

## PATTERNS OF DISEASE PRESENTATIONS IN AN ADULT OUTPATIENT NEUROLOGY CLINIC OF A NEUROLOGIST

Bikram Prasad Gajurel,<sup>1\*</sup> Ragesh Karn,<sup>1</sup> Reema Rajbhandari,<sup>1</sup> Rajeev Ojha<sup>1</sup><sup>1</sup> Department of Neurology, Maharajgunj Medical Campus, Tribhuvan University Teaching Hospital, Maharajgunj, Kathmandu, Nepal**Date of Submission** : July 13, 2022**Date of Acceptance** : July 31, 2022**Date of Publication** : Aug 19, 2022**\*Correspondence to:**

Bikram Prasad Gajurel, Associate Professor, Department of Neurology, Maharajgunj Medical Campus, Tribhuvan University Teaching Hospital, Maharajgunj, Kathmandu.

Phone: +9779841243346.

Email: bikram\_gajurel@hotmail.com

ORCID ID: <https://orcid.org/0000-0002-9995-0705>**Citation:**

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**ABSTRACT****Introduction:** Neurological disorders are very common all over the world. The most common neurological disorders causing maximum disability in Nepal are migraine and tetanus whereas the most common neurological causes of death are ischemic strokes and primary intracerebral hemorrhage. This small-scale study has been carried out to find out the frequency and types of disorders presenting in adult outpatient neurology clinic in a tertiary care hospital in Nepal.**Materials and Methods:** This is a retrospective descriptive study carried out in the outpatient department of the department of neurology at Tribhuvan University Teaching Hospital, Kathmandu, Nepal. The diseases were classified based on the 11th revision of the International Classification of Diseases. Chi-square test and Fisher's exact test were used to calculate the significance of the different types of variables when applicable.**Result:** Of 1939 patients seen over a period of 12 months, diseases of the musculoskeletal system were the commonest (28.7%) followed by headache disorders (18.4%). Diseases of the musculoskeletal system, ischemic stroke, primary intracerebral hemorrhage, movement disorders, diseases of the inner ear were more common in patients more than 50 years and headache disorders; mental, behavioral or neurodevelopmental disorders; seizures and multiple sclerosis or other white matter disorders were more common patients aged 50 years or less. These differences were statistically significant.**Conclusion:** Almost all types of neurological disorders were seen in the adult outpatient neurology clinic providing the opportunity to carry out research and to uplift academic activities in a tertiary care hospital.**Keywords:** Neurological disorders; Outpatient clinic; Tertiary hospital.**INTRODUCTION**

Neurological disorders are very common and are an important cause of mortality and morbidity worldwide.<sup>1</sup> Globally, in 2016, neurological disorders were the leading cause of the disability adjusted life years (DALYs) (276 million; 95% UI 247–308 million) and the second leading cause of deaths (9.0 million; 95% UI 8.8–9.4 million).<sup>2</sup> In a report published in Nepal, the most common neurological disorders causing maximum disability were

migraine and tetanus and the most common neurological causes of death were hemorrhagic and ischemic strokes.<sup>3</sup> Studies addressing the different types of neurological disorders that patients present with in our outpatient setting are lacking. This study has been carried out to find out the frequency and types of various disorders presenting in the neurology outpatient department of a tertiary care hospital in Nepal.

