

Original Research Article

Burden and features of neurological patients in Chittagong Medical College and Hospital in Bangladesh

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ABSTRACT

Background: Neurological disorders are a common and significant public health problem globally, and innovative strategies are needed to address the epidemic in resource-poor settings in Bangladesh. The aim of this study was to evaluate the burden and features of neurological diseases requiring hospitalization in a tertiary care hospital in Chittagong, Bangladesh.

Methods: This study was a prospective observational study conducted from January to June 2021 on patients admitted to the adult neurology unit of a hospital in Chittagong, Bangladesh. Data was collected through face-to-face interviews, laboratory data, and previous medical records, and in-hospital complications and outcomes were recorded. The data was cleaned and analysed using SPSS and presented in tables.

Results: In this study, stroke was the most common neurological condition requiring hospitalization, accounting for 74% of cases and leading to death in 73% of cases. The most frequent in-hospital complication was urinary tract infection (26%), mostly in stroke patients. Of stroke patients, 88% had incomplete recoveries at discharge, while 7% died. Hypertension was the most common risk factor present in both acute confusional state and stroke cases. The median duration of hospital stay was longest among patients with central nervous system infections.

Conclusions: Stroke dominates the burden of neurological diseases requiring hospitalization in tertiary care hospitals in Bangladesh. The most frequent in-hospital complication was urinary tract infections, mostly in stroke cases. The overall in-hospital mortality was 7%, most patients recovered incompletely at discharge (82%).

Keywords: Burden, Chittagong, CNS, Neurological patients, Stroke

INTRODUCTION

Globally, neurological disorders consist of a significant weight of illness. These are common as well as major public health issues. The spectrum of diseases ranges from non-communicable disorders like stroke and neurodegenerative disorders to central nervous system infections. The burden of neurological diseases may be on the increase, especially in developing countries.¹ It is seriously underestimated by traditional epidemiological and health statistical methods that take into account only

mortality rates but not disability rates.² Neurological disorders and some of the other conditions with Neurological impairments and sequelae constitute over 6% of the global burden of disease, and this burden is especially high in many low and middle-income countries.³ It is very obvious that, stroke remains the most frequent cause of neurologic admissions and mortality.⁴ Stroke and CNS infections were the most prevalent neurological disorders identified. Ekenze et al have found that, neurological admissions comprise about 14.8% of medical admissions; furthermore, the spectrum of

neurological diseases are stroke 64.9%, central nervous system infections (21.8%), HIV related neurological diseases (3.5%), hypertensive encephalopathy (3.4%), dementia (3%), subarachnoid hemorrhage (2.2%), Guillian Barre syndrome (1.2%), Parkinson's disease (1.1%), myasthenia gravis (1.0%), motor neuron disease and peripheral neuropathy and accounted for 0.8% and 0.6% respectively.⁵ Non-infectious diseases accounted for 78.2% of neurological admissions, while infectious diseases accounted for 11.8%.⁶ According to the recently published global burden of disease 2010 study (GBD 2010), stroke is the second leading cause of death globally and the third leading cause of premature death and disability as measured in DALY.⁷ Neurology is introduced as a specialty in Bangladesh during the 1960s⁷. An excess burden of cerebrovascular disease and stroke denotes a higher risk of mortality and morbidity in Bangladesh.⁸ However, rigorous population-based epidemiologic studies are needed in many resource-constrained countries to better target solutions. The double burden of communicable and non-communicable neurological disorders in low and middle-income countries needs to be kept in mind when formulating the policy for neurological disorders in these countries.

METHODS

This prospective observational study was conducted from January 2021 to June 2021 by consecutive sampling technique on the patients admitted to the adult neurology unit of Chittagong Medical College and Hospital, Bangladesh. Ethical clearance was obtained from BMRC. Obeying inclusion as well as exclusion criteria of this study in total 584 cases were enrolled as the study population. Any patients with abnormal neurological features admitted to the hospital were included in the study after informed consent was obtained from the participants or their legal guardians. No age restriction was placed in this study, and any patients unwilling to give consent regarding the study were excluded from the study. For ease of implementation, it was planned to

