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*Original Article*

**DOI: http://dx.doi.org/10.3329/jninb.v4i2.38917**

**Journal of National Institute of Neurosciences Bangladesh,**
*July 2018, Vol. 4, No. 2, pp: 69-74*

ISSN (Online) 2518-6612
ISSN (Print) 2410-8030

# Trend of Hospital Admission and Outcome Study of Patients Admitted in a Neurology Unit at a Tertiary Care Neuroscience Hospital in Bangladesh

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[**Received:** 22 March 2018; **Revised on:** 1 April 2018; **Accepted on:** 20 May 2018; **Published on:** 1 July 2018]

## Abstract

**Background:** Neurological disorders is becoming a growing concern both for developed and developing countries. Magnitude of the problem is increasing day by day. Among all neurological disorders, stroke is the leading cause of morbidity and mortality globally. **Objectives:** The purpose of the study was to see the trend of admission of patients with neurological diseases and to study the outcome of patients at referral neurology hospital in Bangladesh. **Methodology:** This retrospective chart review was conducted in the blue unit of the Department of Neurology at National Institute of Neurosciences and Hospital, Dhaka, Bangladesh from 1st January to 31st December 2016 for a period of one (01) year. All the admitted patients with both sexes were selected as study population. The outcome was observed among the study population. **Result:** A total number of 1044 patients were admitted during the study period. Majority of the patients were in the age group of the 41 to 50 years which was 417(39.9%) cases. Both male and female were in highest number in the month of May which was 63 and 48 cases respectively. The total death of the study population was 146(14.0%) cases. The mean length of hospital stay was 8.4±2.31 days. **Conclusion:** Middle aged male is the main bulk of the neurological patients, admitted in a referral neurology hospital in Bangladesh. Highest admission and mortality was observed in stroke patients. *[Journal of National Institute of Neurosciences Bangladesh, 2018;4(2): 69-74]*

**Keywords:** Trend; admission of neurological patients; neurological disorders; outcome

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**Conflict of interest:** There is no conflict of interest relevant to this paper to disclose.

**Funding agency:** This research project was not funded by any group or any institution.

**Contribution to authors:** Chowdhury MTI, Ahmed KMA & Sarkar MSR contributed from the protocol preparation, data collection up to report writing. Manuscript writing was performed by Chowdhury MTI, Choudhury MSJH, Ahmed KMA & Sarkar MSR. Statistical analysis was performed by Yusuf MA, Haider T, Alam MB involved in supervision of the research work and revision of manuscript.

**How to cite this article:** Chowdhury MTI, Choudhury MSJH, Ahmed KMA, Sarkar MSR, Yusuf MA, Haider T, Alam MB. Trend of Hospital Admission and Outcome Study of Patients Admitted in a Neurology Unit at Tertiary Care Neuroscience Hospital in Bangladesh. J Natl Inst Neurosci Bangladesh, 2018;4(2): 69-74



## Introduction

Neurological disorders are important causes of morbidity and mortality worldwide. In last couple of decades this burden is increasing gradually due to expanding number of population and increased life expectancy[1]. The overall global burden of neurologic disease is approximately 20%, the majority being in the developing countries[2].The incidence of neurologic disorder in UK is 0.6% with an

overall 6% lifetime prevalence rate[3]. The Global Burden of Disease (GBD) study showed that over the years the global health impact of neurological disorders had been underestimated[4]. Many patients with acute or chronic neurological problems often get admitted under general medicine and other departments. Approximately 15 to 20% of all medical admission and 40% inpatients in medical wards are neurologic problems that often require consultation even in UK[5]. Despite these statistical logics whenever available, expert neurologic assessment and management can alter the working diagnosis and can have a positive impact on overall hospital management[6]. Diagnostic errors by non-neurologists are not very uncommon, especially regarding epilepsy and other non-organic illness[7]. Retrospective studies have also shown that diagnostic change following neurology consultation is seen in 32 to 50% of inpatient referrals[8]. Studies have also proved that a liaison with neurology consultation may improve inpatient care in UK[9].

Some of the neurological conditions are acute and some are subacute or chronic. Patient with stroke, GBS, CNS infection and several other disorders need emergency admission and other condition like headache, Parkinson's diseases, dementia and peripheral neuropathy can be managed in outpatient department. In this context this present study was undertaken to estimate the trend of admission of patients with neurological disorders in 2016 at a referral neurology hospital in Bangladesh.