## MATERIALS AND METHODS

This is a retrospective descriptive study carried out in the neurology outpatient department of Tribhuvan University Teaching Hospital (TUTH), Kathmandu, Nepal. TUTH is one of the largest referral center in Nepal. The department of neurology runs three days of outpatient clinic in TUTH and one neuro-ophthalmology clinic at B.P. Koirala Lions Centre for Ophthalmic Studies within TUTH premises. The first author of this article kept a register in the clinic to record the age, sex and diagnosis of the patients after obtaining informed consent from the patients. All patients more than 18 years who attended the neurology outpatient department of the hospital from Poush 2076 till Baishak 2078 were included in the study. The outpatient department did not run adequately from Chaitra 2076 till Shrawan 2077 during the COVID-19 pandemic and in order to avoid selection bias, patients attending the clinic from Poush 2077 to Baishak 2078 were included so that the number of patients attending the outpatient department over a period of one year could be represented. Ethical approval to carry out the study was obtained from the Institutional Review Committee of Tribhuvan University Institute of Medicine. The diseases were classified based on the 11<sup>th</sup> revision of the International Classification of Diseases.<sup>4</sup> The data were analyzed by using the Statistical Package for the Social Sciences (SPSS) version 26. Descriptive statistic in the form of frequencies, percentages, mean, medians and standard deviations were used to describe the distribution and types of various disorders presenting to the outpatient department. Chi-square test and Fisher's exact test (to compare variable having frequencies less than 5) were used to calculate the significance between variables when applicable.

## RESULTS

A total of 1939 patients were seen over a period of one year. The number of new patients was 1073 (55.3%) and follow-up patients was 866 (44.7%). Male patients numbered 1021 (52.7%) and female 918 (47.3%). The median age of the patients was 43 (range 18-90 years; standard deviation 15.82). The distribution of the diseases which constituted more than 1% of total cases in the outpatient department was as provided in Table 1.

**Table 1. Distribution of various disorders in the neurology clinic**

Diseases	Freq.	%
Diseases of the musculoskeletal system	557	28.7
Headache disorders	357	18.4
Cerebrovascular diseases	270	13.9
Mental, behavioral or neurodevelopmental disorders	241	12.4
Seizures	152	7.8
Disorders of nerve root, plexus or peripheral nerves	103	5.3
Movement disorders	79	4.1
Diseases of the inner ear	43	2.2
Infections of the central nervous system	27	1.4
Multiple sclerosis or other white matter disorders	22	1.1

Disorders which constituted less than 1% of total cases were disorders with neurocognitive impairment or dementias (n= 17; 0.9%), cerebellar ataxia (n= 15; 0.8%); sleep-wake disorders (n=15; 0.8%), idiopathic intracranial hypertension (n=12,0.6%), syncope (n=9; 0.5%), myasthenia gravis (n=7; 0.4%); motor neuron diseases (n=4; 0.2%), diseases of the muscles (n=4; 0.2%), normal pressure hydrocephalous (n=3; 0.2%); autoimmune encephalitis (n=2; 0.1%).

The distributions of the disorders between young and older patients and the two sexes and the significance of the difference between them were as shown in the Tables 2 and 3.

**Table 2. Distributions of the common disorders among young and older patients**

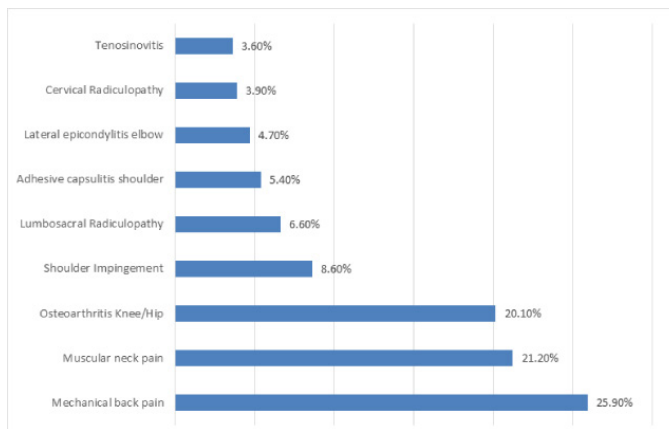
Diseases	Age ≤ 50 years	Age > 50 years	Total	Chi-square (p-Value)
Diseases of musculoskeletal system	294 (23.5%)	263 (38.3%)	557	< 0.001
Headache disorders	331 (26.4%)	26 (3.8%)	357	< 0.001
Mental, behavioral or neurodevelopmental disorders	241 (19.2%)	0 (0%)	241	< 0.001
Ischemic Stroke	49 (3.9%)	135 (19.7%)	184	< 0.001
Seizures	112 (8.9%)	40 (5.8%)	152	0.015
Disorders of nerve root, plexus or peripheral nerves	70 (5.6%)	33 (4.8%)	103	0.466
Movement disorders	31 (2.5%)	48 (7%)	79	< 0.001

