

Original Research Article

Epidemiological and Observational Studies on Neurological Disorders: A cross-sectional study

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Abstract: The aim of this study was to estimate the prevalence and risk factors for different neurological disorders. We also aimed to explore the effect of different socio-demographic variables in neurological disorders. Methods: A prospective cross-sectional study was carried out at Neurology Outpatient Clinic of United Hospital Ltd., Bangladesh, from December 2015 to March 2016 to explore the experiences of patients with neurological disorders. A separate questionnaire was used to collate the information. All registered patients medical records were reviewed. Microsoft Office Excel 2007 software package was used for statistical analysis. Data of 438 patients were collected and analyzed of which 239 (54.57 %) were females and 199 (45.43 %) were males. This study showed a high prevalence of epilepsy, stroke and migraine and an overall low prevalence of Parkinsonism, Alzheimer's and dementia. The values were 121, 97, 52, 43, 23 and 102 for epilepsy, stroke, Alzheimer's, Dementia, Parkinson's and Migraine accordingly. Most of the patients (79.95%) were unmarried in our observational study. Only 20.06% were married. 41.03% and 26.18% patients were alcoholic and smoker respectively. Highest percentage of the patients (27.27 %) belonged to the age group 61 - 70 years, 21.23% to the age group 41 - 50 years and 17.05 % to the age group 51 - 60 years. Moreover, 42.98% of the patients were from community colony. The findings from the present study supported some previous research studies showing that women are more adversely affected by different neurological disorders than men. Therefore, more epidemiological studies need to be conducted to look into the changing pattern of neurological disorders using a uniform methodology.

Keywords: Neurological disorders, Epilepsy, Stroke, Alzheimer's, Dementia, Parkinson's and Migraine

INTRODUCTION

Neurology is a field of science which deals with a diverse domain of diseases, including diseases resulting from disorders of the peripheral, central, and autonomic nervous systems. Neurological disorders (ND) may exhibit both chronic and acute courses, affect a variety of anatomical parts of the body and cell types [1]. These disorders are common diseases resulting in various degrees of disability and loss of productive life [2]. Thus, they have a significant impact on the quality and duration of life [3]. Neurological disorder can result from hereditary and congenital causes. These diseases commonly cause forms of cerebral palsy, hydrocephalus, microcephaly, epilepsies and epilepsy syndromes, hyperactivity, attention deficit, meningoencephalitis, and autism [4]. These are associated with delays in developmental milestones, muscle rigidity, and in-coordination, impairment of speech, hearing and vision. Moreover, neurological disorders ultimately lead

to learning disability and prolonged dependency, thus posing enormous psychosocial and socio-economic challenges to human being [4]. WHO (World Health Organization) has declared that neurological disorders are a major problem worldwide [4]. Neurological disorders affect cognitive as well as mental functioning [1]. There are many neurological disorders such as epilepsy, stroke, alzheimer's, dementia, parkinson's and migraine.

A temporary alteration in brain function due to hypersynchronous neuronal activity is known as *seizure*. Epilepsy is the tendency to have recurrent unprovoked seizure [5]. Stroke is another disorder which is also known as brain attack. It occurs when blood circulation to the brain fails. Thus, brain cells can die from decreased blood flow [6]. Another rapidly expanding and progressive neurological disorder is alzheimer's disease (AD). It is characterized by loss of

memory and overall cognitive functioning. Besides, various behavioral symptoms such as anxiety, depression and apathy are also associated with AD [7]. Dementia is a type of neurological disorder which has a negative effect on the patient. A variety of neurological conditions result in dementia. Anxiety is a common coexisting complaint in patients with dementia. Such condition has been associated with additional burden on patients [1,8]. A progressive age-associated neurological disorder is parkinson's disease (PD), which causes motor disability [9]. It has a prevalence rate of 0.3% in the general population [10]. Rigidity tremor, postural instability and constipation are common symptoms of PD. Other comorbidities include psychiatric symptoms such as anxiety, depression, and hallucination [11]. Moreover, migraine is another common, chronic and probably the most frequently reported types of primary headache among adolescents [12].