**Methodology**

This retrospective chart review was conducted in the Blue Unit of the Department of Neurology at National Institute of Neurosciences and Hospital, Dhaka, Bangladesh. NINS&H is a government run tertiary level neuroscience center which has specialized outpatient services and 24×7 emergency services. Patients are admitted through outpatient or emergency department as per hospital protocol. Patients with neurological disorders coming to this institute or referred from different centers of Bangladesh are treated here.

The study period was from January to December 2016 for the duration of one (01) year. All the admitted patients during this time period at any age of both sexes were selected as study population. The trend of hospital admission was analyzed and the outcome was observed. Statistical analysis was performed by SPSS version 22.0. The qualitative data were expressed as frequency and percentage and the quantitative data were presented with mean with standard deviation. The trend was shown in the line graph.

**Results**

A total number of 1044 patients were admitted during the study period. Higher number of patients were admitted in the month of May, April and August which were 111(10.6%), 100(9.6%) and 100(9.6%) cases respectively (Figure I).

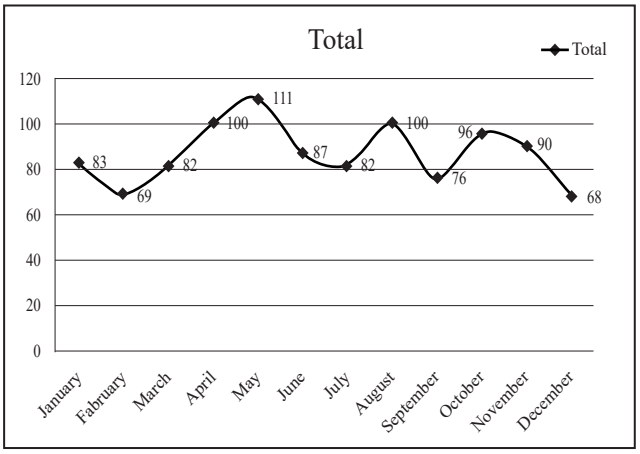


Figure I: Trend of Admission in 2016

The total number of bed was only 24. It had been found that the rate of patient turnover per bed per month was highest in month of May which was 4.6 patients. The minimum was 2.8 patients in the month of December (Figure II).

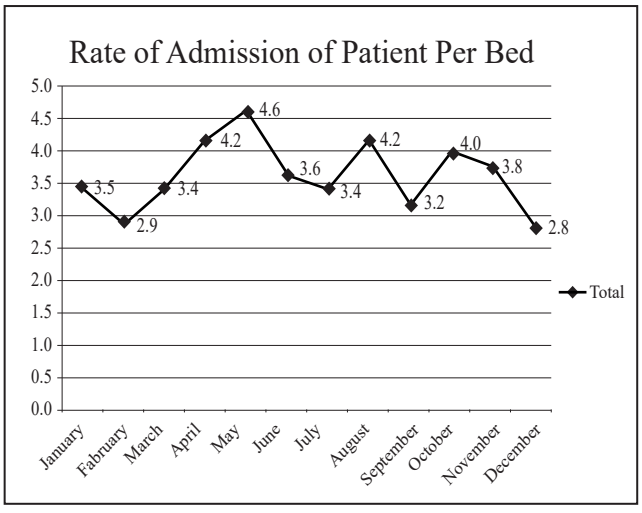


Figure II: Trend of Admission of Patients per Bed in 2016

In this study majority of the patients were in the age group of the 41 to 50 years which was 417(39.9%) cases followed by 31 to 40 years, 21 to 30 years and more than 71 years which were 292(28.0%), 157(15.0%) and 63(6.0%) cases respectively (Table 1).

Table 1: Frequency of Age group among the Study Population

| Age group | Frequency | Percentage |
|---|---|---|
| Less than 21 Years | 52 | 5.0 |
| 21 to 30 Years | 157 | 15.0 |
| 31 to 40 Years | 292 | 28.0 |
| 41 to 50 Years | 417 | 39.9 |
| 51 to 60 Years | 42 | 4.0 |
| 61 to 70 Years | 21 | 2.0 |
| More than 71 Years | 63 | 6.0 |
| **Total** | **1044** | **100.0** |

It was very interesting that both male and female were in highest number in the month of May which was 63 and 48 cases respectively. But throughout the year, male patients are higher in number than the female patients (Figure III).

