Journal of Pharmaceutical Care & Health Systems

Hasan et al., J Pharma Care Health Sys 2017, 4:3
DOI: 10.4172/2376-0419.1000177

Research Article OMICS International

Disease and Prescription Pattern for Outpatients with Neurological Disorders in Bangladesh: An Empirical Pilot Study

Md Fakhrul Hasan[1*], Md Ali Asif Noor[1], Mosiqur Rahman[2], Kala Chand Debnath[2] and Md Siddiqul Islam[1]

[1]*Department of Pharmacy, Southeast University, Dhaka, Bangladesh*

[2]*Department of Pharmaceutical Sciences, North South University, Dhaka, Bangladesh*

[*]**Corresponding author:** Hasan MF, Department of Pharmacy, Southeast University, Dhaka, Bangladesh, Tel: 01711-698261; E-mail: fakrulhasan01@yahoo.com

Received date: Nov 17, 2016; **Accepted date:** Jul 06, 2017; **Published date:** Jul 11, 2017

Abstract

Background: To study the prevalence and prescription pattern for outpatients with neurological disorders in Bangladesh.

Methods: The study was conducted on 1684 patients in six hospitals of Dhaka city from March 2014 to June 2015. Data were collected through a predesigned questionnaire from the patients that contain information about sex, age, marital status, occupation, residential status, affected disease, self-medicated drugs and prescribed drugs.

Results: Out of 1684 patients, male 963 (57.19%) predominance. The study revealed that headache and migraine 50 (29.75%), stroke 403 (23.93%) and seizure 119 (7.07%) were more projecting neurological disorders. Genetic reason for the neurological disorders was found among only 208 (12.35%) patients. Among 812 patients follow up was reported for 575 (70.82%) patients in which physician follow up was 441 (54.31%) and non-physician follow up was 134 (16.51%) patients. Maximum self-medication usage was found for the period of 3 to 6 months for 247 (41.79%) patients. Disease recovery was satisfactory with the self-medication for 223 (37.73%) patients and 38 (6.43%) patients reported side effects. Most extensively prescribed medicines were multivitamins and multi-minerals 675 (40.08%), NSAIDs and other analgesic 560 (33.25%), antiulcerant 476 (28.27%), anticoagulants 438 (26%), antihyperlipidemic 387 (22.98%) and antiepileptic 305 (18.11%) drugs respectively. The crucial reasons for the selection of prescribed medicines were the confidence with physician's prescribed drug 690 (40.97%) and knowledge of the drugs 590 (23.99%). The period of prescribed medicines usage was 1 to 3 months for 669 (39.73%) patients and 3 to 6 months for 491 (29.16%) patients. The patient's compliance for prescribed medicines was satisfactory for 582 (34.56%) patients, good for 474 (28.15%) patients and side effect was reported for 391 (23.22%) patients.

Conclusion: In Bangladesh neurological diseases are not surprising rather than other different diseases prevail in different age and sex. Headache and migraine, stroke and seizure are most frequently encountered neurological disorders here. Treatment procedure of these disorders is not quite suitable due to the anomalies of healthcare management system. Appropriate management of the healthcare system can overcome the existing inconsistencies as well as increase the knowledge, awareness and perception of the patients about health and disorders.

Keywords: Neurological disorders; Malnutrition; Seizure; Hemorrhagic stroke; Peripheral neuropathy; Depression

Introduction

Neurological disorders are major causes of disability worldwide. Structural, biochemical or electrical abnormalities in the brain, spinal cord, cranial nerves, peripheral nerves, nerve roots, autonomic nervous system, neuromuscular junction, and muscles are responsible for neurological disorders [1]. Hundreds of millions of people worldwide are affected by neurological disorders [2]. Neurological disorders account for about 20% of global burden of disease [3]. According to the US NIMH (National Institute of Mental Health) in any given year about 1 in 4 American adults suffer from a mental disorder [4]. In 2005, the prevalence of neurological disorders worldwide was 155.36 per 1000 population. Based on the projections of United Nations that by 2025, there will be 1.2 billion elderly people in the world and 71% will be living in the developing countries, it is expected that neurological disorders in the elderly will show a significant rise, particularly in the developing world [5]. Neurological disorders contributed to 92 million Disability-Adjusted Life-Years (DALY) in 2005 and were estimated to 103 million in 2030 [6,7]. There are more than 600 diseases of the nervous system [8]. Universally common neurological disorders are epilepsy, Alzheimer's Disease (AD) and other dementias, headache, migraine, multiple sclerosis, neuro infections, Parkinson's Disease (PD), stroke, brain tumours, brain trauma, malnutrition related neurological disorders, etc [9]. Like brain tumours and strokes, neurological disorders can be life-threatening or less injurious like tension headaches and sleep disorders [10]. Worldwide prevalence for neurological disorders is 1000 million [11]. Epilepsy is considered as one of the most common neurological disorders worldwide. According to World Health Organization (WHO) approximately 50 million people have epilepsy worldwide [12]. In fact, in developing and low-income countries about 80% of the people have epilepsy [13]. Globally, 47.5 million people living with dementia and it is the third leading cause of death in the UK. As stated by WHO, the