The objective of the present observational study was to estimate the prevalence and risk factors for neurological disorders such as epilepsy, stroke, alzheimer's, dementia, parkinson's and migraine. Additionally, we aimed to explore the effect of different socio-demographic variables in neurological disorders.

METHODOLOGY

Study Area

The study was carried out in the Department of Neurology at United Hospital Ltd, Dhaka, Bangladesh. It is a tertiary care teaching hospital. It runs a separate Neurology Department supported by a separate ward and outpatient Clinic (OPC).

Study period and study population

The study was conducted from December, 2015 to March, 2016. The patients admitted in the department of Neurology and treated with different medications during the study period were included in the present study. A total of 438 patients were registered during this time frame.

Study design and study tools

This hospital based observational study adopted a prospective cross-sectional method to explore the experiences of patients with neurological disorders attending the Neurology Outpatient Clinic of United Hospital Ltd., Bangladesh. Prescriptions of patients being treated at the hospital were included in this study. All registered patients medical records from december 2015 to March 2016 at the Neurology Outpatient Clinic were reviewed. A questionnaire comprising three sections: a) *Socio demographic characteristics of patients*; b) *Respondent knowledge and perception about neurological disorders*; c) *Prevalence rates of*

different neurological disorders, was used to collate the information. After collecting the data, the details were entered in the structured patient profile form. The questionnaire was written in English.

Inclusion and exclusion criteria

Patients suffering from neurological diseases of both sexes attending outpatient clinic (OPC) of Neurology Department were included in the study. Patients who were not diagnosed as having neurologic problem were excluded.

Data analysis

Descriptive statistics were used to analyze the data using frequency table, percentages and charts. Microsoft Office Excel 2007 software package was used for statistical analysis.

Ethical clearance

Permission for the study was obtained from the management of the United Hospital Limited, Dhaka, while informed consent was obtained from patients after explaining the goal of the study.

RESULTS AND DISCUSSION

Socio demographic characteristics

Data of 438 patients with different neurological disorders (ND) were collected and analyzed of which 45.43% were males and 54.57% were females (Table 01 and Figure 01). In neurological disorders, understanding the biological bases of sex/gender differences may be crucial for better understanding the etiology of such disorders [13]. Significant sex differences have been observed in anxiety, neurodegenerative and depressive disorders. Female are more likely to suffer from major depression than men [13]. In our study, the patients with ND were further categorized based on their age. Highest percentage of the patients (27.27 %) belonged to the age group 61 - 70 years, 21.23% to the age group 41 - 50 years and 17.05 % to the age group 51 - 60 years (Table 1). Moreover, 42.98% of the patients were from community colony. The present study also explored that business doing people (42.52%) was found more in the study population (Table 1). We observed an inverse association between education and neurological disorders. 59.01% of the highly educated people (graduates or above) were found as patient with ND in this study (Table 1). Several studies also demonstrate reverse relationship between educational status and neurological diseases [14]. Most of the patients (79.95%) were unmarried in our observational study. Only 20.06% were married (Figure 1). Actually married people have a lower prevalence of psychiatric diseases [15, 16]. Hence, Marriage is less common in neurological disorders.

Table 1: Socio demographic characteristics of study population

Variables	%	Variables	%	Variables	%
Age (Years)		Educational level		Marital Status	
From 21 to 30	7.01%	Illiterate	2.91%	Married	20.06%
From 31 to 40	8.65%	Primary	6.87%	Unmarried	79.95%
From 41 to 50	21.23%	Secondary	10.62%		
From 51 to 60	17.05%	Higher Secondary	20.78%		
From 61 to 70	27.91%	Graduate or Above	59.01%		
From 71 to 80	17.07%				
From 81 to 90	1.15%				
Household Condition		Family Membrs		Sex	
Posh Area	2.33%	Two	19.74%	Male	45.43%
Semi Paka building	18.78%	Three	28.76%	Female	54.57%
Residential Building	35.83%	Four	34.65%		
Community Colony	42.98%	More than four	16.99%		
Average Monthly Family Income		Occupation		Others	
Below TK 10000	1.92%	Service Holder	31.65%	Smoker	26.18%
TK 10000- TK 20000	8.02%	Business	42.52%	Alcoholic	41.03%
TK 20000- TK 30000	36.01%	Student	2.34%	Not smoker/alcoholic	32.78%
Above TK 30000	54.03%	Daily Labour	5.76%		
		Home Makers	20.01%		

