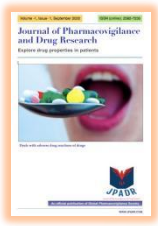
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RESEARCH ARTICLE

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Drug related problems on anti-platelets and anti-coagulants in stroke

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ABSTRACT

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Introduction: Antiplatelet agents prevent platelets from dumping and prevent clots from forming and growing. Anticoagulants slow down clotting thereby reducing fibrin formation and preventing clots. Drug-related problems are a major concern in the view of physical, psychological, and economic burden to patients.
Objectives: The aim of the research work is to access, evaluate and monitor the drug-related problems on antiplatelet and anticoagulants in stroke patients.
Methods: In this study 300 numbers of patients were screened including both males and females of all age groups in a super specialty hospital.
Results: The number of ADRs was found to be predominantly associated with a male as compared to females as well as most ADRs were reported for patients with cardiac stroke as compared to ischemic stroke and hemorrhagic stroke.
Conclusions: Low molecular weight heparins, aspirin, clopidogrel drugs resulted in various adverse drug reactions. Mostly 114 cases of ADR were due to drug-drug interactions followed by drug-food interactions and drug ethanol interactions as was concluded from the study.

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Introduction

A drug related problem is an event or incident involving drug therapy that potentially interferes with required health outcomes. The increasing number combined drug regimens led to more adverse events and complicates follow-up. Drug related problems (DRPs) lead to substantial morbidity and mortality, as well as increased health care expenditure, which in turn affect both patients and society (Alvarez-Sabin *et al.*, 2016). This can lead to prolonged hospital stay and increased health care costs. So the injury or death that may occur as a result of drug related problems has to be evaluated so as to reduce the occurrence of similar events in future. Drug-related problems include medication errors and adverse drug reactions. Drug-related problems are relatively common in hospitalized patients and can result in patient morbidity and mortality, and increased costs (Dahal *et al.*, 2013). The range of reported incidences of adverse drug reactions is even wider. These wide ranges can be largely explained by the different study methods. The introduction of systems for the early detection of adverse drug reactions may help to reduce problems related to drug therapy. Drug-related problems are common in the elderly and include drug ineffectiveness, adverse drug effects, overdosage, underdosage, and drug interactions. Adverse drug effects are effects that are

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unwanted, uncomfortable, or dangerous. Common examples are over sedation, confusion, hallucinations, falls, and bleeding. Among ambulatory people ≥ 65, adverse drug effects occur at a rate of about 50 events per 1000 person-years (Jauch *et al.*, 2013). Hospitalization rates due to adverse drug effects are 4 times higher in elderly patients (about 17 %) than in younger patients (4 %) (Sobrino *et al.*, 2010).

Antiplatelets are the group of powerful medications that prevent the formation of blood clots. Antiplatelets may be prescribed for patients with a history of coronary artery disease, heart attack, angina (chest pain), stroke and transient ischemic attacks (TIAs), peripheral artery disease (DeGregorio-Rocasolano *et al.*, 2018). Antiplatelets may have side effects. Nausea, upset stomach, stomach pain, diarrhoea, rash, and itching are the most common side effects. Any signs of unusual bleeding, such as blood in the urine or stool, nose bleeds, any unusual bruising, heavy bleeding from cuts, black tarry stools, coughing up of blood, unusually heavy menstrual bleeding or unexpected vaginal bleeding, vomit that looks like coffee grounds. dizziness, severe headache, difficulty swallowing, shortness of breath, difficulty breathing or wheezing (European Stroke Organisation, 2008).

It was reported from a study that low dose aspirin increases the risk of bleeding 2- folds as compared to placebo (Flesch *et al.*, 2006). Taking anti-platelets during the last two weeks of pregnancy may cause bleeding problems in the baby or mother both before and after delivery. Anti-platelets can be passed to the infant through breast milk. However, their effect on nursing infants is unknown. Anticoagulants are medicines that help prevent blood clots. Warfarin, acenocoumarol and phenindione block the effects of vitamin K and prevents blood clots forming (Saver *et al.*, 2008). A study conducted to find out the effect of anticoagulant agents associated with chronic subdural hematoma in the elderly reveled that both anticoagulant and antiplatelet agents were associated with an increased risk of CSDH for patients receiving oral anticoagulants, ADP-antagonists, or COX-inhibitors, respectively (Pasquale De Bonis, et al., 2013). The study conducted on atrial fibrillation outcome trials of oral anticoagulant and antiplatelet agents reveled that there was an indication of reduced mortality compared with warfarin. This may in turn reap substantial benefits in terms of reducing the clinical and economic burden of stroke. (Jean-Pierre Bassand, et al., 2012)