Primary intracerebral hemorrhage	26 (2%)	43 (6.3%)	69	< 0.001
Diseases of the inner ear	15 (1.2%)	28 (4.1%)	43	< 0.001
Infections of the central nervous system	18 (1.4%)	9 (1.3%)	27	0.823
Multiple sclerosis or other white matter disorders	21(1.7%)	1 (0.1%)	22	0.001 (Fisher's Exact Test)
Total	1253	686	1939	

**Table 3. Distribution of the common disorders among males and females**

Diseases	Male	Female	Total	Chi-square (p-Value)
Diseases of musculoskeletal system	298 (29.2%)	259 (28.2%)	557	0.636
Headache disorders	175 (17%)	182 (19.8%)	357	0.128
Mental, behavioral or neurodevelopmental disorders	131 (12.8%)	110 (12%)	241	0.572
Ischemic Stroke	104 (10.2%)	80 (8.7%)	184	0.270
Seizures	85 (8.3%)	67 (7.3%)	152	0.401
Disorders of nerve root, plexus or peripheral nerves	54 (5.3%)	49 (5.3%)	103	0.962
Movement disorders	37 (3.6%)	42 (4.6%)	79	0.290
Primary intracerebral hemorrhage	45 (4.4%)	24 (2.6%)	69	0.033
Diseases of the inner ear	18 (1.8%)	25 (2.7%)	43	0.152
Infections of the central nervous system	15 (1.5%)	12 (1.3%)	27	0.761
Multiple sclerosis or other white matter disorders	12 (1.2%)	10 (1.1%)	22	0.858
<b>Total</b>	<b>1021</b>	<b>918</b>	<b>1939</b>	

The distribution of the diseases belonging to the disorders which constituted more than 1% of the total cases was as presented in Figures 1-6 and Tables 4-6.



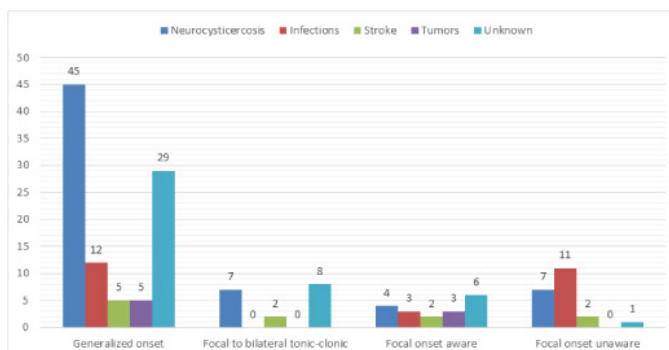
**Figure 1. Distribution of the diseases of the musculoskeletal system**

**Table 4. Distribution of the various types of headache disorders**

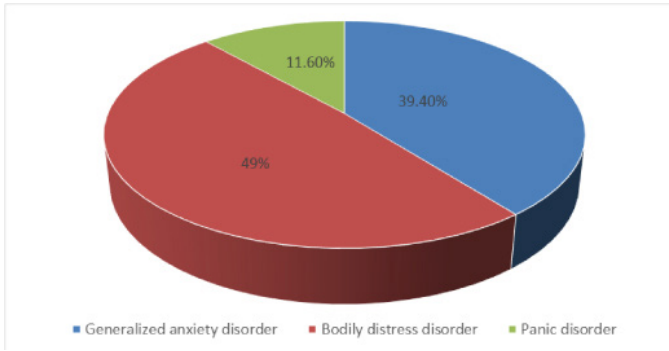
Headaches	Male	Female	Total	Percentage
Migraine without aura	86	110	196	54.9
Tension type	35	34	69	19.3
Mixed	25	12	37	10.4
Migraine with aura	20	10	30	8.4
Medication overuse	6	9	15	4.2
Unspecified	2	5	7	1.9
Trigeminal neuralgia	1	1	2	0.6
Cluster	0	1	1	0.3
Total	175	182	357	100

