Spectrum of neurological diseases seen at the neurology outpatient clinic in North-Central Nigeria

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Abstract

Background: The spectrum of neurological diseases in developing countries like Nigeria is diverse and growing, and reliable data on the profile of these disorders is crucial for workforce planning and health-care demands. We sought to determine the burden of neurological disorders seen at Jos University Teaching Hospital's (JUTH) neurology outpatient clinic in north central Nigeria.

Methods: The study is a cross-sectional study that used a retrospective data abstraction technique on patients who received care at the JUTH neurology clinic between April 2017 and March 2019.

Results: Neurological cases account for approximately 79.9% of all outpatient presentations in the Neurology clinic. There were 2,304 males (47.1%) and 2592 females (52.9%). Cerebrovascular disease (33.9%), seizure disorder (16.3%), movement disorders (9.4%), disorders of nerve roots, plexuses, and peripheral nerve (6.6%), headache disorders (4.2%), and disorders with neurocognitive impairment (3.7%) were the most common neurological diseases.

Conclusion: In our clinic, a wide spectrum of neurological diseases exist, with cerebrovascular disease, epilepsy, and movement disorders being the most frequent and important causes of morbidity and healthcare costs.

Key words: Spectrum, neurological diseases, outpatient clinic, north central, Nigeria

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Introduction

Neurological diseases are a major cause of disability and death globally, [1] with a significant increase in low and medium-income countries over the past three decades and this is expected to continue with aging and population growth.[2] The burden of neurological diseases is exacerbated by population growth, aging, and the impact of geographic, cultural, religious, and ethnic factors.[3]

The spectrum and burden of neurological diseases in developing countries are poorly documented, necessitating accurate data for improving healthcare. The inadequacy of trained neurologists and infrastructure further complicate the situation, with sub-Saharan Africa having a median neurologist-to-population ratio of 0.043; 100,000 inhabitants compared to the WHO recommended ratio of 1; 100,000 [4] as against estimates of 0.7 and 6.6 in the Americas and Europe respectively.[5]

Data on neurological disorders in Nigeria is limited to hospital settings, and not reflective of the true burden of the disease in the population. [6] Furthermore, there is paucity of data on neurological disease burden in North central Nigeria. This study examines the burden, socio-demographics, and spectrum of neurological disorders in the neurology outpatient clinic over a 2-year period.

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Methods

This was a retrospective study carried out in the adult Neurology clinic of Jos University Teaching Hospital from April 2012 to March 2019.

Study Area

The study was conducted in Jos, Nigeria's North-Central area. Jos, the capital of Plateau State, lies between latitude 955^0 to the north and longitude 854^0 to the east. Jos University Teaching Hospital is one of Plateau state's tertiary hospitals, serving a population of 20.7 million people.[7] The hospital also receives referrals from various states in North Central Nigeria, including Nasarawa, Bauchi, Gombe, Benue, Kogi, and the Federal Capital Territory.

The Adult Neurology Clinic receives 40-70 non-emergency patients every week, with referrals coming from various medical centers, as well as within and outside the department of medicine.

Study Participants and Study Design.

The study analysed the medical records of 5,300 adults aged 18 and above who attended the clinic from April 2017 to March 2019, using a retrospective data abstraction approach. Four thousand eight hundred and ninety-six (92%) of the 5300 medical records were complete records.

Data collection

The WHO standard for detecting neurological illnesses served as the starting point for the survey. This questionnaire was evaluated and modified in accordance with the needs of the study. It was created to capture demographic information such as age, gender, socioeconomic class, and place and type of habitation (rural/urban).

The neurological diagnosis captured by the consultant neurologists were documented. The main type of neurological diseases along with the subgroups were recorded according to the international classification of disorders of the neurological system, 11th revision[8] as follows: (1) Movement disorders, (2) Disorders with neurocognitive impairment as a major feature, (3) Multiple sclerosis or other white matter disorders (4) Epilepsy or seizures, (5) Headache disorders, (6) Cerebrovascular diseases, (7) Spinal cord disorders excluding trauma 8) Motor neuron diseases or related disorders (9) Disorders of nerve root, plexus or peripheral nerves, (10) Diseases of neuromuscular junction or muscle, (11) Cerebral palsy, 12) Nutritional or toxic disorders of the nervous system, (13) Disorders of cerebrospinal fluid pressure or flow, (14) Disorders of autonomic nervous system, (15) Human prion diseases (16) Disorders of consciousness, (17) Other disorders of the nervous system, (18) Post procedural disorders of the nervous system, (19) Other specified diseases of the nervous system (20) Diseases of the nervous system, unspecified.

