

A REVIEW ON PHARMACEUTICAL CARE PLAN IN STROKE PATIENTS

Gopu Dharani¹, Dr. D. Akila Devi²

¹Department of Pharmacy Practice, ²Department of Pharmaceutics², Vels Institute of Science, Technology & Advanced Studies (VISTAS), Chennai, India.

Corresponding author: Gopu Dharani¹, Department of Pharmacy Practice, Vels Institute of Science, Technology & Advanced Studies (VISTAS), Chennai, India.

ABSTRACT:

Pharmaceutical care plan is a dynamic process and a clinical pharmacist requires more knowledge on drugs and their therapeutic activity. Pharmaceutical care plan benefits the patient healthcare outcome and also benefits health care professionals in disease prevention. In stroke patients pharmaceutical care plan plays very key role to identify the Drug Related Problems (DRPs), investigating the nature and frequency of DRPs including untreated indications, sub-therapeutic dosage, excessive dosage, drug use without a clear indication, failure to receive drugs, improper drug selection, drug interactions, and adverse drug reactions. The evidence supporting clinical pharmacist role in care of stroke patients is well-established and literature has been published evaluating pharmacist interventions in stroke patients. The purpose of this review is to explain the detailed evidence of pharmacist interventions on stroke patient.

METHODS: The current literature was reviewed using MEDLINE (PubMed), ELSEVIER up to JULY 2019, and International Pharmaceutical Abstracts. The search was based on the following medical subject heading Disease-related search and MeSH terms included: Drug related problems in ischemic attack, stroke, cerebrovascular accident, cerebral hemorrhage, hemorrhagic stroke, and intracranial hemorrhage were identified and a qualitative analysis is performed.

RESULTS: A total 25 abstracts and full-text studies were identified, studied and included. These studies provided evidence supporting pharmacist interventions in stroke patients and clinical pharmacist can provide his contribution in the detecting and resolving DRP's and benefits safe therapeutic administration in patients. By identifying adverse drug reactions, risk factor reduction can be possible. The evidence strongly suggests that pharmacist interventions plays key role in stroke patient outcomes.

Keywords: Pharmaceutical care plan, Drug related problems, Stroke.

Introduction

Cerebrovascular diseases are the most common devastating disorders. According to the World Health Organization report, worldwide 15 million people suffer from a stroke every year and 5 million people dies. Majorly stroke causes disability and placing a burden on their family and community (World Health Organization 2018). The cerebrovascular diseases include ischemic stroke, hemorrhagic stroke, and cerebrovascular anomalies such as intracranial aneurysms and arteriovenous malformations (AVMs). Drug-related problems (DRP) are common in hospitalized patients and results in patient morbidity and mortality. DRP is defined as an event that interferes with desired health outcomes, can lead to ineffective pharmacotherapy, and may cause drug-related morbidity and mortality. Pharmaceutical care plan plays major role in identifying, preventing, and resolving DRPs. Clinical pharmacist optimizes the drug therapy, and improves positive clinical outcomes in reasonable economic expenditures. Pharmaceutical care plan also improves patient's health related quality of life. Defining and classifying DRPs is done by A Norwegian system and consists of six main categories: 1) Drug choice 2) Dosing 3) Adverse Drug Reaction 4) Interaction 5) Drug Use and 6) Alternative. This system involves in reduction of adverse drug events and medication errors. A

literature has been published evaluating the role of the pharmaceutical care plan in stroke patients; the main objective of this systematic review is to summarize the role of clinical pharmacist in stroke patient's outcome.

METHODOLOGY

Literature Search: The current literature was reviewed using MEDLINE (PubMed), ELSEVIER up to JULY 2019, and International Pharmaceutical Abstracts. The search was based on the following medical subject heading, Disease-related search and MeSH terms included: Drug related problems in ischemic attack, stroke, cerebrovascular accident, cerebral hemorrhage, hemorrhagic stroke, and intracranial hemorrhage were identified and a qualitative analysis is performed.

Study Selection: Abstracts and full text articles of interest were identified and reviewed by one author. All articles independently screened for identifying relevant articles and discrepancies resolved by discussion. The abstracts/articles had to contain drug related problems in stroke patients and clinical pharmacist interventions to identify and improve the DRP's. The study population had to comprise patients with Ischemic stroke, transient ischemia attack, or a history of stroke or TIA. Studies included if DRP's in stroke population reported clearly and studies support pharmaceutical care plan is beneficial to improve quality of life in stroke patients. Only studies written in English were included.