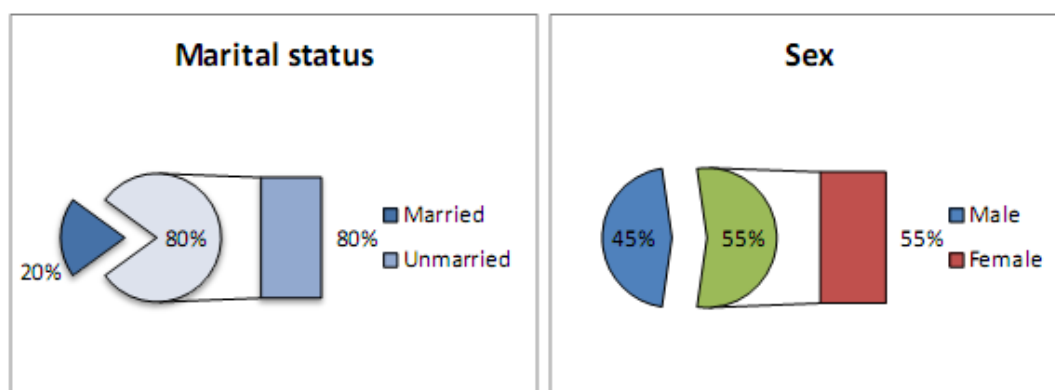


Fig-1: Sex and Marital status of patients with neurological disorders

Risk factors for neurological disorders

Cigarette smoking is a relatively modern habit that spread worldwide throughout the 20th century, though it began much earlier in some regions. Global consumption of cigarettes rose more than 3-fold between 1950 and 2000 [17]. Cigarette smoking prevalence varies geographically and between men and women; rates for men are generally higher than women. In some nations such as Norway, Sweden, and New Zealand, male and female cigarette consumption rates are roughly equal [17]. Smoking has been extensively studied in relation to different brain disorders. The relationship between smoking and neurological diseases, however, has always been controversial. 302 people (out of 438) in the present study support this controversial relationship (Table 02). Only 26.18% smokers were found (Table 1). Recently, two neurological disorders have been studied in relation to smoking: Alzheimer’s disease (AD) and Parkinson’s disease (PD). Many epidemiological studies have found a highly significant negative association between

cigarette smoking and these two neurodegenerative disorders [18]. Furthermore, there is also an inverse association between coffee consumption and neurological disorders [19]. 299 (67.06%) people in our hospital based epidemiological study support this inverse association (Table 2).

Alcohol consumption can damage the nervous system, including the brain. Consequently, alcoholics and chronic heavy drinkers can suffer abnormalities in their mental functioning and changes in behaviors associated with brain impairment. The neurological effects of alcohol can occur directly, because alcohol is a toxic substance [20, 21]. Alcohol can have a negative effect on certain neurological processes, such as temperature regulation, sleep, and coordination. Alcohol interferes with normal sleep patterns. Most people fall asleep easily after one or more alcoholic drinks. Thus, alcoholism-related brain changes can cause abnormalities in mental functioning, resulting in different neurological disorders [22]. Most of the

patients (253 out of 438) in our study support this hypothesis (Table 2).

Stress has a major impact upon neurodegenerative and mental disorders. It plays a major role in susceptibility, progress, and actual outcome. Several studies explored the impact of stress

on the nervous system, neurodegenerative disorders, and mental diseases [23]. There is a connection between stress and neurological disorders. According to the 84.70% respondents in the present study, stress is a major contributor to the selected few neurological disorders (Table 2).

Table 2: Respondent knowledge and perception about neurological disorders.