**Table 5. Distribution of the cerebrovascular diseases**

Diseases	Male	Female	Frequency	Percentage
Ischemic Stroke	104	80	184	68.1
Primary intracerebral hemorrhage	45	24	69	25.6
Cerebral Venous Sinus Thrombosis	5	3	8	3
Transient Ischemic Attacks	5	4	9	3.3
Total	159	111	270	100



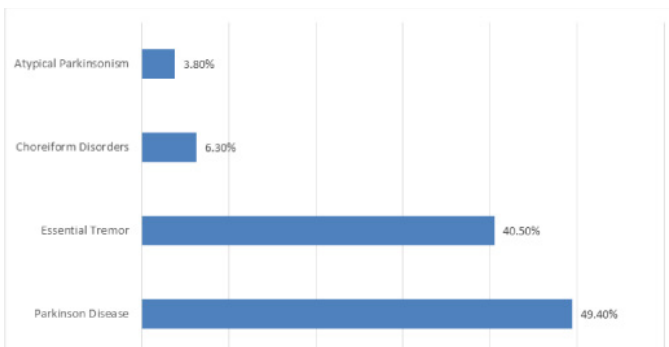
**Figure 2. Distribution of types of seizures and their etiology**



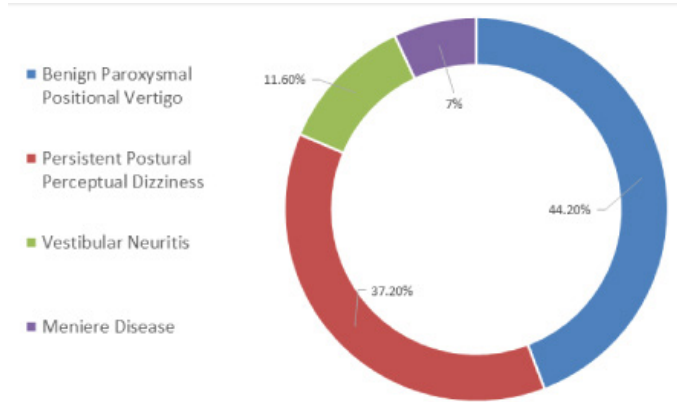
**Figure 3. Distribution of mental, behavioral or neurodevelopmental disorders**

**Table 6. Distribution of the disorders of nerve root, plexus or peripheral nerves**

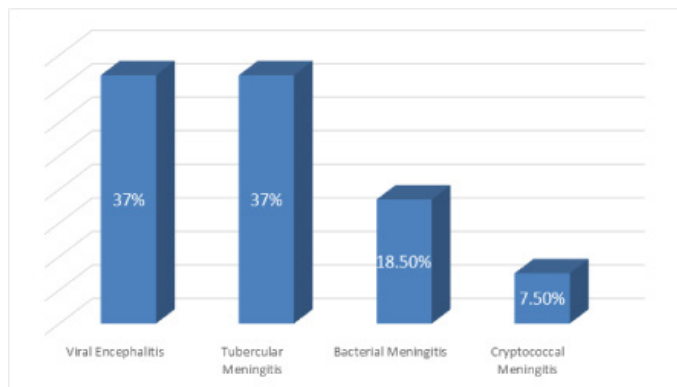
Condition	Frequency	Percentage
Carpal tunnel syndrome	28	27.1
Bell's palsy	25	24.3
Lateral rectus palsy	24	23.3
Guillain-Barre syndrome	11	10.7
Oculomotor palsy	5	4.9
Ulnar nerve lesion	3	2.9
Radial nerve lesion	2	1.9
Chronic inflammatory demyelinating neuropathy	2	1.9
Hypoglossal palsy	2	1.9
Brachial plexopathy	1	0.9
<b>Total</b>	<b>103</b>	<b>100</b>