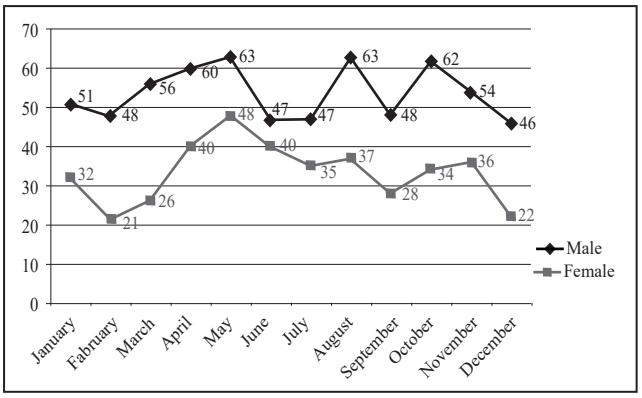


Figure III: Trend of Gender Distribution with Neurological Diseases

In this present study male was predominant than female which was 645(61.8%) cases and 399(38.2%) cases respectively. The male and female ratio was 1.6:1 (Table 2).

Table 2: Gender Distribution among the Study Population

| Gender | Frequency | Percentage |
|---|---|---|
| Male | 645 | 61.8 |
| Female | 399 | 38.2 |
| **Total** | **1044** | **100.0** |

The total death of the study population was 146(14.0%) cases. The mean length of hospital stay was 8.4±2.31 days with the range of 1 to 20 days (Table 3).

Table 3: Outcome Profiles of the Admitted Patients

| Parameters | Frequency | Percentage |
|---|---|---|
| Total Death | 146 | 14.0 |
| Length of Hospital Stay | 8.4±2.31 (1 to 20) Days | |

Intracerebral hemorrhage was the most common disease which was 321(30.7%) followed by ischemic stroke, Subarachnoid hemorrhage(SAH), Cerebral AVM with complications and Cerebral venous sinus thrombosis(CVST) which were 271(25.9%), 91 (8.7%), 20 (1.9%) and 11(1.1%) cases respectively. Moya Moya disease was recorded in 4(0.4%) cases. Among ischemic stroke patients male predominance was observed, which was 147(54.2%)in male and 124(46.3%) in female cases respectively. Among Intracerebral hemorrhage, male patients were more than female which was 191(59.5%) and 130(40.5%) cases respectively. Regarding inflammatory or demyelinating diseases transverse myelitis was the most common disease which was 14(1.3%) followed by multiple sclerosis, Acute disseminated encephalomyelitis(ADEM) and neuromyelitis optica which were 11(1.1%), 8(0.8%) and 4(0.4%) cases respectively. Among the transverse myelitis patients male was slightly predominant than female which was 8(57.1%) cases and 6(42.9%) cases respectively. In multiple sclerosis patients male was predominant than female which was 7(63.6%) and 4(36.4%) cases respectively. Among neuropathies patients GBS, CIDP and Sub-acute combined degeneration of spinal cord (SCD) were found in 30(2.9%), 10(1.0%) and 2(0.2%) cases respectively. Among infectious diseases Tubercular meningitis(TBM), Encephalitis and Pott's disease were the most common which were 28(2.7%), 36(3.5%) and 14(1.3%) cases respectively. Parkinson's disease, Syringomyelia, Motor neuron disease(MND), Dementia, Spino-cerebellar ataxia (SCA) and Post-Polio syndrome were found in the category of degenerative diseases which were 5(0.5%), 1(0.1%), 9(0.8%), 3 (0.3%), 2 (0.2%) and 1 (0.1%) case respectively. Wilson's disease, myotonic dystrophy and Hereditary spastic paraplegia(HSP) were 2(0.2%) respectively. Intracerebral space occupying lesion(ICSOL) and Non-Hodgkin's lymphoma (NHL) were recorded in 15(1.4%) and 3(0.3%) respectively. Myasthenia Gravis and Polymyositis were in 12(1.1%) and 1(0.1%).Patients admitted with headache were found to be IIH, migraine and TTH 11(1.0%), 4(0.4%) and 10(0.9%) cases respectively. Chorea and dystonia were found in 1 (0.1%) case and 2(0.2%) cases respectively. Epilepsy was found in 20(0.5%) cases of which was male was 14 (60%) cases and female was 6 (40%) cases. Regarding myelo-radiculopathies patients PLID and compressive myelopathy were found in 4(0.4%) cases and 7(0.7%) cases respectively (Table 4).