Methods

The proposed study was carried out in indoor wards of neurology and cardiology department of Rohini super specialty hospital. Rohini super specialty hospital, a Territory Care Hospital set up, Hanamkonda. It is a 300 bedded hospital with departments like general medicine, cardiology, neurology, urology, gastroenterology, orthopedics, pediatrics, general surgery and gynecology. It provides all the facilities along with adequate laboratory needs. A prospective observational study was designed for a study period of 6 months. Patients diagnosed with antiplatelets and anticoagulants in ischemic, hemorrhagic strokes and cardiac stroke were enrolled in the study. The in patients who are diagnosed with the antiplatelets and anticoagulants in the department of neurology and cardiology were enrolled into the study by considering following inclusion and exclusion criteria.

Inclusion criteria

- Patients who are taking antiplatelets and anticoagulants in neurology and cardiology department are included.
- A stroke patient with other associated co-morbid conditions also gets admitted.
- Patients of either sex.
- All age groups.

Exclusion criteria

- Patients who are dead.
- Patient treated on outpatient basis.
- Patients already sensitive to particular drug.
- Patients other than taking antiplatelets and anticoagulants.

Study procedure

Study was conducted in neurology and cardiology department. Those patients admitted to have been reviewed on daily basis and the patients who met the criteria were enrolled into the study. For the identification of drug related problems on anti-platelets and anticoagulants, a data collection form was developed consisting of a check list of commonly occurring DRPs and a semi structured patient interview to support the performance of a medication review. All the cases were reviewed and those who met the study criteria were followed after getting the drug therapy. Details were recorded in the suitable designed data collection form including the drug history, treatment chart, adverse effects and drug interactions as per the need of the study. The patient drug therapy was monitored for the drug related problems of antiplatelets and anticoagulants and interviewed the patients or their care givers when necessary. The identified DRP's were identified (Steinberg *et al.*, 2015; Viktil *et al.*, 2008).

All the relevant and necessary data was collected from the following source data such as patient case records – demographics, medication history, treatment chart, direct patient or their care givers interview. Truven Health Analytics-Micromedex solutions for identifying Drug-Drug interactions. Drug interaction checker also for identifying Drug-Drug interactions.

Results and Discussion

The results were presented in following tables. The distribution of patients based on gender were presented in **Table 1**.

Table 1: Distribution of patients based on gender

Gender	No. of Patients (n)	Percentage %
Male	181	69.3
Female	119	39.66
Total	300	100

The distribution of patients with different types of strokes were presented in **Table 2**.

Table 2: Distribution of Patients with different types of stroke

Type of Stroke	No. of Patients (n)	Percentage%
Ischemic stroke	114	38
Hemorrhagic Stroke	11	3.66
Cardiac stroke	175	58.3
Total	300	100

The distribution of patients according to gender in different strokes were presented in **Table 3**.

Table 3: Distribution of patients according to gender in different strokes

Type of stroke	Males	Females
Ischemic stroke	62 (54.38%)	52 (45.61%)
Hemorrhagic stroke	6 (54.54%)	5 (45.45%)
cardiac stroke	114 (65.14%)	61 (34.85%)
Total	182	118

Distribution of patients according to their age were presented in **Table 4.**

Table 4: Distribution of Patients according to Age wise

Age	Ischemic stroke	Hemorrhagic stroke	cardiac stroke
13-19	1 (0.87%)	0	0
20-26	2 (1.75%)	0	1(0.57%)
27-33	2 (1.75%)	0	6 (3.42%)
34-40	9 (7.9%)	1 (9.09%)	19(10.85%)
41-46	6 (5.26%)	1 (9.09%)	10(5.71%)
47-53	8 (7.01%)	2 (18.18%)	20(11.42%)
54-60	23 (21.7%)	3 (27.27%)	42(24%)
61-67	17 (14.9%)	1 (9.09%)	31(17.71%)
68-74	21 (18.42%)	2 (18.18%)	18(10.28%)
75-81	14 (12.28%)	0	20(11.42%)
82-88	10 (8.77%)	0	8(4.57%)
89-95	1 (0.87%)	0	0

The distribution of patients with gender wise ADRs were presented in **Figure 1**.