number of dementia people will be 75.6 million by 2030 [14]. Each year about 6.7 million people die for stroke, which is one of the leading causes of death in developing countries account for more than 80% of deaths [15,16]. The most common disorders of the nervous system are headache disorders [17]. In general, globally the percentage of the adult population with headache is 47%, followed by 38% for tension-type headache, followed by 10% for migraine, and 3% for chronic headache that lasts for more than 15 days per month [18]. WHO stated that approximately 20% of adults aged 60 and over suffer from neurological or mental disorders. Most common neurological disorders seen among older patients are dementia and depression. In fact, neurological and mental disorders account for 6.6% of all Disability-Adjusted Life Years (DALYs) among adults aged over 60s. Dementia mainly affects elder people, it is estimated that 47.5 million people worldwide are living with dementia. According to United Nations report in 2007, up to 1 billion people, nearly one in six of the world's population, suffer from AD and Parkinson disease, strokes, multiple sclerosis and epilepsy to migraine, brain injuries and neuroinfections. This reports also estates that about 6.8 million dying each year mainly due to aforementioned diseases. In fact, AD is the most common cause of dementia and may contribute to 60-70% of cases [19]. The Alzheimer's Association (AA) estimates in 2012 that 5.4 million Americans have AD. The number of Alzheimer's patients will be in between 11 million and 16 million as per AA estimates, with one new case appearing every 33 seconds by 2050 in US [20]. Depression especially unipolar among over 60 year olds accounts for 5.7% of Years Lived with Disability (YLDs). It is most commonly seen in developed countries. Globally, as per WHO, unipolar depression is considered as third leading causes of disease burden. Albeit brain tumor, cerebral palsy, encephalopathy, headaches, metabolic diseases, movement disorders are common neurological disorders affecting children, malnutrition related disorders such as beri-beri, polyneuropathy, Wernicke's encephalopathy, polyneuropathy, cognitive dysfunction etc. are most projecting. In low-income and developing countries, wasted and stunting among children are common [5]. The prevalence of wasted children in low income countries is 8% as states by WHO. In Latin America, the prevalence of wasted children is only 2%, but in developing countries such as Bangladesh it is 16% [21-23]. In Bangladesh, stunting is also well-known account for 45%, but 14% in Latin America [24,25]. The global average for stunting among children in low income countries is 32% [26]. In fact, more that 15% of the DALYs lost globally are estimated to be from malnutrition [27]. In 2012, the Centers for Disease Control (CDC) stated that Autism and Autism Spectrum disorders were affected from 1 in 88 children living in the US [28]. Bangladesh is a developing country in which neurology appeared as a new field in the 1960s [29]. In July 2015, the population of Bangladesh is estimated at 168,957,745 [30]. Currently, this country has an overall life expectancy of 70.94 years with male life expectancy of 69.02 years and female life expectancy of 72.94 years. Bangladeshi people lead a good life. The most common diseases of Bangladesh are stroke, malnutrition and infection disease. Except aforementioned diseases, a part of the population is affected with neurological disorders. The condition of neurological disorders in Bangladesh is totally different from industrialized country [31]. The level of mental health of a person depends on multiple social, psychological, and biological factors at any point of time. In the developed countries, older adults are more vulnerable to elder abuse including physical, sexual, psychological or emotional, financial or material; abandonment, neglect and serious losses of dignity and respect. Current evidence suggests that 1 in 10 older people experience elder abuse. Elder abuse is not only responsible to physical injuries, but also to serious, sometimes long lasting psychological consequences including depression and anxiety [31]. Although, Bangladesh is low income country, elder abuse is not common. A large number of people with common neurological disorders do not receive appropriate treatment due to poverty. Apart from the above-mentioned problems, the social and cultural stigma continuing in our society regarding neurological disorders, make the diagnosis and treatment even more challenging. Besides most of the people living in rural areas are facing the lack of logistic facilities for managing these conditions. In addition to this, the sociocultural stigma surrounding the neurologic disorders makes diagnosis and treatment more challenging. Moreover, a large section of population live in rural areas where there is lack of required facilities for managing those conditions [32]. As per international standard healthcare system should have close collaboration of physicians, pharmacists and nurses, but in Bangladesh it is not well practiced. Here, the main inconsistency is the absence of pharmacists, who are not only drug specialist but also disease specialist. Previously, there was no study that showed the pattern of outpatient's neurological diseases. The objective of this study was to analyse disease and prescription pattern for outpatients with neurological disorders in Bangladesh.

Methods

Study site

The study site was Dhaka City Corporation, which is the capital of Bangladesh. It is the mega city of Dhaka district and Dhaka division. The Dhaka metropolitan area is the 11th largest city proper in the world with a population of 17 million people in an area of 1,528 km^2 [33,34]. Including private and public, there are about 194 hospitals in this city [35]. Six hospitals named Combined Military Hospital (CMH)-Dhaka Cantonment, National Institute of Neurosciences and Hospital, Labaid Specialized Hospital, Dhaka Medical College and Hospital, Sir Salimullah Medical College, Dhaka, and PG Hospital (BSMMU)-Dhaka were selected for the collection of data because these are the main hospital of Dhaka city.