Table 2: Outcomes Variable among the Study Population

| Diseases (System wise) | Sub Types | Gender | | Total |
|---|---|---|---|---|
| | | Male | Female | |
| • Cerebrovascular Diseases | Ischemic Stroke | 147(54.2%) | 124(46.3%) | 271(25.9%) |
| | Intracerebral hemorrhage | 191(59.5%) | 130(40.5%) | 321(30.7%) |
| | CVST | 7(63.6%) | 4 (36.4%) | 11(1.1%) |
| | AVM with complication | 13(65%) | 7 (35%) | 20(1.9%) |
| | SAH | 52(57.2%) | 39 (42.8%) | 91 (8.7%) |
| | Moya Moya Disease | 3(75%) | 1(25%) | 4(0.4%) |
| | Cerebral aneurysm (admitted for procedure) | 2(100%) | 0(0%) | 2(0.2%) |
| | Lateral Medullary Syndrome | 2(66.7%) | 1(33.3%) | 3(0.3%) |
| | Cortico-Venous Fistula | 1 (100%) | 0 (0%) | 1 (0.1%) |
| | TIA | 1 (100%) | 0 (0%) | 1 (0.1%) |
| • Inflammatory/ Demyelinating Diseases | Neuromyelitis optica | 3(75%) | 1(25%) | 4(0.4%) |
| | Multiple Sclerosis | 7(63.6%) | 4(36.4%) | 11(1.1%) |
| | PRES | 1(50%) | 1 (50%) | 2(0.2%) |
| | ADEM | 6(75%) | 2(25%) | 8(0.8%) |
| | NMO Spectrum Disorders | 2(66.7%) | 1(33.3%) | 3(0.3%) |
| | Transverse Myelitis | 8(57.1%) | 6(42.9%) | 14(1.3%) |
| | Tolosa Hunt Syndrome | 2(100%) | 0(0%) | 2(0.2%) |
| • Neuropathies | GBS | 17 (56.7%) | 13(43.3%) | 30 (2.9%) |
| | CIDP | 8 (80%) | 2 (20%) | 10 (1.0%) |
| | SCD | 1 (50%) | 1 (50%) | 2(0.2%) |
| • Infectious Diseases | TBM | 15(53.6%) | 13(46.4%) | 28(2.7%) |
| | Encephalitis | 20 (55.5%) | 16(44.5%) | 36(3.5%) |
| | PUO | 2(100%) | 0(0%) | 2(0.2%) |
| | Tubercular lymphadenopathy | 1(100%) | 0(0%) | 1(0.1%) |
| | Milliary TB | 1(100%) | 0(0%) | 1(0.1%) |
| | Pott's Disease | 8(57.1%) | 6(42.9%) | 14(1.3%) |
| | PTB | 1(100%) | 0(0%) | 1(0.1%) |
| • Degenerative Diseases | Parkinson's Disease | 3(60%) | 2(40%) | 5(0.5%) |
| | Syringomyelia | 1(100%) | 0(0%) | 1(0.1%) |
| | MND | 5(55.6%) | 4(44.4%) | 9(0.8%) |
| | Dementia | 2 (66.7%) | 1 (33.35) | 3 (0.3%) |
| | SCA | 1 (50%) | 1 (50%) | 2 (0.2%) |
| | Post-Polio Atrophy | 1 (100%) | 0 (0%) | 1 (0.1%) |
| • Hereditary/Congenital Anomaly | Congenital Anomaly | 1 (50%) | 1 (50%) | 2 (0.2%) |
| | Wilson's Disease | 2 (100%) | 0 (0%) | 2 (0.2%) |
| | Myotonic Dystrophy | 1 (50%) | 1 (50%) | 2 (0.2%) |
| | HSP | 2 (100%) | 0 (0%) | 2(0.2%) |
| • CNS Tumors | ICSOL | 11 (73.3%) | 4 (26.7%) | 15(1.4%) |
| | NHL | 2 (66.7%) | 1 (33.3%) | 3(0.3%) |
| • Myopathy & NMJ Disorders | Myasthenia Gravis | 8 (66.7%) | 4 (33.3%) | 12(1.1%) |
| | Polymyosistits | 1 (100%) | 0 (0%) | 1(0.1%) |
| • Headache | IIH | 7 (63.6%) | 4 (36.4%) | 11(1%) |
| | Migraine | 1 (25%) | 3 (75%) | 4(0.4%) |
| | TTH | 8 (80%) | 2 (20%) | 10(0.9%) |
| • Movement Disorders | Chorea | 1 (100%) | 0 (0%) | 1(0.1%) |
| | Dystonia | 1 (50%) | 1 (50%) | 2(0.2%) |
| • Seizure Disorder | Epilepsy | 14 (60%) | 6 (40%) | 20(0.5%) |
| • Myelo-radiculopathies | PLID | 1 (25%) | 3 (75%) | 4(0.4%) |
| | Compressive Myelopathy | 4(57.1%) | 3(42.9%) | 7(0.7%) |

