Original Article

Assessment of Drug Utilization Pattern of Stroke Patients in Neurology Department of a Tertiary Care Hospital

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Abstract

Background: Appropriate use of drug is an eventual component in the quality of health facility and medicine care provided to patients. Stroke is the second leading cause of death and irrational use of drug is one of the most important causes of this global burden. Therefore, regular monitoring of prescribing pattern of stroke management is very essential to provide appropriate therapy. **Objective:** This study was conducted to evaluate the extent of drug use pattern in neurology department of a tertiary care hospital. **Methods:** An observational descriptive cross-sectional study was carried out among 639 purposively taking indoor patients in neurology department of Dhaka Medical College from July 2021 to June 2022. All data were evaluated by WHO /INRUD core drug use indicators and analyzed by spss 2016. **Result:** out of 639 patients male 433 (67.76%) is prominent, ischemic stroke 399 (62.44%) is higher than hemorrhagic stroke and 61-80 years 279 (43.66%) is predominant age group. 100% polypharmacy is observed here, maximum drugs are prescribed in trade name 69.88%, 38.70% encounters contain injection and 43.82% drugs are prescribed from essential drug list. Omeprazole 639 (100%) is the most commonly prescribed drug followed by antibiotic 502 (78.56%). **Conclusion:** According to the study findings it can be stated that the incidence of ischemic stroke is prominent and male are more affected. The extent of polypharmacy is very high. Maximum drugs are prescribed in trade name. Over use of antibiotic is observed here. Omeprazole is the most commonly prescribed drug. Irrational use of drug therapy is remarkable.

Key words: Stroke , Drug utilization pattern, WHO/INRUD core drug use indicators, Rational.

Introduction:

Stroke is the most common neurological disorder. The worldwide incidence of strokes is 17 million per year and it is the second leading cause of death[1].The World Health Organization defines stroke as " rapidly developing clinical signs of focal (or global) disturbance of cerebral function, lasting more than 24 hours or leading to death, with no apparent cause other than that of vascular origin"[2].

Stroke can mainly be divided as ischemic and hemorrhagic based on clinical syndrome. Acute occlusion of blood flow to the brain due to a thrombus of cerebral origin or from another part of circulation can be caused in case of ischemic stroke and subarachnoid hemorrhage in brain tissues or intra cerebral hemorrhage can be occurred in case of hemorrhagic stroke [3].

In developing countries, 90% of the world stroke mortalities has been observed[4]. It is mostly remarkable in geriatric and people with co-morbidities, demanding multiple medications. An extremely diverse pattern of prescribing and utilization of medication is observed in this situation[5].

Pharmacoepidemiology refers to the study of the uses and effects or side effects of drugs in well-defined

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populations to provide a risk benefit assessment of effects and to assess the probability of adverse effect of drugs. It may be related to drug, giving impulse on the safety and effectiveness of drugs as well as related to utilization to improve the quality of drug therapy through educational interventions. Therefore, the drug utilization researches are powerful exploratory methods to learn the role and uses of drugs from marketing, distribution and prescription in a large population [6].

To establish a strong evidence based medicine, the World Health Organization has adopted the Anatomical Therapeutic Chemical Classification System in conjugation with defined daily dose (DDD) method[7]. To enhance the quality of drug uses, WHO/ International Network of Rational Use of Drugs has developed 'core drug use indicators' basically focusing on prescribing patterns, patient-centric and facility-specific indicators [8].

Therefore, to improve the quality of drug use, current study was conducted to determine the rate and pattern of medication utilization in the management of stroke patient among inpatient of a neurology department of a tertiary care hospital.