Study design and data collection

This is patient and prescription-based cross-sectional study that was conducted among outpatients with neurological disorders selected from Neurology department of six hospitals in Dhaka city. The period of this study was between March 2014 and June 2015. During this period, a total of 1684 patients with neurological disorders were identified. Information about patient, disease, medicine was collected in a predesigned questionnaire. Summary of information is listed in Table 1.

Statistical analysis

Data were collected and the results were finally compiled and presented. Microsoft Excel 2010 (Roselle, IL, USA) was used for the statistical and graphical evaluations.

Scope for error

Since the study is based on the answers provided by the patients and their prescriptions not based on any laboratory test, there is no scope for error.

Ethical Considerations

The study protocol was approved by the ethical review committee of Department of Pharmacy, Southeast University, Dhaka, Bangladesh. The study was conducted in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

Results

Out of 1684 patients, 57.19% were male and remaining 42.81% were female. The majority of the patients attending neurology department were 51-60 years age group (28.38%) followed by 18.53% in the age group between 41-50 years, 16.98% in the age group between 21-30 years, 16.09% in the age group between 31-40 years and 13.54% in the age group above 60 years. Minimum amounts of patients (5.52%, 0.95%) were aged 11-20 and below 10 years. There was marital status (64.07%) predominance. 25.59% patients were office worker followed by 20.72% students, 19.48% day labour, 16.45% household and 13.42% retired. The majority of the patients (82.84%) lived in urban area. Detailed patient related information is offered in Tables 1-6.

Gender	Number (n)	Percentage (%)
Male	963	57.19
Female	721	42.81

Table 1: Study with gender as variable.

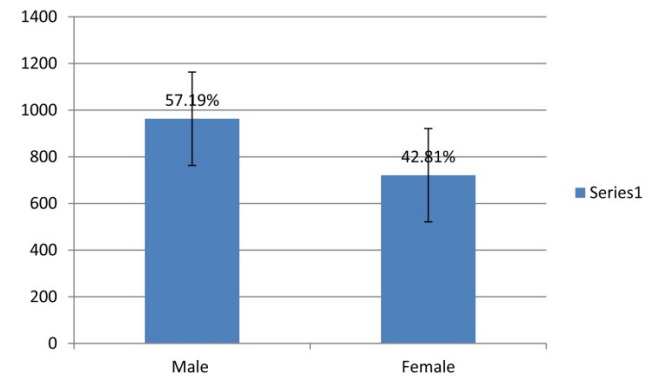

Figure 1: Graphical representation of study with gender as variable.

Age (yrs.)	n	%
< 10	16	0.95
11-20	93	5.52
21-30	286	17
31-40	271	16.1
41-50	312	18.5
51-60	478	28.4
> 60	228	13.5

Table 2: Study with age as variable.

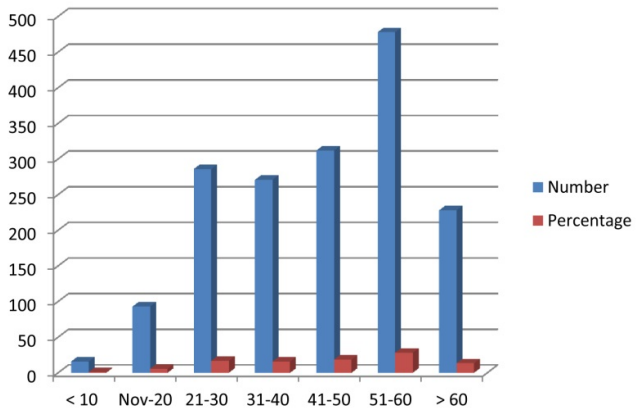

Figure 2: Graphical representation of study with age as variable.

Marital Status	n	%
Married	1079	64.1
Unmarred	421	25
Occupation		
Students	349	20.7
Office Worker	431	25.6
Day Labor	328	19.5
House hold	277	16.5
Retired	226	13.4
Others	70	4.16

Table 3: Study with marital status as variable.

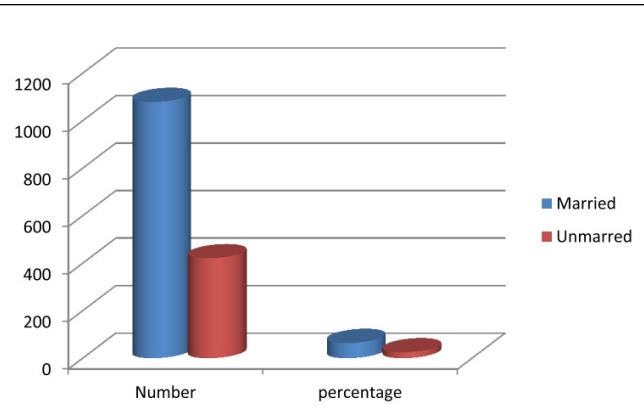

Figure 3: Graphical representation of study with marital status as variable.

