, or preventive medications, as well as noncompliance.<sup>[7]</sup> During 2002, there were 3.3 billion prescriptions dispensed from community pharmacies throughout the United States and over 44,000 hospitalized patients die each year resulting from medical errors. This categorization of drug therapy problems was first defined, described, and developed in 1990 by the research group at the Peters Institute of Pharmaceutical Care at the University of Minnesota. The first two categories of drug therapy problems are associated with the indication. The third and fourth categories of drug therapy problems are associated with effectiveness. The fifth and sixth categories of

drug therapy problems are associated with safety. The seventh category deals with patient compliance.<sup>[8]</sup> These categories of drug therapy problems are not specific to pharmacological class, area of practice, medical service, and unique patient group based on age, disease state, or health care plan. All practitioners who deliver pharmaceutical care must be capable to identify, prevent, and resolve all of the seven types of drug therapy problems for a given patient. Drug therapy problems can occur at any stage of the medication use process. Therefore, the practitioner must anticipate drug therapy problems in order to prevent them.<sup>[9]</sup>

#### CAUSES OF DRUG THERAPY PROBLEMS

**Drug/Dose Selection:** The cause of the drug related problems related to the selection of the drug and/or dosage schedule, inappropriate drug selection, inappropriate dosage selection, more cost-effective drug available. Pharmacokinetic problems including ageing/deterioration in organ function and interactions, Synergistic/preventive drug required and not given, deterioration/improvement of disease state, new symptom or indication revealed/presented, manifest side effect and no other cause.

**Drug Use Process:** It Includes Inappropriate timing of administration and/or dosing intervals, Drug underused/ under-administered, drug overused/ over-administered, Therapeutic drug level not monitored, drug abused (unregulated overuse), Patient unable to use drug/form as directed.

**Information:** It Includes Instructions for use/taking not known, Patient unaware of reason for drug treatment, Patient has difficulties reading/understanding Patient Information Form/Leaflet, Patient unable to understand local language, Lack of

communication between healthcare professionals.

**Patient/Psychological:** It Includes Patient forgets to use/take drug, Patient has concerns with drugs, Patient suspects side-effect, Patient unwilling to carry financial costs, Patient unwilling to bother physician, Patient unwilling to change drugs, Patient unwilling to adapt life-style, Burden of therapy, Treatment not in line with health beliefs, Patient takes food that interacts with drugs.

**(Pharmacy) Logistics:** It Includes prescribed drug not available (anymore), prescribing error (only in case of slip of the pen), dispensing error (wrong drug or dose dispensed).<sup>[10]</sup>

#### RISK FACTORS FOR DRUG THERAPY PROBLEMS

Although medications provide a beneficial effect in most patients, the elderly are at particular risk for drug-related problems, which have been defined as undesirable patient experiences related to drug therapy that actually or potentially interfere with desired patient outcomes. Recent research, on drug-related problems and adverse drug reactions has identified several categories of risk factors that may be used to identify patients who are susceptible to drug related problems and adverse drug reactions. These categories include specific medications, certain therapeutic categories of drugs, and patient status.

**Specific medications** Several therapeutic agents commonly used in geriatric patients have been targeted as high-risk medications. Specific medications that are potential risk factors include digoxin, warfarin, lithium and chlorpropamide. Each of these medications is highly potent and requires careful dosing calculations based on the patient's status. Monitoring patient response in light of laboratory results related to liver and kidney function is critical in ensuring appropriate

patient outcome when these agents are prescribed.

**Therapeutic agents** In addition to specific medications, several classes of therapeutic agents that may be prescribed for elderly patients have been reported as risk factors based on research of elderly nursing facility residents. Individual patient characteristics may serve as important risk factors in determining the prevalence of drug-related problems. In fact, some research indicates that high-risk patient characteristics are more prevalent than medication risk factors as causes of drug-related problems." Typical elderly patient characteristics that have been associated with drug-related problems include patients who:

- Receiving nine or more different medications and two or more doses of medication per day
- Having six or more active chronic medical diagnoses and previous adverse drug reactions
- Having low body weight
- Having decreased renal function.<sup>[11]</sup>