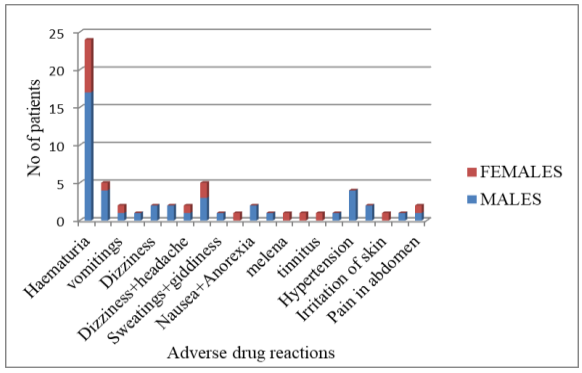


Figure 1: Distribution of patients with gender wise ADRs

The distribution of types of ADRs in different Strokes were presented in **Figure 2**.

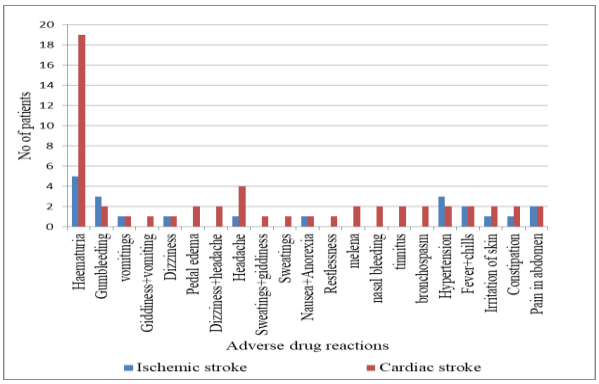


Figure 2: Distribution of types of ADRs in different Strokes

The distribution of the drug Interaction based on severity were presented in **Table 5**.

Table 5: Distribution of the drug Interaction based on severity

Severity of Interaction	Drug-drug interaction	Drug-Food interaction	Drug-Ethanol interaction
Major	4	4	1
Moderate	75	46	5
Minor	35	18	0
Total	114	68	6

The distribution of ADRs based on drugs were presented in **Figure 3**.

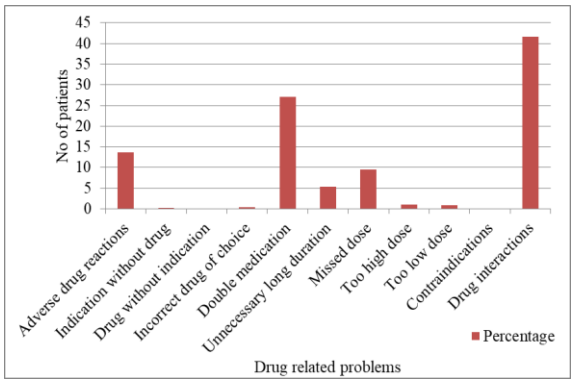


Figure 3: Distribution of ADRs based on Drugs

The distribution of identified drug related problems were presented in **Table 6**.

Table 6: Distribution of identified drug related problems

Type of Drug related problems	No. of patients (n)	Percentage%
Adverse drug reactions	62	13.7
Indication without drug	1	0.2
Drug without indication	0	0
Incorrect drug of choice	0	0
Double medication	122	27.05
Unnecessary long duration	24	5.32
Missed dose	43	9.53
Too high dose	5	1.1
Too low dose	4	0.88
Contraindications	0	0
Drug interactions	188	41.68
Total	451	100

Conclusions

In this study, about in 300 prescriptions were analyzed including both male female of all ages in super specialty hospital. In the study population the demographic data and ADR's are found that male dominate over female and cardiac stroke over ischemic and hemorrhagic stroke. Out of 300 patients, patients enrolled with cardiac stroke, ischemic stroke, hemorrhagic stroke. Among 300 patients, drug-drug interactions were 114, drug-food interactions were 68, drug-ethanol interactions were 6. Among all the drugs low molecular weight heparins, aspirin, clopidogrel has shown more ADRs compared with other antiplatelet and anticoagulants.

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