recruit all consecutive cases admitted in a day (8 am to 8 pm), two days a week, in the study hospital for 8 weeks. The days were selected purposively to match the date of admission days of the co-investigators. Recruiting all cases over a period was not feasible, considering the volume of cases. After obtaining the study approval (ethical and study hospital administration), three dedicated research assistants (RAs) were recruited for the study hospital. A daylong training and coordination meeting of the investigators were organized to bring uniformity in data collection and study procedures. In cases unable to respond or seriously ill, information was collected by interviewing the closest person accompanying the case. For some of the cases, study procedures were completed the following day. RA recorded the in-hospital complications and outcome at the end of hospital stay from the hospital management record files. Diagnosis was recorded from the case management file in the hospital or if missing for any reason, were recorded at discharge or death. In-hospital complications were recorded from the hospital management sheet at discharge. The outcome was recorded at discharge or from the discharge register as complete recovery, incomplete recovery, discharge on request (DOR) and death. All data were processed, analyzed and disseminated by using MS Excel and SPSS version 22.0 program as per necessity.

RESULTS

In this study, among total 584 participants, 53% were male. The mean±SD age of the participants was 55±0.73 years. In total acute confusional state patients were 33 (6%) in number and the most common presenting symptom was decreased alertness 88%, followed by dizziness 45%, vomiting 42%, partial or complete loss of sensation 36%. In 432 (74%) stroke patients, the most frequent presenting symptom was muscle weakness 90%, followed by slurred speech 68%, dizziness 44%, decreased alertness 31%, vomiting 28%, etc.

Table 1: Frequency of presenting symptoms in major disease categories (N=584).

Symptoms	Acute confusional state	In stroke	CNS infections	Other diseases
	n/N (%)	n/N (%)	n/N (%)	n/N (%)
Total number of cases	33/584 (6)	432/584 (74)	28/584 (5)	91/584 (15)
Muscle weakness	8/33 (25)	386/432 (90)	5/28 (19)	9/23 (39)
Headaches	10/33 (30)	59/432 (14)	17/28 (61)	5/23 (22)
Unexplained pain	4/33 (12)	18/432 (4)	1/28 (4)	2/23 (9)
Vomiting	14/33 (42)	126/432 (28)	17/28 (60)	5/23 (22)
Dizziness	15/33 (45)	192/432 (44)	8/28 (28)	5/23 (22)
Slurred speech	11/33 (32)	283/432 (68)	6/28 (21)	5/23 (22)
Change in vision	3/33 (9)	11/432 (3)	2/28 (7)	0/23 (0)
Tremors	1/33 (3)	5/432 (1)	1/28 (4)	0/23 (0)
Decreased alertness	28/33 (88)	135/432 (31)	19/28 (68)	12/23 (52)
Seizures/epilepsy	5/33 (15)	19/432 (4)	12/28 (43)	3/23 (13)
Partial/complete sensation loss	12/33 (36)	44/432 (10)	10/28 (36)	1/23 (4)

Table 2: Frequency of diseases and deaths categorized by disease syndromes (N=584).

Variables	Total cases	Death
	n/N (%),	n/N (%)
Total number of cases	584/584 (100)	40/584 (7)
Stroke	432/584 (74)	29/40 (73)
Acute confusional state	33/584 (6)	6/40 (15)
Peripheral/cranial neuropathy	14/584 (2)	0/40 (0)
Demyelinating diseases	5/584 (1)	0/40 (0)
Diseases of spinal cord	16/584 (3)	1/40 (3)
Neurodegenerative disorder	8/584 (2)	0/40 (0)
Psychiatric disorder	11/584 (2)	0/40 (0)
Parkinsonism/other movement disorders	7/584 (1)	0/40 (0)
Others	58/584 (10)	4/40 (10)

In patients with CNS infections 28 (5%), the most common symptom was decreased alertness 68%, followed by headache 61%, vomiting 60%, seizures/epilepsy 43%, partial or complete loss of sensation 36%, etc. Among the patients with other diseases, 91 (15%), the most frequent symptom was decreased alertness 52%, followed by muscle weakness 39%, headache 22%, dizziness 22%, slurred speech 22%, vomiting 22%, seizures/epilepsy 13% etc. (Table 1).

