



AN OBSERVATIONAL STUDY ON TYPES OF DRUG RELATED PROBLEMS IN DEPARTMENT OF NEUROLOGY

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Abstract:

Aim: To study the incidence of drug related problems in neurology department

Method: A prospective study (Sri Sri Neuro Centre, Hanumakonda) was carried out for a period of 6 months by involving patients from neurology department who were on more than one drug.

Results: Of 206 patients, 59.1 % had drug interactions, 22.8 % non-adherence, 10.5 % treatment effectiveness, 7.1 % adverse drug reactions and 0.5 % patients had therapeutic duplication.

Conclusion: Drug interactions, non-adherence and ADRs are most frequently observed DRPs.

Keywords: Drug Related Problem, Adverse Drug Reaction, Drug Interaction.

Introduction

Drug Related Problem (DRP) is defined as an extent or circumstance involving drug treatment that actually or potentially interferes with the patient experiencing an optimum outcome of medical care [1]. DRPs can increase the carrying cost and also can block the attained of the therapy purposed [2]. One of the factors for identifying DRPs is use of electronic prescription and for improving the drug safety [3]. The core process of pharmaceutical care is identification, prevention and solution of DRPs [4]. The purpose of identifying DRPs is to realize the best possible outcomes from drug therapy and help to the patients achieve their goals of therapy [5]. Therefore, through knowledge of DRPs may benefit health care professionals including pharmacists to identify DRPs, resolve actual DRPs and prevent potential DRPs in order to optimise patients' outcomes [6]. 50-80 % of the drug related problems can be prevented by pharmacist intervention [7].

There are two types of DRPs: Actual DRP and potential DRP

Actual DRP: An actual drug related problem is defined as an event which is already seen in patients due to the drugs which are administered without involvement of pharmacist.

Potential DRP: Potential drug related problem is defined as an event that occurs in the absence of pharmacist intervention.

The most important drug related problems include adverse drug reactions (ADRs), drug interactions (DIs) and therapeutic failure [8].

Types of drug related problems:

HEPLER AND STRANDS classified the DRPs into 8 categories: [9]

i. Adverse Drug Reaction (ADR)

ii. Drug interaction (DI)

iii. Failure to receive drug

iv. Subtherapeutic dosage

v. Over dosage

vi. Indication without drug therapy

vii. Drug use without indication

viii. Inappropriate drug selection

i. Adverse Drug Reaction (ADR):

According to WHO an Adverse Drug Reaction (ADR) is defined as a response to a drug which is noxious and unintended and which occurs at doses normally used in man for the prophylaxis, diagnosis or therapy for a disease and for the modification of function excluding failure to accomplish the intended purpose. Drug administration either alone or combination can lead to ADR. When the number of medications administered increases the frequency of ADR increases [10]. ADRs are major cause for morbidity and it accounts mostly 5% of hospitalised patients all over the world. ADRs are 4th leading cause of death in pulmonary disease, diabetes mellitus, AIDS, pneumonia and automobile death conditions [10]. Ex: theophylline induced anxiety and seizure [10]; methylxanthines induced hypokalaemia [11].

ii. Drug Interactions (DIs):

Drug-drug interaction:

Drug-drug interaction can be defined as a change in a drugs effect on the body when the drug is taken together with a second drug [12]. A drug-drug interaction can delay, decrease, or enhance absorption of either drug. This can decrease or increase the action of either or both drugs or cause adverse effects [11]. More number of drugs prescribed in elderly patients is more prone to drug-drug interactions. Patient factors, prescriber factors, and

communication between health professional and patient are the risk factors for drug-drug interactions [13]. Interactions can be prevented by avoiding multiple drug treatment and potential benefits of drug combination [13]. Ex: combination of linezolid and theophylline, linezolid may enhance the hypertensive effect of sympathomimetic [11], combination of amlodipine and labetalol cause bradycardia [12].

