

# Disability Burden Due to Neurological Disorders: A matter of Future Concern

Siddharth Maheshwari\*, Suman Kushwaha, Aldrin Anthony, Satyam Singh

Department of Neurology, Institute of Human Behavior and Allied Sciences, Dilshad Garden, Delhi, India

## Abstract

**Aim:** To study disability burden due to common prevalent neurological disorders.

**Material and Methods:** Study from a tertiary care neuropsychiatry hospital from North India. Cases had been collected with all detailed demographic and relevant findings from the year 2009 to 2018; almost 10 years of data were collected and recorded. The detailed analyses of the cases were done. All the cases which lead to permanent disability leading to Locomotors, cognitive and other deficits from the Neurological disorder were included and recorded. Cases leading to temporary disability were excluded from the study.

**Results:** Total numbers of patients around ten years were 1203 in number, Out of which 1001 were males and 202 were females. Stroke accounted for the largest proportion of disability among all neurological disorders analysed. Cerebral palsy, post encephalitis sequelae and mental Retardation with Epilepsy were the second, third, and fourth largest contributors of permanent physical or cognitive disability. The proportional contributions of the other neurological disorders analysed were less substantial and varied from 0.4% for Multiple sclerosis to round 5% for tuberculosis of Brain.

Among the largest number Stroke Cerebrovascular accident is the largest group comprises of round 44 % of the permanent disability followed by Cerebral palsy, (22.8%) Post encephalitis, sequelae (11.8%) and mental Retardation with Epilepsy (9.2%). Other groups comprises of Tuberculosis of brain (5.2%), Motor Neuron diseases (3.5%) and small number of cases of myelopathy, dementia and Multiple sclerosis and related disorders.

Stroke the number of male patients are more as compared to females.

The age pattern varied between the various neurological disorders for disability. The age group range for CVA varies from 30 to 80, mostly in elderly, whereas cerebral palsy, post encephalitis sequelae, mental retardation and Epilepsy prevailed in younger age group.

**Conclusion:** The burden due to Neurological disorders is increasing in India and leading to further disability. In developing countries were most of the population belongs to middle or low socio-economic status against increase the burden as the sole family member get disabled and the whole family is dependent on their livelihood.

**Keywords:** Stroke • Epilepsy • Disability • Rehabilitation

## Introduction

There is a phase of epidemiological transition in India with increase in non-communicable diseases. Neurological disorders constitute a major portion of non-communicable disease [1,2]. The average crude prevalence rate of common neurological disorders in India is 2394 and ranged from 967 to 4070/100000 population with higher prevalence rate in rural population [2]. The major causes leading to neurological disability includes Stroke, nerve and muscle disorders, epilepsy, parkinsonism and related disorders, dementia demyelinating disorders like multiple sclerosis, NMO, neuroimmunological disorders and neuroinfections.

Among these neurological disorders Stroke is the most common cause leading to disability and permanent impairment in physical and cognitive functions. Neurological disorders including stroke, communicable neurological diseases, and brain cancer accounted for 10.2% of global DALYs and 16.8% of all deaths in 2015.

DALYs from all neurological disorders combined exceeded those from all

**\*Address for Correspondence:** Siddharth Maheshwari, Department Of Neurology, Institute of Human behavior and allied sciences, Dilshad garden Delhi 110095 India, Tel: +919868396865; E-mail: drsiddharthvds@gmail.com

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injuries (249.8 million), cardiovascular disease (228.9 million, excluding stroke), cancer (209.4 million), and mental and substance use disorders (162.4 million) [3]. Stroke accounted for largest proportion of total DALYs (47.3%) followed by migraine, meningitis, and Alzheimer's disease and other dementias. The Epilepsy percentage is round 5% and motor neuron disease 0.4%. Again Stroke accounted for deaths (67.3%) among all the neurological disorders followed by Alzheimer's disease and other dementias. Rest Neurological disorders contribute to deaths varied from 0.2% for multiple sclerosis to 4 % for meningitis [4].

## Stroke

Stroke is the major cause for disability and death and it's a major health concern in India [5]. One study from Kolkata showed the average annual incidence of stroke was 145 per 100,000 populations [6]. Most common type is Ischemic stroke that account for about 80% [7].

Stroke is the commonest cause of disability in our study also leading to permanent deficits in physical and cognitive functions. Acute stroke management in the recent years had been changed with the availability of thrombolysis and Neurointerventions at the dedicated centres. There is decrease in mortality, morbidity and burden due to stroke with introduction of such therapies and the literature available had shown the same. However implications of such facilities in country like ours requires the establishment of stroke units at various levels, and such efforts had been started and going on a good pace as previously it is available only at few centres in India. Beside this a lot of efforts is still require for the awareness and sensitization of physicians and doctors at periphery to identify stroke at the earliest and refer to a nearby centre for timely interventions so that long term disability and death associated with it can be further reduced.