In this study, 22.98% patients were affected with headache, 17.64% with ischemic stroke, 6.77% with migraine, 6.29% with hemorrhagic stroke, 5.29% with dementia, 3.99% with focal seizure, 3.92% with

peripheral neuropathy, 3.08% with primary generalized seizure etc. given in Table 3. In case of 12.35% patient's family history was responsible for the respective disorders given in Figure 1.

Residential Status	n	%
Urban	1395	82.8
Rural	289	17.2

Table 4: Study with residential status as variable.

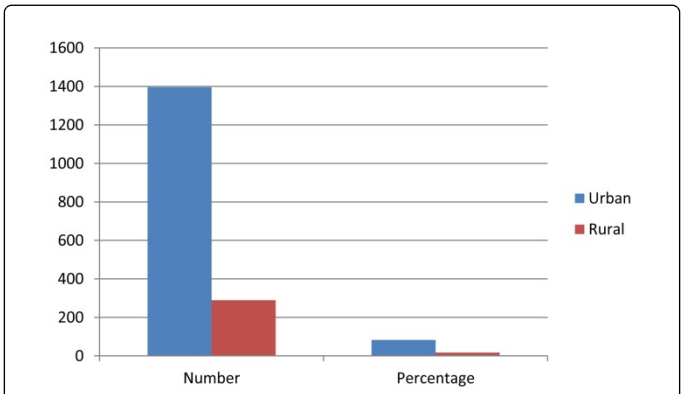

Figure 4: Graphical representation of study with residential status as variable.

The duration of disease for maximum patients (36.99%) was 1 year, followed by 1-2 years for 27.02% patients and less than 6 months for 19% patients. The lowest suffering (>2 year) was seeing among 16.98% patients. Only 33.02% patients took previous measure by physician check-up against respective neurological disorders and 51.78% patients did not take physician check-up. 15.2% patients relied on herbal, unani and homeopathis medicines (Complementary and Alternative Medicine, CAM) as a primary treatment. Follow up of the patients are given in which physician follow up was 54.31% followed by 16.51% indigenous medicine practitioners follow up and 29.19% didn't follow up among 812 patients. Out of 575 patients, 38.78% patients were obtained partial recovery followed by 42.96% no recovery and worse condition was reported for 18.26% patients. Actually hearth hazard effect was reported among patients due to use of physician recommended medication as well as indigenous medicine practitioner recommended medication. In addition to neurological disorders, 17.46% patients were also affected by other non-neurological disorders. Among them peptic ulcer disease (43.54%), diabetes mellitus (25.85%), heart disease (8.84%), rheumatoid arthritis (6.46%), Chronic Obstructive Pulmonary Disease (COPD) (4.76%) and bronchial asthma (2.38%) were common. The most widely used self-medicated medicines used by affected patients were NSAIDs and other analgesic (30.8%), antiulcerant (28.43%), anticoagulants (21.15%), antiepileptic (21.15%), antihyperlipidemic (18.1%) and antihypertensive (10.32%) drugs. The medicine which was used in least percentage was antimigraine (8.1%) drugs. The foremost neurological disorders that enforced the patients to take self-medication were headache (26.73%), ischemic stroke (24.02%), migraine (14.55%), hemorrhagic stroke (12.18%), focal seizure (8.79%), primary generalized seizure (6.94%) etc. The main reasons for the self-medication was the pre-experience, which was seen among 29.78% patients, 27.58% as suggestions from others, 24.7% as knowledgeable of the drugs, 13.36% as reduction of physician's fees and 4.57% as no confidence with physician's medication. The duration of self-medication usage were found in case of 41.79% patients for the period of 3 to 6 months, 29.44% for 1 to 3 months and 21.32% for less than 1 month. Only 7.45% patient's used self-medication for 6-12 months. The patient's compliance for self-medication varies from excellent to self-medication. 37.73% patients stated that the disease recovery was satisfactory with the self-medication, followed by 21.15% as good and 4.57% as excellent. In this study reported side effects for the self-medication was 6.43% patients and 30.12% patients did not response.

Neurologic Disease	Number (n)	Percentage (%)
Headache	387	22.98
Migraine	114	6.77
Ischaemic stroke	297	17.64
Haemorrhagic stroke	106	6.29
Subarachnoid haemorrhage	19	1.12
Transient ischemic attack	16	0.95
Focal seizure	67	3.99
Primary generalized seizure	52	3.08
Dementia	89	5.29
Parkinson's disease	28	1.66
Dystonia	24	1.42
Peripheral neuropathy	66	3.92
Hydrocephalus	15	0.89
Myopathy	26	1.54
Paraplegia	32	1.9
Cranial nerve palsy	18	1.06
Lumber spondylosis	43	2.55
Cerebral palsy	23	1.37
Potts disease	17	1
Meningitis	22	1.3
Brain tumour	33	1.96
Encephalopathy	19	1.13
Cervical spondylosis	22	1.3
Transverse myelitis	35	2.08
Disc prolapse	49	2.9
Undiagnosed	42	2.49

Table 5: Study with neurologic disease as variable.