Considering the top five causes of morbidity intracerebral hemorrhage, ischemic stroke, SAH, encephalitis and TBM were in the list which was 322 cases, 271 cases, 91 cases, 36 cases and 28 cases respectively (Table 5).

Table 5: Top Five causes of Morbidity

| Disease | Male | Female | Total |
|---|---|---|---|
| Intracerebral hemorrhage | 191 | 131 | 322(30.7%) |
| Ischemic Stroke | 147 | 124 | 271(25.9%) |
| SAH | 52 | 39 | 91(8.7%) |
| Encephalitis | 20 | 16 | 36 |
| TBM | 15 | 13 | 28 |

Intracerebral hemorrhage, Ischemic Stroke, SAH, Encephalitis and TBM were the five most common causes of mortality which was 88 cases, 37 cases, 15 cases, 4 cases and 2 cases respectively (Table 6).

Table 6: Top Five Causes of Mortality

| Disease | Male | Female | Total |
|---|---|---|---|
| Intracerebral hemorrhage | 55 | 33 | 88 |
| Ischemic Stroke | 20 | 17 | 37 |
| SAH | 10 | 5 | 15 |
| Encephalitis | 3 | 1 | 4 |
| TBM | 1 | 1 | 2 |
| **Total** | **89** | **57** | **146** |

## Discussion

In this study among stroke patients, ICH (30.7%) was most common followed by ischemic stroke (25.9%), SAH (8.7%). Higher number of ICH patients were probably due to increased number of referral from primary and secondary health care centers. Among ischemic stroke patients male was predominant than female which was 147(54.2%) cases and 124(46.3%) cases respectively. Among ICH, male were more than the female which was 191(59.5%) cases and 130(40.5%) cases respectively. Regarding inflammatory or demyelinating diseases transverse myelitis was the most common disease which was 14(1.3%) cases followed by multiple sclerosis, ADEM and optic neuritis which were 11(1.1%) cases, 8(0.8%) cases and 4(0.4%) cases respectively. Among the transverse myelitis patients male was slightly predominant than female which was 8(57.1%) cases and 6(42.9%) cases respectively. In multiple sclerosis patients male was predominant than female which was 7(63.6%) cases and 4(36.4%) cases respectively.

Among neuropathies patients GBS, CIDP and SCD were found in 30(2.9%) cases, 10(1.0%) cases and 2(0.2%) cases respectively. Among infectious diseases TBM, encephalitis, Pott's disease were the most common which were 28(2.7%) cases, 36(3.5%) cases and 14(1.3%) cases respectively. Parkinson's disease, Syringomyelia, MND, Dementia, SCA and Post-Polio Atrophy were found in the category of degenerative diseases which were 5(0.5%) cases, 1(0.1%) cases, 9(0.8%) cases, 3 (0.3%) cases, 2 (0.2%) cases and 1 (0.1%) case respectively. Congenital Anomaly, Wilson's disease, myotonic dystrophy and HSP were 2(0.2%) cases in each disease. ICSOL and NHL were recorded in 15(1.4%) cases and 3(0.3%) cases respectively. Myasthenia Gravis and polymyositis were in 12(1.1%) cases and 1(0.1%) cases respectively among Myopathy & NMJ disorders. Considering headache patients, IIH, migraine and TTH were in 11(1.0%) cases, 4(0.4%) cases and 10(0.9%) cases respectively. Chorea and dystonia were found in 1 (0.1%) case and 2(0.2%) cases respectively. Epilepsy was found in 20(0.5%) cases of which was male was 14 (60%) cases and female was 6 (40%) cases. Regarding myelo-radiculopathies patients PLID and compressive myelopathy were found in 4(0.4%) cases and 7(0.7%) cases respectively.