These clinical diagnoses were supported by necessary investigations, which included radiological; spine x-rays and MRI/CT scans of the brain and spine, electrophysiological; electroencephalography (EEG) and electromyography (EMG), laboratory; full blood counts, electrolytes, urea and creatinine, and liver function tests, and CSF studies. Based on the clinical presentation, other investigational methods were considered.

Statistical Analysis

The study used SPSS version 25 for data analysis, focusing on demographic, qualitative, and attributory variables. Quantitative variables were compared using independent student's t-tests and Pearson Chi square test for comparing age groups and genders. Statistical significance was set at a two-tailed p-value ≤ 0.05.

Ethical considerations

Approval for the study was obtained from the Ethics Committee of JUTH Jos.

Results

The study reviewed 4,896 adult neurology patients with 3,912 (79.9%) diagnosed with neurological diseases. The mean age was 52.7±16.3 years, with males older than females. The majority were females 2,592 (52.9%), and participants between the ages of 51-70 accounting for 47.2% of the study population. The age and sex distribution of the respondents are shown in Figure 1

Cerebrovascular disease was the commonest neurological disorder, accounting for 33.9% of cases, followed by seizure, movement, nerve root, headache, and neurocognitive impairments.

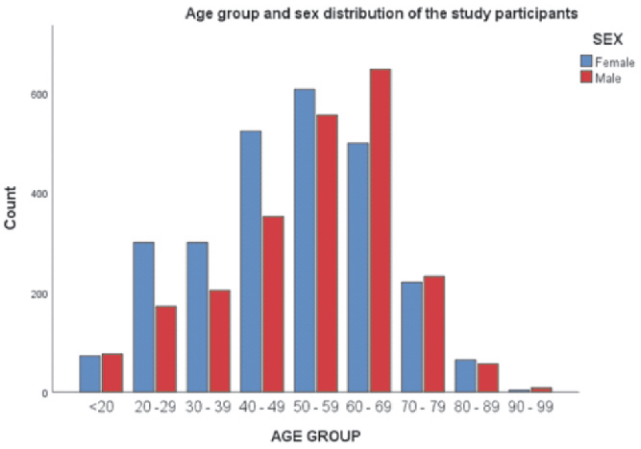


Figure 1: Age and sex distribution of the study respondents

Table 1: Frequency of the various neurological disorder group of the subjects according to ICD-11

ICD-11 diagnostic profile of subjects n= 4896	N	%
Movement disorders	460	9.4
Disorders with neurocognitive impairment as a major feature	180	3.7
Multiple sclerosis or other white matter disorders	8	0.2
Epilepsy or seizures	800	16.3
Headache disorders	208	4.2
Cerebrovascular diseases	1664	33.9
Spinal cord disorders excluding trauma	84	1.7
Disorders of nerve root, plexus or peripheral nerves	324	6.6
Diseases of neuromuscular junction or muscle	40	0.8
Cerebral palsy	16	0.3
Nutritional or toxic disorders of the nervous system	4	0.1
Disorders of cerebrospinal fluid pressure or flow	16	0.3
Disorders of consciousness	4	0.1
Other disorders of the nervous system	36	0.7
Other specified diseases of the nervous system	40	0.8
Diseases of the nervous system, unspecified	28	0.6
Neurological	3912	79.7
Non neurological	984	20.2
Total	4896	100

ICD-11: International Classification of Diseases - 11th Revision, n: Number

Table 2: Sex distribution of the major neurological diseases

Diagnosis	Male	Female	Total	P-value
Stroke	796	868	1664	0.434
Seizure disorder	380	420	800	0.785
Movement disorder	312	148	460	<0.001*
Lumber spondylosis	36	56	92	0.095
Cervical spondylosis	23	27	50	0.951
Parkinson's disease	182	94	276	<0.001*
Vascular dementia	54	30	84	0.001*
Alzheimer's dementia	25	16	41	0.1
Migraine headache	20	104	124	>0.001*
Tension headache	40	16	56	0.005
Secondary headache	16	8	24	0.220δ
Cluster headache	4	0	4	0.049δ