In this study most widely prescribed medicines were multivitamins and multiminerals for 40.08% patients followed by NSAIDs and other analgesic for 33.25% patients, antiulcerant for 28.27% patients, anticoagulants for 26% patients, antihyperlipidemic for 22.98%

patients, antiepileptic for 18.11% patients, antihypertensive for 13.3% and antimigraine for 8.43% patients. In depth used prescribed drug for neurological disorders are given in Table 4. The underlying reason that enforced the patients to take prescribed medicines was the confidence with physician's prescribed drugs which was seeing among 40.97% patients, followed by 35.04% as knowledge of the drugs and 23.99% as suggestion from others. The duration of prescribed medicines usage were found in case of 39.73% patients for the period of 1 to 3 months, 29.16% for 3 to 6 months, 23.09% for less than 1 months and 8.02% for 6-12 months. About the patient's compliance for prescribed medicines, 34.56% patients stated that the disease recovery was satisfactory, followed by 28.15% as good, 8.25% as excellent. 5.82% patients did not response and side effect was observed among 23.22% patients.

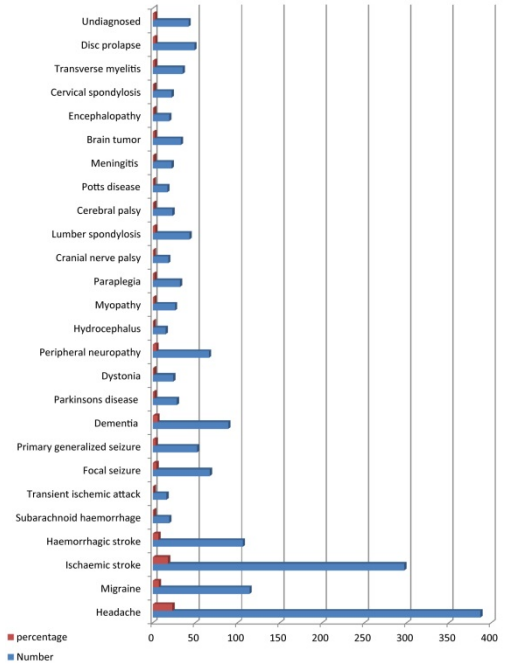

Figure 5: Graphical representation of study with neurologic disease as variable.

Discussion

Bangladesh is one of the densely populated countries in the world where infectious diseases, malnutrition and many chronic neurological disorders are quite common. Although, there is no national statistics up till now in our country, but there are some hospital based studies that reflect to some extent the situation of some diseases in Bangladesh. This is the first study showing crystal clear idea about the outpatients with neurological disorders and prescribing trends in Bangladesh. The demographic profile of the patients reflects that neurological disorders are more prevalent in the male, 40 to 60 years age and married person. Age-related increases in neurological disorder are also more common in developed world. As per WHO, more than 20% of adults aged 60 and above 60 suffer from a neurological disorders as stated earlier [34]. Like other developing country marriage rate is also higher in this country that was seen by the marital status of the patients. A study conducted by Gajurel et al. in India showed similar findings in term of age and sex [36]. This study showed that office worker, student, day labour and household were more prone to neurological orders. Anusha et al. showed that householders are mostly affected by epilepsy in India [37]. Our study showed that 82.84% patients lived in urban area, but this is not actual phenomena. In the rural area, prevalence will be high. In the study of Gourie-Devi et al. the prevalence rate of neurological disorders in urban and rural populations was 2,190 and 4,070/1,00,000 respectively in India [38]. In case of developed country, the most common neurological disorders are AD, PD, amyotrophic lateral sclerosis, stroke, traumatic brain injury, spinal cord injury epilepsy etc. Stroke is considered as major killer and cause of disability in developing world. The average annual incidence rate of stroke in India currently is 145 per 100,000 populations, which is higher than the western nations [39]. In the US, stroke is the fifth number cause of death, killing nearly 129,000 people a year and considered as leading cause of long-term severe disability [40]. In this study headache and migrane, stroke and epilepsy were the foremost neurological disorders. According to the study of Saxena et al. majority of people with primary headache disorders live in the developing world [41]. In the study of prevalence and characteristics of headache, Ali et al. showed that 30% school and college going students had headache in Bangladesh [42]. One percent of Americans will develop epilepsy in their lifetime. About 2.5 to 3 million people in the US have epilepsy. Additionally, about 1 in 26 people will experience recurring seizures [43]. The study of Mannan et al. showed that the number of epilepsy patients in Bangladesh is about 1.3 million. The folkloristic concepts of medicinal plants play an active role in the treatment of various medical conditions. In this study, 15.2% patients took CAM. The use of folk medicines will be higher in rural area of Bangladesh. About 3.5 billion people in developing countries primarily depended on medicinal plants and herbal medicine around for their healthcare needs. As said by WHO, more than 80% of the world's population trusts on traditional medicine for their medical care. According to the study of Mannan et al. showed that about 70% of patients visited indigenous medicine practitioners, exorcists, spiritualists before to consulting the physician in Bangladesh [44-46]. In the study of role of traditional healers and indigenous medical practitioners in health care Nandan et al. showed that nearly three-fourth of the indigenous medical practitioners (74.37%) in the rural area of Agra were treating 15 patients in a day. In this study, the mostly used self-medicated medicines were NSAIDs and other analgesic, antiulcerants, anticoagulants, antiepileptic drugs, etc. Due to availability of medication like consumer products self-medication is not only limited to over-the-counter medicines that were proved by the self-medication patters of the patients in this study. Day-by-day more drugs were changed from Prescription-Only Medications (POM) to pharmacy medications. The prevalence rates of self-medication amongst university students are relatively high. Previous studies have reported prevalence rates of about 76% in Pakistan, 94% in Hong Kong, 87% in India, 43.2% in Ethiopia, 86.4% in Brazil, 98% in Palestine, and 55% in Egypt. Headache, ischemic stroke, migraine, hemorrhagic stroke, focal seizure etc. were the neurological disorders for taking these self-medicated medicines. In the study of Sawalha et al. showed that headache and flu were the most common health conditions reported to be self-medicated in Palestine. This study revealed that past experiences and suggestion from others were the main reasons for selecting self-medication. Biswas et al. showed that past experiences and familiarity were main reason for self-medication of antibiotics in Bangladesh. In addition to this financial factor is likely to partly account for the self-medication [47-51]. In the study of self-medication practice: the case of Kolladiba town, North West Ethiopia, Abrha et al. revealed that high costly of modern health care is