RESULTS

A total of 930 articles were identified, 25 of which were included in this review. All systemic articles reviewed published as full text articles. Four cross sectional observational study, six prospective study, three randomization clinical trials, two retrospective descriptive studies, two matched case-control study, two prospective interventional studies are included in this systemic review and remaining is included from patient outcomes such as patient satisfaction, health-related quality of life (HRQoL), drug therapy problems. Studies have shown that pharmaceutical care performed in the hospital settings was feasible, a clear benefit and positive impact on patient's Health related quality of life (HRQoL). Mostly 80% of drug-related problems can be prevented. A prospective observational study by Kavithasamy p et al., suggests that occurrence of stroke was more in men than women because of social habits [1]. Dilip Chandrasekhar et al also explained same that occurrence of stroke was more in men than women [2]. The age group of 41 to 70 are mostly has high risk for stroke. Ischemic stroke cases are registered more in number than other strokes. In this study Drug-Drug Interactions are classified according to the severity, and most number of drug interactions occurred is severe. The observed Drug-Drug interactions in this study increases risk of hospitalization and higher health-care cost. Drug-Drug Interactions mainly occurred between antihypertensive, anticoagulants, and antiplatelet. Antihypertensive contributed much to the occurrence of ADRs [1]. A prospective interventional study by Dilip Chandrasekhar et al., divided study population into intervention group and control group. This study suggests population in rural areas has more risk to stroke than in urban. Ischemic stroke cases are registered more in number than any other strokes. Clinical characteristics like right hemisphere brain lesions is more than left hemisphere lesion. Medium Adherence to anticoagulant therapy in interventional group than in control group is observed. The intensified pharmaceutical care given to intervention group resulted in a greater improvement in the HRQoL subscales and summary scores and this study mainly suggest that pharmaceutical care performed in the hospital settings was feasible and had a clear benefit and positive impact on patient's HRQoL [2]. A cross-sectional descriptive study by Iman ABasheti et al., suggests drug related problems were categorized into efficacy, inappropriate drug adherence and inappropriate knowledge. The identified drug related problems more than 70.0% were of major severity and 80% DRP's under the "efficacy" category were major in severity, 99.3% of TRPs were major in severity under the "inappropriate drug adherence" category. This study also suggests that patients who had hypertension and diabetes mellitus were found to be none-adherent to their medications and it is associated with increased comorbidity [3]. A prospective study was conducted by Carina Hohmann et al., demonstrates that drug related problems mostly occurs at the time prescribing process. This study suggests DRPs occurs due to inappropriate drug indication and drug dosage. Other factors include age, aphasia, high prevalence of comorbidity, polypharmacy, IV route of administration because of impaired oral intake and drugs which requires frequent monitoring and adjusting dose has high risk of medication errors. Patient receiving

heparin, warfarin, antihypertensive medication, and combination of antiplatelet drugs has high risk for drug interactions and medication errors. This study also suggests that drug related problems occur at transcription error or unintended discontinuation of drug therapy. The author mentioned clinical pharmacist involvement in the discharge process, computerized order entry of drugs, monitoring drug-drug interactions prior to administration, and patient counselling will improve therapeutic outcome [4]. A retrospective descriptive study by Kannikar Semcharoen et al., mentioned most common comorbidities were hypertension and other comorbidities were dyslipidemia, diabetes and atrial fibrillation. The possible drug interactions include Warfarin–phenytoin, Warfarin–carbamazepine, Warfarin–prednisolone, Warfarin–co-trimoxazole, Warfarin–amiodarone, Meropenem–sodium valproate, and Clopidogrel–omeprazole. The author mentioned adverse drug reactions such as

Adverse Drug Reactions to Drugs

Drug	Adverse drug reaction
Atorvastatin	Hepatotoxic, myopathy
Aspirin plus dipyridamole, cilostazol	Headache, palpitation, tachycardia
Nicardipine	Phlebitis
Warfarin	Upper gastrointestinal bleeding
Hydralazine, carvedilol	Hypotension