The results showed that, majority (n=432) of the patients had a stroke (74%), followed by others: 58 (10%), acute confusional state: 33 (6%), diseases of the spinal cord: 16

(3%), peripheral neuropathy: 14 (2%), psychiatric disorder: 11 (2%), neurodegenerative disorder: 8 (2%). Among deaths of 40 (7%), majority (73%) were died from stroke (73%), followed by acute confusional state: 6 (15%) and others: 4 (10%), disease of spinal cord: 1 (3%) (Table 2).

Table 3: In hospital complications among stroke cases compared to total (N=584).

Variables	Total complications	Complicacy
	n/N (%)	In stroke n/N (%)
Total number of cases	214/584 (37)	159/432 (37)
Aspiration pneumonia	38/214 (18)	34/159 (21)
Hyponatremia	50/214 (23)	38/159 (24)
Hypokalemia/hyperkalemia	18/214 (8)	14/159 (9)
Hypo/hyperglycemia	14/214 (8)	10/159 (6)
Infection/sepsis	24/214 (11)	11/159 (7)
UTI	56/214 (26)	42/159 (26)
Bed sore	7/214 (3)	6/159 (4)
DVT	0/214 (0)	0/159 (0)
Others	7/214 (3)	4/159 (3)

Our results reveal that, in patients who had UTI: 56 (26%), majority had a stroke (26%); followed by the patients who had hyponatremia: 50 (23%) and aspiration pneumonia: 38 (18%), 24% and 21% had a stroke respectively (Table 3).

Table 4: Outcome of the cases by disease syndromes (N=584).

Outcomes	Acute confusional state	In stroke	CNS infections	Others	Total
	n/N (%)	n/N (%)	n/N (%)	n/N (%)	n/N (%)
Total cases	33/584 (6)	432/584 (74)	28/584 (5)	91/584 (16)	584/584 (100)
Complete recovery	7/33 (21)	9/432 (2)	10/28 (36)	16/91 (18)	42/584 (7)
Incomplete recovery	17/33 (52)	381/432 (88)	12/28 (43)	69/91 (76)	479/584 (82)
Left hospital	3/33 (9)	13/432 (3)	3/28 (11)	4/91 (4)	23/584 (4)
Death	6/33 (18)	29/432 (7)	3/28 (11)	2/91 (2)	40/584 (7)

Table 5: Timeline of the illness by disease syndromes (N=584).

Time/duration	Acute confusional state	In stroke	CNS infections	Psychiatric disorders	Other diseases
	Day	Day	Day	Day	Day
	Median (range)	Median (range)	Median (range)	Median (range)	Median (range)
Duration of Illness at presentation	3 (1-30)	2 (1-60)	7 (1-90)	2 (1-60)	1 (1-1095)
Time to death	4 (1-16)	3 (1-25)	9.50 (2-14)	2 (1-04)	3 (2-12)
Time to DORB	5 (2-22)	2 (1-9)	14 (3-22)	3 (0-3)	3 (2-5)
Time to discharge	4.5 (1-16)	3 (1-81)	7.5 (2-13)	1 (1-4)	3.5 (2-12)
Hospital staying	4 (1-16)	3 (1-81)	6 (1-22)	3 (1-4)	3 (1-25)

Among 584 patients, 33 (6%) had an acute confusional state and most of them (51%) had an incomplete recovery, followed by complete recovery: 21%, death: 18%, discharge on request/left hospital of own: 9%. Of the patients who had stroke: 432 (74%), the majority of them had an incomplete recovery: 88%, followed by death: 7%, discharge on request/left the hospital of own: 3%, complete recovery: 2%. Among patients with CNS infections: 28 (5%), 43% had an incomplete recovery and 36% had a complete recovery. Of patients with other diseases, 76% had an incomplete recovery, followed by a complete recovery of 18%, discharge on request/left the hospital of own: 4% and death: 2%. In this study, the median of the duration of hospital stay was the longest among the patients with CNS infection: 6 (1-22) days, followed by acute confusional state: 4 (1-16) days, stroke 3: (1-81) days and psychiatric disorders: 3 (1-4) days. The median of the duration of illness at presentation was the longest among the patients with CNS infection: 7 (1-90) days, followed by acute confusional state: 3 (1-30) days, stroke 2 (1-60) days and psychiatric disorders: 2 (1-60) days. The median of the time to death was the longest among the patients with CNS infection: 9.5 (2-14) days, followed by acute confusional state: 4 (1-16) days, stroke: 3 (1-25) days and psychiatric disorders: 2 (1-4) days. The median of the time to DORB was the longest among the patients with CNS infection: 14 (3-22) days, followed by acute confusional state: 5 (2-22) days, psychiatric disorders: 3 (0-3) days, other diseases: 3 (2-5) days and stroke: 2 (1-9) days.