Materials and methods:

This was an observational, descriptive, cross sectional study which was carried out in inpatient department of neurology of Dhaka Medical College and Hospital. Total study period was one year extending from July 2021 to June 2022. Study population was all patients admitted in neurology department of Dhaka Medical College and Hospital selected by purposive sampling technique. After taking written consents, the prescriptions on file were seen randomly and sorted whether the diagnosis was stroke or not. If the diagnosis was stroke then it was recorded in data collection form as sample. Patients who did not give consent were excluded from the study. Total 639 data were collected then assessed by WHO core prescribing indicators and analyzed by spss 2016. All the prescribed drugs were coded as per the WHO ATC classification system. DDD per 1000 patient days was calculated from the prescription data using the formula: (items issued × amount of drug) / WHO DDD measure. To calculate the WHO prescribing indicators the optimal index of all indicators was set as 1. The value closer to 1 indicates rational and vice versa. Calculated index = optimal value/ observed value is used for non polypharmacy, rational antibiotic and injection safety indices. Calculated index = observed value/ optimal value is used for generic name, index of EDL.

Result:

A total of 639 prescriptions were analyzed during the study period and a total of 3788 drugs were prescribed in 639 prescriptions. The proportion of prescriptions including antibiotic among 639 prescriptions was 502 (78.56%) & the proportion of drugs prescribed from essential drug list was found 1660 (43.82%) out of 3788 drugs prescribed in 639 prescriptions.

Table I: Gender distribution of the patients (n= 639)

Gender	Number of patients	Percentage (%)
Male	433	67.76
Female	206	32.24
Total	**639**	**100**

Table I showed that among 639 patients 433(67.76%) were male and 206(32.24%) were female.

Table II: Age distribution of the patients (n= 639)

Age group (in years)	Number of patients	Percentage (%)
21-40	89	13.93
41-60	271	42.41
61-80	279	43.66
Total	**639**	**100**

Table II illustrated that 61-80 years was the prominent age group occupied 279(43.66%) among 639 patients.

Table III: Type of stroke (n= 639)

Type of stroke	Number of patients	Percentage (%)
Ischemic stroke	399	62.44
Hemorrhagic stroke	240	37.56
Total	639	100

Table III narrated that among 639 encounters 399(62.44%) were ischemic and 240(37.56%) were hemorrhagic stroke.

Table IV: Number of drugs per encounter (n=639)

Number of drugs	Number of prescription	Percentage (%)
1-4	0	0
≥ 5	639	100
Total	**639**	**100**

Table IV showed that 639(100%) encounters contained more than 5 drugs.

Table V: Nomenclature of the prescribed drugs

Nomenclature of drugs	Number of drugs	Percentage of drugs (%)
Generic name	1141	30.12
Trade name	2647	69.88
Total	**3788**	**100**

Table V illustrated that among 3788 drugs 2647(69.88%) drugs were prescribed by trade name and 1141(30.12%) were prescribed by generic name.

Table VI: Formulations of the prescribed drugs:

Formulation of the drugs	Number of drugs	Percentage (%)
Injection	1466	38.70
Others	2322	61.30
Total	**3788**	**100**

Table VI showed that among 3788 drugs 1466(38.70%) were prescribed in injectable formulations.

Table VII: Calculated WHO prescribing indicators for the study

WHO prescribing indicators	Optimal value (%)	Obtained value	Optimal index	Calculated optimal index
Extent of non polypharmacy prescriptions	≤ 3	0	1	3
Percentage of drugs prescribed in generic name	100	30.12	1	0.3012
Percentage of prescriptions including antibiotics	≤ 30	78.56	1	0.381
Percentage of prescriptions including injections	10	38.70	1	0.258
Percentage of drugs prescribed from essential drug list	100	43.82	1	0.4382

Table VII showed that the optimal index of non polypharmacy was 3 (>1) and the optimal index of others were < 1.