This study shows evidence of pharmaceutical interventions has benefit in patient outcome. Some of the pharmaceutical interventions provided include, the patients receiving dual antiplatelets and has high risk of bleeding, addition of omeprazole reduces risk, reducing dose of piperacillin/tazobactam dose 4.5 g IV q 6 h to 2.25 g IV q 6 h in patients with creatinine clearance of < 20 ml/min, Increasing atorvastatin dose 20 mg to 40 mg for better reduction of low-density lipoprotein cholesterol, changing omeprazole from intravenous to oral route in patients with normal gastrointestinal tract function, discontinuation of antibiotics if there any persistent infection, stop enoxaparin prior to undergoing cardiac catheterization, monitoring vancomycin level while using, measurement of international normalized ratio (INR) in patients receiving warfarin, and replacing warfarin by a new oral anticoagulant in patients with history of labile INR despite long history of warfarin usage. 84% of above clinical pharmacist recommendations has been accepted by physician [5]. A study conducted by Carina Hohmann on intervention group and control group that indicates pharmaceutical care has a clear benefit and positive impact on patient's health related quality of life (HRQoL). In this study 12 months comparison done to patients receiving intensified pharmaceutical care and patients with standard care of HRQoL in patients and this study reports patients who do not receive intensified pharmaceutical care have a higher chance of deteriorating HRQoL and patient with pharmaceutical care was stable in several subscales and HRQoL is maintained [6]. A matched case–control study by Renata Daud-Gallottia explains adverse events are principal in deceased patients due to improper diagnostic or therapeutic procedures and inexperienced nursing activities. Author mentioned severe adverse events leads increase in mortality [7]. A prospective study and conducted by Ramesh A, explains major drug related problems were observed in patients with age group of 60-69 years, among drug-drug interactions were common. The Author explained clearly drugs involved in drug related problems.

Types of Drug Related Problems and Drugs involved

TYPES OF DRUG RELATED PROBLEMS	DRUGS INVOLVED
Drug use without indication	Domperidone Piperacillin+tazobactam Ondansetron Paracetamol Pantoprazole Tramadol
Drug Duplication	Clopidogrel Pantoprazole
Subtherapeutic Dose	Amlodipine Telmisartan Metoprolol Nimodipine
Overdose	Ranitidine Rabepazole
Adverse Drug Reactions	amlodipine induced constipation atorvastatin induced myopathy insulin induced hypoglycemia
Improper drug selection	Rabepazole Ramipril Ondansetron
Failure to Receive drugs	LMWH Multivitamins
Medication errors	Clopidogrel Aspirin Atorvastatin Mannitol Pantoprazole
Untreated indication	Cough with expectoration Anemia Vomiting

The author explained most of the ADRs belonged to 'probable' category on WHO scale. Majority was 'Mild' in severity and identified ADRs were 'Not preventable' and none of them were probably preventable and definitely preventable. Also author mentioned involvement of pharmacist in assessment of drug related problems improves patient quality of life mostly in elderly patients with poly-pharmacy. In this study the pharmacist focused in identification of potential DRPs. Most of the cases, there was a change in drug therapy and this recommendations accepted in high. In this study Poly-pharmacy was found to be a potential risk factor leads to drug related problems. By involving pharmaceutical care for early detection of drug related problems improve the therapeutic outcomes [8].

CONCLUSION:

Studies have shown that pharmaceutical care performed in the hospital settings was feasible, a clear benefit and positive impact on patient's Health related quality of life (HRQoL). Studies also suggest occurrence of stroke was more in men than women because of social habits and age group of 41 to 70 are mostly has high risk for stroke. Ischemic stroke cases are registered more in number than other strokes. The most number of drug interactions occurred is severe and observed Drug-Drug interactions in this study increases risk of

hospitalization and higher health-care cost. Drug-Drug Interactions mainly occurred between antihypertensive, anticoagulants, and antiplatelet. Antihypertensive contributed much to the occurrence of ADRs. The drug related problems mostly occurs at the time prescribing process and DRPs occurs due to inappropriate drug indication and drug dosage. Other factors include age, aphasia, high prevalence of comorbidity, polypharmacy, IV route of administration because of impaired oral intake and drugs which requires frequent monitoring and adjusting dose has high risk of medication errors. Patient receiving heparin, warfarin, antihypertensive medication, and combination of antiplatelet drugs has high risk for drug interactions and medication errors. Clinical pharmacist involvement in the discharge process, computerized order entry of drugs, monitoring drug-drug interactions prior to administration, and patient counseling will improve therapeutic outcome. The pharmaceutical care has a clear benefit and positive impact on patient's health related quality of life (HRQoL) and the patients who do not receive intensified pharmaceutical care have a higher chance of deteriorating HRQoL.

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