responsible for practicing self-medication [52]. In developed countries, the rate of self-medication is very poor for strictly rules and regulation. The uncontrolled use of medicines can be harmful because of adverse drug reactions, although in this study the compliance for self-medication was satisfactory for 37.73% patients. This study found self-medication practice for 35.1% patients. The current prescribing trends were evaluated the commonly prescribed drugs for neurological were multivitamins and multiminerals, NSAIDS and other analgesic, antiulcerant, anticoagulants, antihyperlipidemic, antiepileptic, antihypertensive, antimigrane drugs. In the study of Sekar et al. showed that antihypertensive drugs (32%) followed by antiplatelet (14%) neuroprotective (10%) and nootropics (8%) are prescribed drug for stroke in India [49]. Carbamazepine (13.3%) was the first line drug prescribed for simple partial seizures and complex partial seizures according to the study of Anusha et al. in India [37] (Figures 2-6).

Types of the drug	Prescribed drugs	n	%
NSAIDs and other analgesic	Naproxen, Ibuprofen, Aspirin, Ketorolac, Tromethamine, Diclofenac, Indomethacin, Tolfenamic acid, Etoricoxib, Paracetamol, Tramadol, Morphine, Naloxone, Naltrexone, Fentanyl, Nalbuphine	560	33.3
Antiulcerant	Antacids, Ranitidine, Famotidine, Omeprazole, Esomeprazole, Rabeprazole, Pantoprazole	476	28.3
Antimigraine	Zolmitriptan, Sumatriptan	142	8.43
Anticoagulants	Aspirin, Warfarin, Clopidogrel, Cilostazol, Heparin, Streptokinase	438	26
Antihyperlipidemic	Atorvastatin, Fluvastatin, Simvastatin, Fenofibrate, Niacin	387	23
Antihypertensive	Labetalol, Nimodipine, Mannitol, Furosemide, Losartan, Atenolol, Propranolol, Captopril, Acetazolamide	224	13.3
Steroidal	Prednisolone, Betamethasone, Dexamethasone	58	3.44
Multivitamins and	Vitamins: Vitamin A, Vitamin D, Vitamin B complex, Vitamin C,Vitamin E.	675	40.1
Multiminerals	Minerals: Calcium, Phosphorous, Iodine, Magnesium, Selenium,Iron, Zinc, Copper, Manganese, Chromium, Molybdenum, Chloride,Potassium		
Antiepileptic	Valproic acid, Carbamazepine, Lamotrigine, Topiramate, Oxcarbazepine, Pregabalin, Gabapentin, Lacosamide, Oxcarbazepine, Phenytoin, Diazepam, Lorazepam, Phenobarbital, Diazepam, Clonazepam, Lorazepam, Midazolam, Flurazepam, Flumazenil, Phenobarbital, Thiopental	305	18.1
Hypnotic	Zaleplon, Zolpidem	46	2.73
Anti-Alzheimer	Donepezil, Rivastigmine	89	5.29
Muscle relaxants Baclofen	Tizanidine	46	2.73
Anticonvulsant Phenytoin	Phenobarbital, Fosphenytoin, Pregabalin, Gabapentin	14	0.83
Antihistamine	Meclizine, promethazine, pheniramine maleate	28	1.66
Antidepressant	Amitriptylin, Nortriptyline, Imipramine, Doxepin, Citalopram, Fluoxetine, Bupropion, Maprotiline, Selegiline	69	4.1
Antipsychotic	Chlorpromazine, Prochlorperazine, Clozapine, Risperidone	13	0.77
Anti-Parkinson	Bromocriptine, Carbidopa, Entacapone, Levodopa, Procyclidine, Ropinirole, Selegiline	40	2.38
Antibacterial	Isoniazid, Pyrazinamide, Streptomycin, Ampicillin, Vancomycin, Ceftriaxone	39	2.32
Antiviral	Acyclovir, Oseltamivir, Zidovudine, Lamivudine, Abacavir, Nevirapine	12	0.71
Anticancer	Methotrexate, Cisplatin, Paclitaxel, Carboplatin	33	1.96
Others	-	79	4.69

Table 6: Study with types and prescription of drugs as variable.