STATEMENTS	YES	NO
1. Do you have any idea about neurological diseases?	302 (68.95%)	136 (31.05%)
2. Did you have any improve after consult with physician?	267 (60.96%)	171 (39.04%)
3. As a patient did you complete your treatment?	254 (57.99%)	184 (42.02%)
4. Did the provider tell you enough about your treatment?	341 (77.85%)	97 (22.15%)
5. Did the provider's service match your expectation?	284 (64.84%)	154 (35.15%)
6. Were you comfortable talking with your physician?	249 (56.85%)	189 (43.13%)
7. Alcoholism consumption is a potential factor for the development of neurological disorders.	253 (57.76%)	185 (42.23%)
8. Is cigarette smoking associated with the development of neurological disorders?	136 (31.05%)	302 (68.95%)
9. Stress is a contributor to neurological disorders.	371 (84.70%)	67 (15.30%)
10. There is an inverse relation between coffee consumption and neurological disorders.	299 (67.06%)	139 (30.95%)

Prevalence rates of different neurological disorders

In this study, the prevalence of most of the neurological disorders except epilepsy and parkinson's diseases was higher in female compared to male (Figure 2). Epileptic patients were found more in our study and the incidence was higher in men than women (Figure 02), which is in correspondence with earlier studies, however many researchers have explored that generalized epilepsies are more frequent in women [13]. Several studies have shown remarkable increasing trend of stroke in the community [24]. We found 97 stroke patients (out of 438), of which 52 were female and 45 were male (Figure 2). Presently, stroke is an emerging health problem and women are more likely affected than men [25]. Alzheimer's disease (AD) is a progressive neurological disorder and the prevalence is

higher in women compared to men [26]. In our study, AD is more frequent in women. Dementias were also higher in women than in men (Figure 2), which is in correspondence with previous studies [27]. Different studies reported that the prevalence and incidence of parkinson's disease (PD) are significantly higher in male compared to female [13]. We observed same outcome in our study (Figure 2). Several studies suggested that the prevalence of migraine with female to male ratios ranging from 2 : 1 to 3 : 1 and peaking in midlife. The strikingly higher prevalence of migraine in females compared with males is one of the hallmarks of migraine [28]. We also noticed that the prevalence of migraine is significantly higher in women than men (Figure 2).

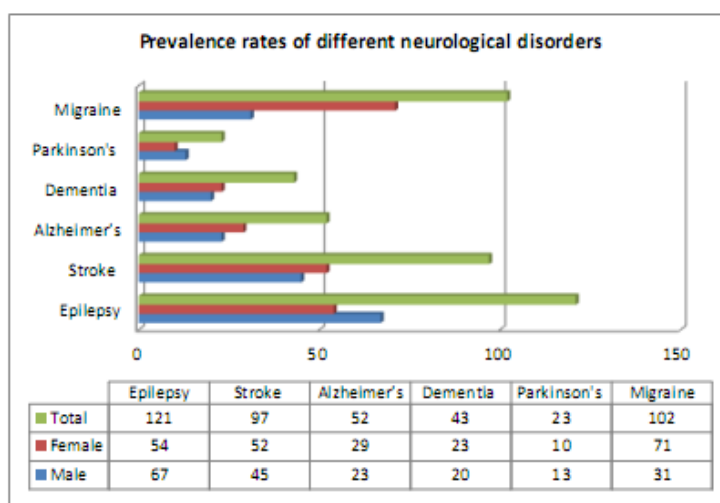


Fig-2: Prevalence rates of different disorders in the study population

CONCLUSION

Neurological disorders are a leading cause of disability internationally. The findings from the current study supported some previous research studies showing that women are more adversely affected by different neurological disorders in terms of incidence and prevalence than men. Findings of our study also showed a high prevalence of epilepsy, stroke and migraine and an overall low prevalence of Parkinsonism, Alzheimer's and dementia. The most noticeable result of our study was that marital status might result in differences in prevalence rates of neurological disorders. Therefore, more epidemiological studies need to be conducted to look into the changing pattern of neurological disorders using a uniform methodology.

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