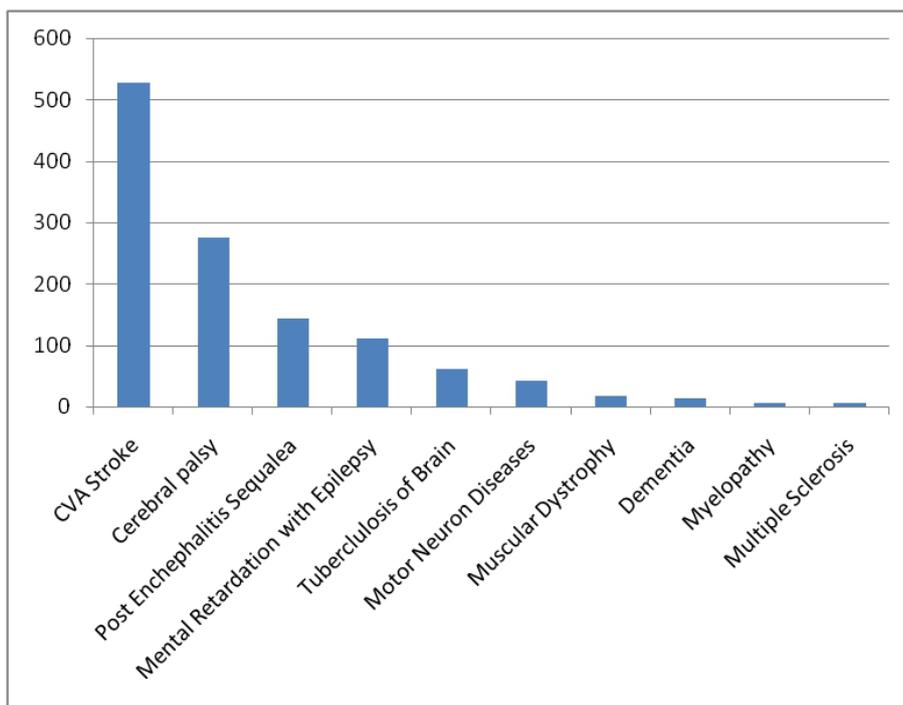


Figure 1. Showing various neurological disorders and there numbers.

DIAGNOSIS	TOTAL PATIENTS	MALE	FEMALE	%
1 CVA Stroke	527	475	52	43.8
2 Cerebral palsy	275	235	40	22.8
3 Post Encephalitis Sequalea	143	113	30	11.8
4 Mental Retardation with Epilepsy	111	77	34	9.2
5 Tuberculosis of Brain	62	42	20	5.2
6 Motor Neuron Diseases	42	30	12	3.5
7 Muscular Dystrophy	18	16	2	1.5
8 Dementia	14	8	6	1.2
9 Myelopathy	6	4	2	0.5
10 Multiple Sclerosis	5	1	4	0.4

Figure 2. Showing % of various neurological disorders.

### Epilepsy

Epilepsy is another cause for disability and a social stigma especially in country like ours (India). Commonest causes includes trauma, infections like tuberculosis cysticercous, stroke and perinatal injuries.

In one study the epilepsy prevalence rate of ~5 per 1000 and incidence rate of ~50 per 100,000 [8,9]. Special mention needs to be made regarding care of people with epilepsy in view of the associated stigma, myths and treatment gaps associated with epilepsy leading to burden to the patients and their family members [10,11].

There is a lack of awareness that epilepsy is a brain disorder and can be treated. It is therefore important to further focus on such and to create public awareness.

### Cerebral Palsy

Incidence of Cerebral palsy is round 3 cases per 1000 live births in India Cerebral palsy (CP) is the most common type of motor disability in childhood [12]. Prevalence of CP is on the rise [13].

Profile of CP in developing country is also different from those of developed countries [14]. Spastic quadriplegia is the most common type of CP in developing countries rates between 36% and 71% whereas spastic dysplasia (5%–47%) is commoner in the developed world [14]. Birth Asphyxia, perinatal complications, infectious and bilirubin encephalopathy among the commoner causes leading to cerebral palsy. Speech problems, seizures, microcephaly, and intellectual disability (38.61%) are common co-morbidities Cerebral palsy among the very common cause for lifelong disability and permanent impairment of functions and a major contributor to neurological disorder

burden in developing countries like ours (India). A lot of awareness and campaign regarding the overall antenatal care is going on with more emphasis on institutional deliveries

### Infections of the CNS

Tubercular meningitis is a severe form of the CNS infection, leading to high mortality and morbidity. The deficits in tubercular meningitis can be motor and cognitive both or a combination. The physical deficits may lead to hemiparesis due to vasculitic infarcts. The permanent disability due to this disease is on rise in developing countries especially in India, leading to permanent deficits of neurological functions, owing to the seriousness of the diseases and identification of multiple drug resistant MDR tuberculosis. Currently one third of Drug resistant MDR TB is in India recently declared by WHO. Most factors found to correlate with poor outcome can be directly related to the stage of the disease at the time of diagnosis [15].

### Neurodegenerative disorders

Parkinsonism, Dementia and other neurodegenerative disorders are also one of the causes for permanent physical and cognitive impairment. With the population on the rise and substantial increase in the population of elderly, such disorders are on the rise, further increasing the possibility of disability due to such disorders.