**Figure 4. Distribution of movement disorders**



**Figure 5. Distributions of the diseases of the inner ear**



**Figure 6. Distributions of the infections of the central nervous system**

The lowest number of patients (22 cases) belonged to the multiple sclerosis or other white matter disorders (demyelinating disease) group; out of these, there were 17 cases (77.3%) of optic neuritis, three cases (13.6%) of neuromyelitis optica spectrum disorders and two cases (9.1%) of multiple sclerosis.

**DISCUSSION**

This is one of the first study which has been done to define the frequency and nature of neurological disorders in the outpatient setting in Nepal. The authors couldn't define the prevalence of neurological disorders in the outpatient setting in Nepal as data on total and type of disorders presenting in the outpatient clinic are lacking in our set up. One study defined the frequency of neurological disorders in patients admitted in TUTH as 59.48% of the total admissions in the medicine department.<sup>5</sup> The same study lists stroke, seizure disorders and meningitis as the most common neurological disorders in the inpatient setting.<sup>5</sup>

The most common disorder in this study are the diseases of the musculoskeletal system. These disorders range from 3.9% to 7.5% in the literature from developing countries.<sup>6,7</sup> Patients usually consider the pain associated with musculoskeletal problems as originating from the 'nerves' and subsequently visit neurology services. Headache disorders are the most common neurological disorders in the outpatient setting in low- and middle-income countries.<sup>6,7,8</sup> Headache is the next most common disorder in our setting. Even though there was no difference between males and females when headaches were considered in total (Table 3), migraine without aura is more prevalent in females in our study (Table 4).

Although cerebrovascular disorders in the outpatient setting constitute less than one third of the prevalence in the inpatient setting (almost 50% of total admissions),<sup>5</sup> our finding is consistent with the finding of a similar study from a neighboring country; the two countries probably share similar epidemiological profiles of this group of disease.<sup>6</sup> Seizures constitute one of the major reasons for patients for visiting the neurology clinics and its prevalence in our set-up is similar to other developing countries.<sup>6, 9,10</sup> The most common reason for seizures in underdeveloped countries is neurocysticercosis.<sup>11</sup> Our study also suggests similar conclusion (Figure 2).

Mental, behavioral or neurodevelopmental disorders (previously somatoform or functional disorders) are very common in neurology outpatient department. Widely known as the Jhum-Jhum syndrome in our country, these disorders can constitute 42% of the patient population.<sup>12</sup> In one study done in Scotland, functional neurological disorders were the second most common disorder seen in the neurology outpatient clinic.<sup>13</sup> Although female sex is considered to be a risk factor of somatoform disorder<sup>14</sup> we do not find this association in our study (Table 3).

In addition to these, a lot of other common neurological disorders were also seen (Tables and Figures 4-6). The most important limitation of this study is that it is retrospective and based on the registry maintained by a single neurologist. If it had been prospective and included data of all patients visiting the outpatient department it would have been more representative of the actual

distribution of the disorders in a hospital. In addition, the COVID-19 pandemic also affected the outpatient visits. We tried to minimize this by including data from the months in which the number of patients visiting the outpatient department were like the pre-pandemic time. In the future, large-scale research over a longer duration of time can be done in the outpatient settings so that it can provide better data to compare and to study.

## CONCLUSIONS

It can be concluded that almost all types of neurological disorders can be seen in the adult outpatient neurology clinic in a tertiary care hospital in Nepal. The outpatient clinic can provide an ample opportunity to carry out research in various conditions and helps to uplift academic activities in a tertiary care hospital.

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Conflicts of Interest: None

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