DISCUSSION

The aim of this study was to evaluate the burden and features of neurological diseases in Chittagong Medical College and hospital, Bangladesh. In this cohort of 584 cases, we have found stroke cases represent the commonest neurological condition requiring hospitalization (74%). The users of hospital care in a tertiary care setting are from the low socioeconomic status populations. The other common conditions requiring hospitalization were acute confusional state followed by CNS infections. The in-hospital complications were urinary tract Infections, aspiration pneumonia, hyponatraemia, and most in stroke cases. The overall in-hospital mortality was about 8%, most patients recovered incompletely at discharge (81%) and 4% of the cases left the hospital of their own. The hospital stay was relatively short (~3 days) to accommodate new cases, and hence a large number of cases were discharged with incomplete recovery, mostly in stroke cases. The results should be taken into account when debating health policy, health systems and allocation of resources to healthcare and research, as well as being determinators for education on all levels. We aimed to make these data available to all actors who have a stake in these disorders, first and foremost neurologists, but also professional and patients' organizations, as well as politicians and decision-makers in the healthcare system. Hospital-based studies conducted in past decades

have indicated that hypertension is the main cause of ischaemic and haemorrhagic stroke in Bangladesh. The high number of disability-adjusted life-years lost due to stroke (485 per 10,000 people) show that stroke severely impacts Bangladesh's economy.⁹ The burden of deaths and disabilities originated from neurological disorders is increasingly recognized as a global public health challenge. Therefore, its burden is set to rise during the next few decades due to the increasing ageing population. The explosion of vascular risk factors such as hypertension, dyslipidemia, and diabetes mellitus in many developing countries has led to escalating rates of cardiovascular diseases, mainly stroke and ischemic heart diseases.¹⁰ Hence it is not surprising that stroke is the commonest neurologic disorder in our cohort. Stroke patients were relatively younger compared with those in developed countries. Nearly 7% of patients presenting with stroke for admission succumbed, and that the majority of stroke survivors are discharged with severe functional limitations.¹¹⁻¹³ Chowdhury et al reported that stroke was the most common condition (47.5%) observed at referral, followed by seizure (9.3%), disease of the spinal cord (7.8%) and encephalopathy (6.3%).¹⁴ We found that in the case of stroke patients most frequent risk factors were diabetes mellitus, smoking, sedentary lifestyle. In acute confusional state, the most frequent risk factors were diabetes mellitus, followed by smoking. In a study most common medical condition contributes to delirium were uncontrolled hypertension (63.2%), then fever and infection (41.6%), uncontrolled DM (36.6%), CVD (28.4%), CKD and electrolytes abnormalities (10.5%), joint diseases and pain (13.7%).¹⁵ Smoking was also a prevalent risk factor found in patients with CNS infection. In the US physicians' health study, Kurth and colleagues found that current smoking was associated with a twofold increase in the risk of ischaemic stroke (RR 2.11, 95% CI, 1.72-2.60).¹⁶ There is a high modifiable burden of risk factors for adult stroke deaths in rural Bangladesh, most notably including hypertension. Betel consumption may be an under-recognized risk factor for stroke death.¹⁷ The World Health Organization (WHO) ranks mortality due to stroke in Bangladesh as number 84 in the world. The crude death rate per 1000 people in Bangladesh is reported at 5.8%.⁹ Our study showed that, incomplete recovery occurred mostly due to stroke, followed by acute confusional state and CNS infection. Patients discharged on request/left the hospital of their own mostly due to stroke, followed by acute confusional state and CNS infection. The death occurred due to stroke, followed by acute confusional state and CNS infection. Good information about the diseases for patients and their relatives via various channels should get even higher priority. Also, the GBD 2010 should influence the distribution of resources allocated to research, both basic and applied. Neurologists have a good case for more resources to research on their topics and neuroscience in general. This data would inspire our thinking around neurology and public health in general and the system approach to the provision of health services in neurology.