Drug-drug interactions include Pharmacokinetic interactions and pharmacodynamic interactions. Pharmacodynamic interactions are mainly synergism, antagonism and additive effect; synergistic is one of the most pharmacodynamic interactions [14]. Ex: efficacy of inhaled corticosteroids might be reduced in patients with asthma and COPD. Higher doses of inhaled corticosteroids are required in patients with asthma who smokes [15]. Pharmacokinetic type of interaction which affects the drug absorption, distribution, metabolism and elimination. The most pharmacokinetic interaction is metabolism [14]. Ex: smoking and theophylline; theophylline has a narrow therapeutic window dose adjustment is done in the smoking patients [15].

Drug-food interaction:

Drug-food interactions occurs when food and medicine interfere with one another. Interactions can happen both prescription and over the counter medicines. These include antacids, vitamins and iron pills [16]. Interaction between food and drugs can produce negative effects in safety and efficacy of drug therapy and nutritional therapy. They may increase or decrease the drug effect. Taking one hour before or 2 hours after eating interactions can be avoided [14]. Ex: while taking ACE inhibitors potassium containing foods are avoided like banana, sweet potato etc... [16].

Drug-disease interaction:

Drug-disease interaction is an event in which a drug intended for therapeutic use causes some harmful effect in a patient because of disease or condition that the patient has. There are some diseases that alter the body ability to metabolize or breakdown, a drug so that it can have the intended effect [17]. These interactions can occur in any age group people but more common in elderly people and who are having a greater number of diseases. For example, beta blockers are taken for hypertension can worsen the asthma [18].

iii. Failure to receive drug:

Failure to receive drug is defined as a deviation from the prescribed medications because of a choice, non-comprehension or forgetfulness [19]. Ex: Iron preparations, multivitamins, paracetamol, phenytoin [7].

iv. Sub therapeutic dosage:

It can be defined as if the prescribed dose was less than recommended dose [19]. Ex: according to indication or

guidelines; budesonide inhaler -pregabalin [20], amoxicillin-calcium [19], telmisartan-metoprolol [7].

v. over dosage:

Over dosage can be defined as if the prescribed dose was too high in relation to the patient's renal function, liver function or age; Ex: Gabapentin and allopurinol dose was not adjusted in renal function patients.

vi. Indication without drug therapy:

If a patient had an unnecessary drug therapy this was classified as indication without drug therapy [19]. Ex: calcium and vitamin D, omeprazole, potassium, prednisolone [20].

vii. Drug use without indication:

Inappropriate drug use according to explicit Swedish criteria and inappropriate drugs according to renal function or disease were classified as inappropriate or ineffective drug. Ex: antidiabetic agents like Metformin and Glibenclamide [19].

viii. Medication error:

The National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP) defines a "medication error" as "any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the health care professional, patient, or consumer".

Types of Medication Error include prescription error, dispensing error and administration error

The main aim of the study was to identify the incidence of drug related problems in neurology department. Objectives of the study are to identify risk factors for drug related problems, identify the drugs which cause DRPs, study the frequency of identified DRPs, identify the incidence of DRPs in this department, help the patients to have better therapeutic benefits and to enhance the patient quality of life.

Need for the study: Conducting this study, will help the patients to have the better therapeutic outcome. It is imperative to know the drug related problems in patients. By conducting this study, we can identify the types of DRPs observed in patients of neurology department It is necessary to know about drug related problems to provide maximum therapeutic benefit and improve patient quality of life. Though there are many studies from the western countries, there are very few studies conducted in India, especially in Warangal region. Therefore, this study is conducted to assess the health condition and drug related problems. By assessing and evaluating the different drug related problems in Neurology patients will give a prospective approach towards better patient care.

Materials and methods

Our study was a prospective study carried out for a period of 6 months at a private neurology clinic after obtaining approval from Institutional Ethics Committee. Out patients

from neurology department, patients receiving more than one medication, patients of all age groups, with or without comorbid conditions and patients on polypharmacy were included in our study. Patients with Single indication, patients of departments except neurology and other ambulatory condition such as poisoning, and accident cases were excluded.