Anne B. Taegtmeyer et al.,<sup>[12]</sup> conducted a study to characterize the types of drug related problems among neurology inpatients and furthermore to study factors affecting the acceptance of clinical pharmacologists and pharmacists recommendations for improving drug safety. Clinical pharmacologists and pharmacists can play an important role in identifying drug related problems among neurology inpatients. Their recommendations for optimizing medication-safety were accepted for prescriptions associated with an adverse drug event and high-risk drug combinations. Harminder Singh et al.,<sup>[13]</sup> conducted a prospective and descriptive to evaluate the impact of a Pharmaceutical Care service in the identification and resolution of drug-related problems and in quality of life of a group of elderly outpatients with chronic health conditions. The drug related problems attributed to hospital admissions are mostly avoidable through proper patient education and

strengthening the need of pharmacovigilance with little more vigilance in patient care. Achyuth Kumar et al, <sup>[14]</sup> conducted a prospective study to identify drug related problems amongst inpatients, clinical outcome derived from pharmaceutical reactive intervention and passive interventions. The reactive interventions of clinical pharmacist improved the patient outcome and passive interventions influence physician's decision-making in drug therapy.

Ding-Cheng Chan <sup>[15]</sup> conducted a study to identify Drug-related problems. The most common DRP category was drug not taken/administered, and the most common offending drug category was cardiovascular agents. Prevalence of drug related problems was high among geriatric outpatients prescribed multiple medications. Careful medication review was needed in routine clinical practice to improve prescription quality. Sonal Sekhar et al, <sup>[16]</sup> conducted a retrospective study to investigate type, nature and incidence of drug related admissions. Drug related problems are significant, increased awareness and enhanced collaborative efforts among patients, physicians, pharmacists and caregivers within community and hospital have the potential to minimize the impact of this problem. Roberta Simone Andrezza et al, <sup>[17]</sup> conducted a cross-sectional study to assess the frequency and types of drug-related problems and to identify the possible causes and drugs involved in these problems. One-third of the patients attending the emergency room had a drug-related problem, highlighting the importance of considering drugs as a possible cause of health problems and the need for their more rational use. Sam Jeeva Kumar et al, <sup>[18]</sup> conducted a prospective study to evaluate the drug related problems occurring to the patient in suburban area mainly drug related problems like medication errors, irrational prescription, adverse drug reaction and drug interaction.

Clinical pharmacists play a major role in minimizing the drug related problems.

Gopal Kannan et al, <sup>[19]</sup> conducted a study to identify drug-therapy related problems and resolve them by providing pharmaceutical care. Pharmacist can identify drug Related Problems/Pharmaceutical Care Issues and resolve it by intervention, thereby playing a pivotal role in promoting patient care. Yvonne Koh et al, <sup>[20]</sup> conducted an observational, longitudinal, and non-concurrent study to test the significant difference between age and gender of patients and their risk of acquiring drug related problems. Healthcare professionals could spend more time in monitoring patients. Koneri.R et al, <sup>[21]</sup> conducted prospective study to determine the causality, severity, preventability, classification of adverse drug events, and drug therapeutic failures resulting in hospitalization. The prevalence of drug related hospitalizations is high, which merits further research and intervention.

### **Prioritizing Drug Therapy Problems**

Once identified, each drug therapy problem can be prioritized as to the urgency with which it needs to be addressed. This prioritization depends upon the extent of the potential harm each problem might inflict on the patient, the patient's perception of the potential harm, and the rate at which this harm is likely to occur. If multiple drug therapy problems are to be dealt with sequentially, the patient should be involved in the decision as to the priority given to each drug therapy problem. Prioritizing drug therapy problems is an essential skill because of the high frequency with which you will encounter patients who have more than one drug therapy problem at the same time.

### **Documenting Drug Therapy Problems**

Documenting the patient's drug therapy problems is that each problem identified will added to the patient's record and includes the medical condition, illness, or complaint

involved, the drug therapy or therapies involved, and the likely cause of the drug therapy problem. Drug therapy problems are most efficiently documented within the care plan for each medical condition involved. The interventions required to resolve the drug therapy problem would also be associated with that care plan. The action that was taken (increase dosage, discontinue drug therapy, add preventive drug to regimen) also needs to be recorded.

### CONCLUSION

It is essential that practitioners who intend to provide pharmaceutical care understand the

descriptions and identification of each type of drug therapy problem as well as their common causes. It is important to note that in today's health care system, patients are under-dosed three to four times more frequently than they are over-dosed. The responsibility to identify, resolves, and prevent drug therapy problems is the unique contribution that pharmaceutical care practitioners make to a patient's health care. Continuous referral to the seven categories of drug therapy problems ensures that a consistent, rational, comprehensive, and effective care plan can be established for even the most complicated patient.

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