This was a single centered study with small sized samples regarding the issues. Moreover, the study was conducted at a very short period of time. So, the findings of this study may not reflect the exact scenario of the whole country.

CONCLUSION

The burden of neurological diseases requiring hospitalization in tertiary care hospital in Bangladesh is dominated by strokes. The users of the hospital care in a tertiary care setting are of low socioeconomic status populations. The other common conditions requiring hospitalization were Acute confusional state followed by CNS infections. The frequency of in-hospital complications was relatively high and the most frequent being urinary tract infections, aspiration pneumonitis, and hyponatraemia, and mostly in stroke cases. The overall in-hospital mortality was 7%, most patients recovered incompletely at discharge, 82%, and 4% of the cases left the hospital of their own. The findings of this prospective study could be utilized by hospital managers for planning resource allocation in neurology units, and researchers could utilize them for further studies in the future.

Recommendations

Further study recommended for robust data and more accurate findings.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Alam MB. Neurological Disease Burden: Bangladesh Perspective. J Nat Inst Neurosci Bangladesh. 2015;1(2):31-2.
2. WHO. Neurological disorders: public health challenges. World Health Organization; 2006.
3. Murray CJL, Lopez AD. The global burden of disease: a comprehensive assessment of mortality and disability from diseases, injuries and risk factors in 1990 and projected to 2020. Harvard School of Public Health, Boston. 1996.
4. Philip-Ephraim EE, Eyong KI, Chinenye S, William UE, Ephraim RP. The burden of inpatient neurologic disease in a tropical African hospital. Canadian J Neurol Sci. 2013;40(4):576-9.
5. Ekenze OS, Onwuekwe IO, Ezeala BA. Profile of neurological admissions at the University of Nigeria Teaching Hospital Enugu. Niger J Med. 2010;19(4):419-22.
6. Eze CO, Kalu UA. Pattern of neurological admissions in the tropics: experience at Abakaliki South-Eastern Nigeria. Niger J Med. 2014;23(4):302-5.
7. Bhopal R, Rahemtulla T, Sheikh A. Persistent high stroke mortality in Bangladeshi populations: Novel hypotheses to explain this need testing urgently. Br Med J. 2005;331(7525):1096.
8. Alam MB. Neurological Disease Burden: Bangladesh Perspective. J Nat Inst Neurosci Bangladesh. 2017;1(2):31-2.
9. Mukherjee D, Patil CG. Epidemiology and the global burden of stroke. World Neurosurg. 2011;76(6):S85-90.
10. Burden of Neurological Conditions-PAHO/WHOPan American Health Organization. Available at: <https://www.paho.org/en/noncommunicable-diseases-and-mental-health/noncommunicable-diseases-and-mental-health-data-portal-3>. Accessed on 6 August 2021.
11. Bhowmik NB, Abbas A, Saifuddin M, Islam MR, Habib R, Rahman A, et al. Ischemic Strokes: Observations from a Hospital Based Stroke Registry in Bangladesh. Stroke Res Treat. 2016;2016.
12. Stroke in Bangladesh. World Health Rankings. Available at: <https://www.worldlifeexpectancy.com/bangladesh-stroke>. Accessed on 18 August 2021.
13. Islam MN, Moniruzzaman M, Khalil MI, Basri R, Alam MK, Loo KW, et al. Burden of stroke in Bangladesh. Int J Stroke. 2013;8(3):211-3.
14. Chowdhury RN, Hasan ATMH, Ur Rahman Y, Khan SI, Hussain AR, Ahsan S. Pattern of neurological disease seen among patients admitted in tertiary care hospital. BMC Res Notes. 2014;7:202.
15. Rahman MM, Panday R, Sohel KU, Ahmed Z, Khanam S, Sarker MS, et al. Etiological evaluation of acute confusional state in elderly (≥ 60 years) patients. J Med. 2021;22(1):41-5.
16. Kurth T, Kase CS, Berger K, Schaeffner ES, Buring JE, Gaziano JM. Smoking and the risk of hemorrhagic stroke in men. Stroke. 2003;34(5):1151-5.
17. Mateen FJ, Carone M, Alam N, Streatfield PK, Black RE. A population-based case-control study of 1250 stroke deaths in rural Bangladesh. Eur J Neurol. 2012;19(7):999-1006.

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