### Motor Neuron Diseases

Motor neuron disease (ALS) is clinically characterised by Progressive weakness of limbs and wasting. The course is progressive leading to death due generally by respiratory failure, with 50% of patients die within 15–20 months after diagnosis [16,17]. The causes of motor neuron diseases remain unknown, but are postulated to have combine environmental and genetic factors. Motor Neuron diseases lead to permanent physical impairment of functions leading to the disability.

The median prevalence of 4.48 per 100 000 and a standardised incidence rate of 1.68 per 100 000 person-years [18,19].

## Discussion

India is a country with variable cultural, geographical, social and economic background. There are challenges as the numbers due to neurological disability is rising in all the age groups. Measures requires at many levels for legislation and guidelines for disability evaluation and benefits. According to WHO, disability is defined as 'a disability is any restriction or lack (resulting from an impairment) of ability to perform an activity in the manner or within the range considered normal for a human being'. Disability can be divided into three periods-(a) Temporary partial disability—is that period in which the affected person is totally unable to work, (b) Temporary partial disability—is that period when recovery has reached the stage of improvement so that the person may begin some kind of gainful occupation and (c) Permanent disability applies to permanent damage or loss of use of some part/ parts of the body after the stage of maximum improvement has been reached and the condition is stationary from any medical treatment. All our cases pertain to this group of permanent disability. Report published by WHO on Global burden of disease study reported that the percentage of disorders related with mind and Brain would rise to 14.7% by 2020. The Neuropsychiatric disorders though comprise only 1.4% of all deaths, they account for a remarkable 28% of all years of life lived with disability. Population in almost all the age groups were affected with peak around 60 years According to 2001 census there are 77 million people above the age of 60 years and it is expected that it will increase to 177 million by 2025 significant rise in age-related disorders such like Stroke, Dementia and other neurodegenerative disorders [20]. One community based survey from Bangalore the prevalence rates were 2190 and 4070, respectively, for Urban versus Rural population having prevalence of Neurological disorders with a ratio of 1:1.85 [21].

These surveys coupled with other had demonstrated that the prevalence of neurological disorders is significantly higher in rural population as compared

with urban. Various epidemiological studies in India had shown that there are 20 to 30 million people with neurological disorders and the common disorders include epilepsy (6 to 8 million), headache (10-12 million), and strokes (1 to 2 million). There are few studies in India on the magnitude and severity of disability consequent to neurological disorders. Taly and Chaudhuri in the hospital-based study at NIMHANS Bangalore observed that at discharge from the hospital 92% of 1093 patients had disability with varying degree of severity [22]. Follow-up after six months showed that the disability persisted in 79% but there was a slight favourable change with increase in the proportion of those with mild disability. However, there was significant impact on the quality of life since 80% of them required assistance for daily activities. In another survey by Bangalore Urban Rural Neuroepidemiological survey (BURN), disability assessment done using modified Barthel index showed that 20% of 3128 persons identified with neurological disorders, had significant disability and it was twice more common in the rural region compared to the urban [23]. These Studies had raised a matter for future concern in respect to the proper management of neurological disorders in acute phase, to prevent disability and a comprehensive team work for neurorehabilitation addressing all the domains of it, especially including motor, sensory and psychosocial part. The economic burden of neurological disorders includes direct and indirect cost. Direct cost includes admission to hospitals, investigations cost, expensive medications and the cost of travel. Indirect costs, mainly in the form of burden to the family because of neurological disability, loss of employment and in cases when the disabled person is the only lone earning member of the family in such cases situation become much worse. In study by Thomas et al. [23] conducted in six medical centres, the annual cost of epilepsy per patient was INR 13755. Based on this data and the number of people with epilepsy in the country, the economic burden was estimated to be INR 68.75 billion. The data from same study can be extrapolated and give an indirect cost or burden due to other neurological disorders.

In India we need to promote a national policy for improving neurology care, increase public awareness with involvement of the government.

Prevention of stroke through national intervention programs to reduce the risk factors of stroke like hypertension, diabetes mellitus, smoking, obesity, and adaptation of a healthy life style, reduction of birth injuries which contribute to significant proportion of cerebral palsy and epilepsy, early diagnosis and treatment of infections of the brain like tubercular meningitis.

## Conclusion

A neurological disorder leading to permanent physical and cognitive disability is of a matter concern in India and world. In countries like ours with limitation in resources in catering a population of round 130 billion efforts must be made in the direction for the prevention and management of causes that leads to neurological disease and further development of disability. The burden of neurological disorders has increased substantially over the past few years because of population ageing, despite substantial decreases immortality rates from communicable diseases and stroke. Neurological diseases are a major cause of disability and death Worldwide and it's a matter of great concern when only earning member of the family become disabled because of neurological disease, making the whole family very difficult to earn their livelihood. Neurorehabilitation forms an integral component of neurology services since disability due to neurological disorders, unlike other diseases, is a major issue. The Government and health care system should take in account for the allocation of budgets, creating infrastructural facilities, training, education, health needs at all levels and strengthen the super speciality sectors for a comprehensive health care management including the neurorehabilitation so to reduce the burden of neurological disorders.

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