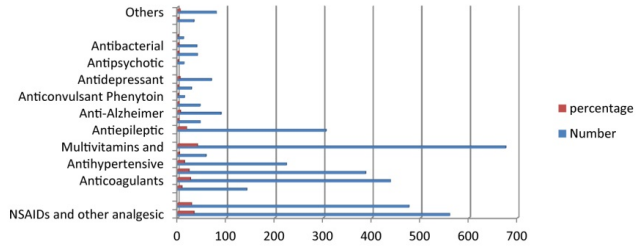

Figure 6: Graphical representation of study with types and prescription of drugs as variable.

Conclusion

The study showed that headache and migraine, stroke and seizure were more prominent disease that are not comparable to western countries in which Alzheimer disease and other dementia are primary neurological disease. As a developing country in addition to neurological disorders, peptic ulcer disease, diabetes mellitus and heart disease were seen among patients. NSAIDs and other analgesic, antiulcerant, anticoagulants, antiepileptic and antihyperlipidemic were the most commonly reported type of medications consumed through self-medication. The commonly prescribed drugs for neurological were multivitamins and multiminerals, NSAIDs, antiulcerant, anticoagulants, antihyperlipidemic, antihypertensive, antiepileptic and antimigrane. In this study, side effects were reported among 23.22% patients. The study also revealed that presence of multivitamin and minerals in a number of prescriptions. In this study, most frequent use of self-medicated drugs, irrational uses of multivitamin and minerals and reported side-effect of drugs are mainly health care setting of this country. Actually, the healthcare system in Bangladesh is totally different. In western countries, most of the pharmacists are working as hospital and community pharmacist, but in Bangladesh most of the pharmacists are industrial pharmacists due to management hierarchy of hospitals and community clinics. Medicine can save lives, but the population of this country passes their life with great risks. Proper settings of healthcare management system, especially placement of hospital and community pharmacy can save the life of the people of Bangladesh.

References

1. Neurological disorders webquest (2015) Neurological Disorders Project.
2. Wikipedia (2015) Neurological disorder.
3. Burton KJ, Allen S (2003) A review of neurological disorders presenting at a paediatric neurology clinic and response to anticonvulsant. Ann Trop Paediatr 23: 139-143.
4. Mental disorders in America (2015) The Kim Foundation.
5. World Health Organization (2006) Neurological Disorders: Public Health Challenges.
6. Bower JH, Asmera J, Zebenigus M, Sandroni P, Bower SM, et al. (2007) The burden of inpatient neurologic diseases in two Ethiopian hospitals. Neurology 68: 338-342.
7. Osuntokun OB (1971) The pattern of neurological illness in tropical Africa: Experience at Ibadan, Nigeria. J Neurol Sci 12: 417-442.
8. Medicines in development for neurological disorders (2015) Epilepsy Foundation.
9. Gourie-Devi M (2008) Organization of neurology services in India: Unmet needs and the way forward. Neurol India 56: 4-6.
10. Neurological disorders: types, research & treatment (2015).
11. Neurological disorders affect millions globally: WHO report (2015)
12. Dekker PA (2002) Epilepsy: A manual for medical and clinical officers in Africa. World Health Organization.
13. Prilipko L (2005) Atlas: Epilepsy care in the World. World Health Organization.
14. Saxena S (2015) First WHO ministerial conference on global action against dementia. Geneva: World Health Organization.
15. Murray CJ, Lopez AD (1996) The global burden of disease: a comprehensive assessment of mortality and disability from diseases, injuries and risk factors in 1990 and projected to 2020. Geneva: World Health Organization.
16. Rodgers A, Vaughan P (2002) The world health report 2002: reducing risks, promoting healthy life. France: World Health Organization.
17. Ahmed F (2012) Headache disorders: differentiating and managing the common subtypes. Br J Pain 6: 124-132.
18. Stovner L, Hagen K, Jensen R, Katsarava Z, Lipton R, et al. (2007) The global burden of headache: a documentation of headache prevalence and disability worldwide. Cephalalgia 27: 193-210.
19. Mental health and older adults (2015).
20. 2014 Alzheimer's disease facts and figures.
21. De Onis M, Brown D, Blössner M, Borghi E (2012) Levels and trends in child malnutrition: UNICEF-WHO-The World Bank joint child malnutrition estimates. New York: UNICEF.
22. Post CLA, Victora CG (2001) The low prevalence of weight-for-height deficits in Brazilian children is related to body proportions. J Nutr 131: 1290-1296.
23. Rahman MN, Mistry SK, Hossain MI (2014) Nutritional status of child labourers in Dhaka city of Bangladesh: findings from a cross sectional study. Bangladesh J Child Health 38: 130-136.
24. Srinivasan CS, Zanello G, Shankar B (2013) Rural-urban disparities in child nutrition in Bangladesh and Nepal. BMC Public Health 13:581.
25. de Onis M, Blössner M, Borghi E (2012) Prevalence and trends of stunting among pre-school children, 1990-2020. Public Health Nutr 15: 142-148.
26. Kimani-Murage EW, Muthuri SK, Oti SO, Mutua MK, van de Vijver S, et al. (2015) Evidence of a double burden of malnutrition in urban poor settings in Nairobi, Kenya. PLoS One 10: e0129943.
27. Murray C, Lopez (2015) A Gender and nutrition in the global burden of disease, 1990 to 2020.
28. Center for Disease Control and Prevention (2014) CDC estimates 1 in 68 children has been identified with autism spectrum disorder.
29. Chowdhury RN, Hasan ATMH, Rahman YU, Khan SI, Hussain AR, et al. (2014) Pattern of neurological disease seen among patients admitted in tertiary care hospital. BMC Research Notes 7: 202.
30. U.S. Census Bureau Current Population.
31. The World Factbook (2015) Central Intelligence Agency.
32. World Health Organization (2016) Mental health: strengthening our response. World Health Organization.
33. Chowdhury RN, Hasan ATMH, Rahman KM, Shyfullah M, Deb SR, et al. (2012) Spectrum of neurological disorders: experience in specialized outpatient clinic in Bangladesh J Med 13: 39.
34. Wikipedia (2015) Dhaka.
35. Greater Dhaka sustainable urban transport project
36. List of public (government) & private hospital list in Dhaka.
37. Gajurel BP, Parajuli P, Nepali R, Oli KK (2012) Spectrum of neurological disorders admitted in Tribhuvan University teaching hospital Maharajgunj. J Inst Med 34: 50-53.
38. Murthy NV, Anusha B, PerumalP (2012) A Study on trends in prescribing pattern of antiepileptic drugs in teritiary care teaching hospital. Int J of Chem and Pharm Sci 3: 25-30.