Results

Table 1: Types of drug related problems and percentage of drug related problems

S.no	Type of Drug related problems	% of drug related problems
1	Drug interactions	59.1 %
2	Non- adherence	22.8 %
3	Adverse drug reactions	7.17 %
4	Treatment effectiveness	10.5 %
5	Therapeutic duplication	0.5 %

Table 2: Percentage of drug related problems in male and female patients

S.no	Type of Drug related problems	Female	Male
1	Drug interactions	65 %	35 %
2	Non- adherence	69 %	31 %
3	Adverse drug reactions	62 %	38 %
4	Treatment effectiveness	33 %	67 %
5	Therapeutic duplication	0 %	100 %

Table 3: Drug related problems in different age groups

S.no	Type of Drug related problems	Age group (in years)
1	Drug interactions	51- 60
2	Non- adherence	31- 40
3	Adverse drug reactions	51- 60
4	Treatment effectiveness	61- 70
5	Therapeutic duplication	51- 60

Discussion

Drug interactions:

Among 404 total DRPs observed in our study, 239 DRPs were drug- drug interactions in which major, moderate, minor accounted for 59 %, 40 % and 1.27 % respectively. Most of the cases had more than 4-5 drugs prescribed in this department. Drug interactions were observed more in 51-60 years age group. Our results were similar to the study conducted by Roheena Zafar *et al.*, 2017 [21] where 62.2 % major reactions were observed in 56 % male and 44 % female patients (total 633 drug interactions). In our study prescribing > 5 drugs remained the major risk factor for developing drug interactions with or without comorbid conditions. In contrast to our study Celin A.T *et al.*, 2012 [7] observed only 25 % drug interactions. The combination of propranolol with rizatriptan, propranolol with naproxen, and aspirin with paracetamol attributed to higher number of drug interactions.

Non-adherence:

In our study 23 % patients were observed to be non - adherent to medications. Similar study conducted by Iman A.Basheti *et al.*, 2018 [22] observed non-adherence in 28 % patients. The reason for noncompliance in patients is due to side effects of prescribed drugs, discontinuation of medication on relieving their symptoms and not visiting hospital or clinics for follow-up. In contrast to our study D.Wucherer *et al.*, 2019 [23] observed no adherence in more than 60 % patients.

Adverse drug reactions:

Of total 404 DRPs in neurology department, 7.2 % patients had ADRs which is similar to the results of Celin A.T *et al.*, 2012 [7] wherein they found 15 % ADRs. The major risk factor for developing ADRs is polypharmacy, which is mostly observed in patients with comorbid conditions and also in elderly patients. In contrast to our study, Jennifer R Grace *et al.*, 2018 [24] observed 43 % ADRs.

Therapeutic duplication:

In our study 0.46 % therapeutic duplication was observed compared to 0.6 % therapeutic duplication observed in study conducted by Farzaneh Forouguniah *et al.*, 2016 [25]. The occurrence of therapeutic duplication may be due to not discontinuing previous medication, before prescribing the patients with new drug belonging to same therapeutic class.

Conclusion

In our study, DRPs such as drug-drug interactions, adverse drug reactions, non-adherence, treatment effectiveness, therapeutic duplication, medication error, over dose and contraindications were observed. Polypharmacy, multiple co- morbid conditions, age, lack of awareness and unnecessary use of drugs are the major risk factors for DRPs. Anti -migraine drugs, non-steroidal anti-inflammatory drugs cause more DRPs. Drug interactions, non-adherence and ADRs are most frequently observed DRPs. According to our study, potential DRPs are found to be more than actual DRPs. Clinical Pharmacist has important role in management of treatment, patient counseling creating awareness of disease, drug and thus help in early detection of DRPs so that overall treatment cost can be reduced and patients can be benefited with maximum therapeutic outcome.

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