Table VIII: ATC classification & defined daily dose (DDD) of prescribed drugs

Name of the drug	ATC code	Dose of the drug (mg)	Frequency of administered drugs	Patient volume with percentage (%)	WHO standard DDD (mg)	DDD per 1000 patient days (mg)
Ceftriaxone	J01DD04	1000	2	502(78.56%)	2000 (p)	1992.03
Aspirin	B01AC06	75	1	299(46.79%)	1 tablet (o) independent of strength	3.34
Atorvastatine	C10AA05	20	1	299(46.79%)	20 (o)	3.34
Omeprazole	A02BC01	20	2	639(100%)	20(o)	31.30
Vinpocetine	N06BX18	5	3	74(11.58%)	15(o)	13.51
Lactulose	A06AD11	3400	3	225(35.21%)	6700 (o)	6755.56
Ondansetrone	A04AA01	16	3	31(4.85%)	16 (o)	48.38
Olmesartan	C09CA08	20	1	29(4.54%)	20 (o)	34.48
Cinnarizine, combinations	N07CA52	20	3	27(4.22%)	90 (o)	24.81
Betahistine	N07CA01	16	3	29(4.54%)	24 (o)	68.96
Amlodipine	C08CA01	5	1	100(15.65%)	5 (o)	10
Nimodipine	C08CA06	60	5	224(35.05%)	300 (o)	4.46
Dexamethasone	H02AB02	5	3	190(29.73%)	1.5 (p)	17.52
Ramipril	C09AA05	5	1	142(22.22%)	2.5 (o)	14.08
Paracetamol	N02BE01	1000	3	145(22.96%)	3000 (o)	6896.55
Levetiracetam	N03AX14	500	2	55(8.61%)	1500 (o)	12181.81
Linagliptin	A10BH05	5	1	59(9.23%)	5	16.94
Sodium chloride	A12CA01	600	3	48(7.51%)	1000 (o)	37500

Table VIII illustrated that among 639 encounters 639(100%) contained omeprazole and its DDD/1000 patient days was 31.30 mg, 502(78.56%) contained ceftriaxone and DDD/1000 patient days was 1992.03.

Discussion:

Drug utilization analysis is important for optimization of the patterns of drug prescribing to assure patient safety. Here WHO/INRUD core drug use indications are fundamental tools[9]. In this study demographic profile showed that among 639 stroke patients 433(67.76%) were male and 206 (32.24%) were female which may indicate that male are more vulnerable for stroke than female. Similar findings were found to the study conducted in

Guntur, Andhra Pradesh where male 294(66.14%) and female 152(33.85%)[10].

In this study the incidence of ischemic stroke was higher 399 (62.44%) compared to hemorrhagic stroke 240 (37.56%) which is in accordance with the study of Jena S.S. ***et al***; 2018 [11]. Predominant age group of this study was 61-80 years (43.66%) which is around similar to the study conducted in andhre Pradesh in India where 61-70 years (26%) was predominant age group[3]. The number of drugs per prescription was ≥5 (100%) in this current study which is similar to the study conducted by karishma S ***et al***; 2020 where it was 8 (21.28%)[10].

According to WHO core drug prescribing indicators the optimal value of prescribed drug in generic name is 100%, in this study 30.12% drugs were prescribed in generic name. Similar study was conducted by Atif M ***et al***; 2016 where 83.1% was prescribed in generic name [8]. The proportion of prescriptions including antibiotic was 78.56% in comparison to WHO critical value 30% which is also around similar to the study conducted by Atif M ***et al***; 1016 where this value was 52.4% [8].

Again encounters with an injection was 38.70% found in this study where WHO core value 10 and a study was conducted by Ola A. Aki ***et al***; 2014 where this value was 9.9% which is dissimilar to this current study [9]. Therefore, the use of injectable formulation is irrational when oral formulation is appropriate because of the total cost of therapy. The proportion of EDL in this study was 43.82% and the WHO indicator value is 100%. A study conducted by Upadhya M ***et al***; 2023 where finding was 65.47% [5].

The prominent incidence of drug use of this study was omeprazole 639(100%) followed by ceftriaxone 502(78.56%), aspirin 299(46.79%) and atorvastatine 299(46.79%). Similar study conducted by Jena SS ***et al;*** 2018 where antihypertensive 856(69.9%) had highest percentage followed by lipid lowering agents 819 (66.9%) and antiplatelet drugs 805 (65.7%)[11].

Conclusion:

According to the study findings it can be stated that the incidence of ischemic stroke is prominent and male are more affected. The extent of polypharmacy is very high. Maximum drugs are prescribed in trade name. Over use of antibiotic is observed here. Omeprazole is the most commonly prescribed drug. Irrational use of drug therapy is remarkable.

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