39. Gourie-Devi M, Gururaj G, Satishchandra P, Subbakrishna DK (2004) Prevalence of neurological disorders in Bangalore, India: a community-based study with a comparison between urban and rural areas. Neuroepidemiology 23: 261-268.
40. Kaul S, Bandaru VC, Suvarna A, Boddu DB (2009) Stroke burden and risk factors in developing countries with special reference to India. J Indian Med Assoc 107: 367-370.
41. Mung'ala-Odera V, Meehan R, Njuguna P, Mturi N, Alcock KJ, et al. (2006) Prevalence and risk factors of Neurological disability and impairment in children living in rural Kenya. Int J Epidemiol 35: 683-688.
42. Mateen FJ, Dua T, Steiner T, Saxena S (2008) Headache disorders in developing countries: research over the past decade. Cephalalgia 28: 1107-1114.
43. Siddiqi MH, Rahman MH, Hadiuzzaman, Yeasmin F, Ali Y (2012) Prevalence and characteristics of headache assessed in Bangladeshi school and college going students. Comm Bas Med J 1: 14-18.
44. Holland K (2015) Epilepsy by the numbers: facts, statistics, and you.
45. Obi JO, Sykes RM (1984) Neurological diseases as seen at the outpatient Paediatric Neurology Clinic in Benin City. Ann Trop Paediatr 4: 217-220.
46. Karmakar P, Islam MM, Kibria MG, Hossain MS, Hossain MS, et al. (2012) Prevalence, belief and awareness of preferring traditional healthcare system in urban and rural people of Noakhali district, Bangladesh. Int Curr Pharmace J 1: 229-234.
47. Jamison DT, Breman JG, Measham AR, Alleyne G, Claeson M, Evans DB, Jha P, Mills A, Musgrove P, editors (2006) Disease Control Priorities in Developing Countries. 2nd edition, Oxford University Press, New York.
48. Debas HT, Laxminarayan R, Straus SE (2006) Complementary and Alternative Medicine in disease control priorities in developing countries, 2nd edition, Oxford University Press, New York.
49. Kuriakose C, Shifafiya MN, Sekar V, Kumar RS (2014) To evaluate the prevalence and drug prescribing trends in stroke patients: a retrospective study. Int J of Chem and Pharm Sci 5: 22-26.
50. Flaiti MA, Badi KA, Hakami WO, Khan SA (2017) Evaluation of self-medication practices in acute diseases among university students in Oman. J Acute Dis 2014: 249-252.
51. Sawalha AF (2007) Assessment of self-medication practice among university students in Palestine: therapeutic and toxicity implications. The Islam Uni J 15: 67-82.
52. Biswas M, Roy MN, Manik MIN, Hossain MS, Tapu SMTA, et al. (2014) Self-medicated antibiotics in Bangladesh: a cross-sectional health survey conducted in the Rajshahi City. BMC Public Health 14: 2-5.
53. Abrha S, Molla F, Melkam W (2014) Self-medication practice: the case of Kolladiba Town, North West Ethiopia. Int J of Pharma Sci and Res 5: 670-676.