In this present study the total death of the study population was 146(14.0%) cases. Neurological disorders are an important cause of mortality and constitute 12% of total deaths globally[5]. Within these, cerebrovascular diseases are responsible for 85% of the deaths due to neurological disorders. Neurological disorders constitute 16.8% of the total deaths in lower middle-income countries compared with 13.2% of the total deaths in high income countries[2]. Intracerebral hemorrhage, ischemic stroke, SAH, encephalitis and TBM were the five most common causes of mortality which was 88 cases, 37 cases, 15 cases, 4 cases and 2 cases respectively.

Worldwide shortage of neurologists and other neurological specialists is an important warning for the global public health community which has to be paid for the increasing trend of neurological disease in terms of public health resource allocation[8-13]. Public health professionals and health-care policy makers must now implement much-needed public health interventions to address the growing need for neurological care across all ages and socioeconomic classes[8].

Though the number of neurologists has increased over last decade in Bangladesh, it is still not enough[14]. Many patients with neurological problems are often dealt by

internists and others from different specialties. Studies have proved the usefulness of liaison with neurology, especially in teaching hospitals[3] and the patient care also improved with specialist management. So, it has been tried to get a glimpse of the neurology service in this teaching hospital. This study reflects admission of patients with neurological problems in neurology unit and its outcome. It gives a transparent idea about the burden of neurological cases in the departments.

## Conclusion

In conclusion middle aged male is the main bulk of the neurological patients, admitted in a referral neurology hospital in Bangladesh. Hospital stay is observed prolonged due to increased number of admission of stroke patients. Number of patients with ICH is higher than ischemic stroke, probably due to increased number of referral from primary and secondary health care centers. Highest morbidity and mortality is observed in stroke patients. Stroke outcome can be satisfactory if they are managed in a comprehensive and dedicated stroke unit. Further large-scale study should be carried out to see the real scenario.

## References

1. Feigin, Valery L et al. GBD 2015 Neurological Disorders Collaborator Group. Global, regional, and national burden of neurological disorders during 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. The Lancet Neurology, Volume 16, Issue 11, 877-897

2. Mathers CD et al. Deaths and disease burden by cause: global burden of disease estimates for 2001 by World Bank country groups. Washington, DC, World Health Organization/World Bank/Fogarty International Center, United States National Institutes of Health, 2004 (Disease Control Priorities in Developing Countries (DCPP) Working Papers Series, No. 18; http://www.fi c.nih.gov/dcpp/wps.html, accessed 25 July 2005)

3. Chowdhury RN, Hasan AH, Rahman YU, Khan SI, Hussain AR, Ahsan S. Pattern of neurological disease seen among patients admitted in tertiary care hospital. BMC research notes. 2014;7(1):2024.

4. Dua T, Cumbrera MG, Mathers C, Saxena S. Global burden of neurological disorders: estimates and projections. Campanini B (Editora). Neurological disorders: Public Health Challenges. Ginebra: Banco Mundial. 2006:27-39

5. Burton KJ, Allen S: A review of neurological disorders presenting at a paediatric neurology clinic and response to anticonvulsant. Ann Trop Pediatric. 2003, 23: 139-143

6. MacDonald BK, Cockerell OC, Sander JWAS, Shorvon SD: The incidence and lifetime prevalence of neurologic disorder in a prospective community-based study in the UK. Brain. 2000, 123: 665-676

7. Forbes R, Craig J, Callender M, Patterson V: Liaison neurology for acute medical admissions. Clin Med. 2004;4:290-10

8. World development indicators. Washington, DC, The World Bank, 2003

9. Chandra V et al. Neurological disorders. In: Jamison DT et al., eds. Disease control priorities in developing countries, 2nd ed. Washington, DC, The World Bank and Oxford University Press, 2006

10. Lee AC. Global Burden of Neurological Disorders. Global Health Education Consortium. 2009 Jun.

11. Menken M, Munsat TL, Toole JF. The global burden of disease study: implications for neurology. Archives of neurology. 2000;57(3):418-20.

12. Whiteford HA, Ferrari AJ, Degenhardt L, Feigin V, Vos T. The global burden of mental, neurological and substance use disorders: an analysis from the Global Burden of Disease Study 2010. PloS one. 2015;10(2):e0116820

13. McColgan P, Carr AS, McCarron MO: The value of a liaison neurology service in a district general hospital. Postgrad Med J. 2010

14. Alam MB. Neurological Disease Burden: Bangladesh Perspective. Journal of National Institute of Neurosciences Bangladesh. 2017;1(2):31-2