P-value: Probability value *significant p-value δ Fisher exact p-value

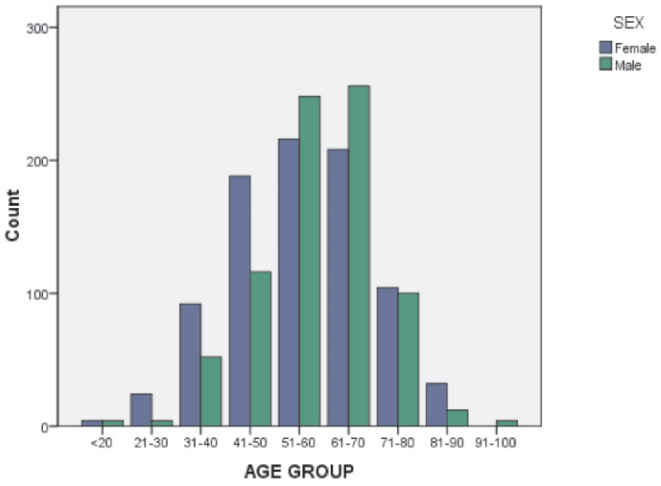
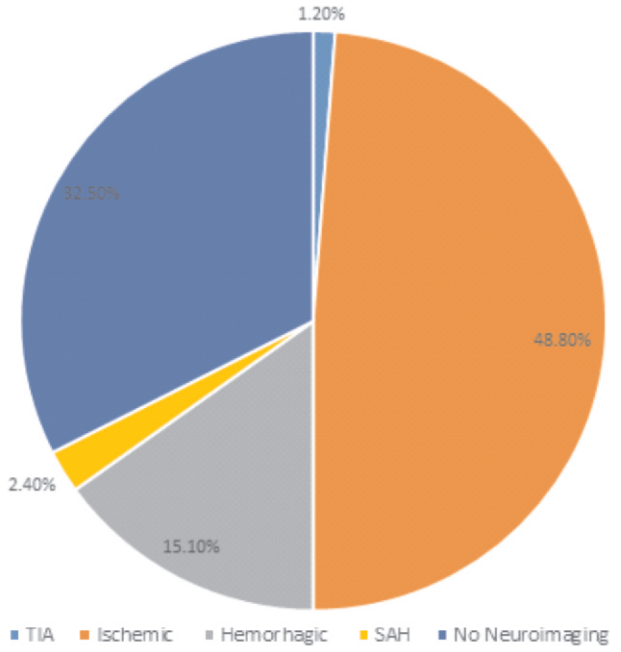


Figure 2: Age group and sex distribution of participants with stroke

Ischemic stroke was the commonest subtype, with 540 patients lacking documentation. The age group and sex distribution of participants with stroke is shown in figure 2 while the pie chart of stroke subtype is shown in figure 3.

Seizure disorder was present in 16.3% of patients, with complex partial seizures being the most common, followed by the subtypes; Post-stroke, generalized tonic-clonic, post-traumatic, pseudoseizure, absence seizure, and myoclonic epilepsy in decreasing order of frequency. Age and sex distribution of participants with seizure disorder is shown in figure 4.

Movement disorder was the presentation in 460 patients with Parkinson's disease being the commonest subtype, followed by vascular Parkinsonism, essential tremors, dystonia, hemifacial spasm, Huntington's chorea, and multiple system atrophy-Parkinsonism. The age and sex distribution of participants with movement disorder is shown in Figure 5



TIA: Transient Ischaemic Attack, SAH; Subarachnoid haemorrhage

Figure 3: pie chart of stroke subtype

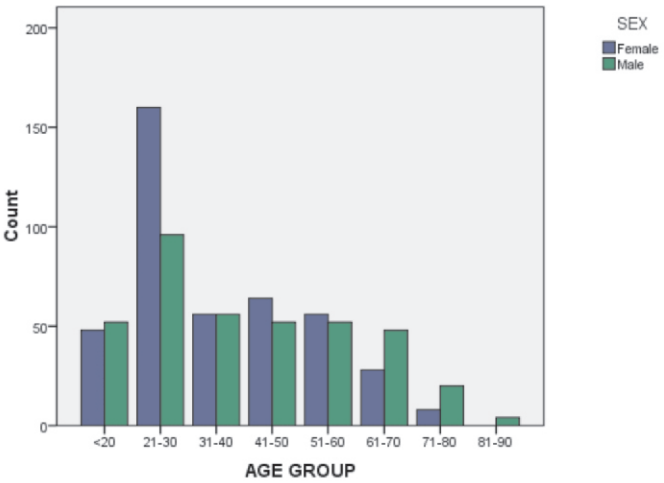


Figure 4; Age and sex distribution of participants with seizure disorder

Peripheral neuropathy was the most common presentation among patients with nerve root, plexuses, and peripheral nerve disorders, followed by lumber spondylosis, cervical spondylosis, Bell's palsy, trigerminal neuralgia, Guillian Barre syndrome, benign paroxysmal positional vertigo, and Meniere's disease.

Migraine was the commonest type of headache followed by tension headache, secondary headache, and cluster in decreasing frequency.

Table: 3 Mean age distribution of various neurological disease presentation

Diagnosis	Number	Mean age (years) ±SD	T-statistics	p-value	95% CI
Stoke					
Yes	1664	57.58 ±13.152	-15.401	<0.001*	-8.317 - -6.438
No	3232	50.20 ± 17.111			
Seizure disorder					
Yes	800	38.52 ± 16.710	29.273	<0.001*	15.833 - 18.106
No	4096	55.48 ± 14639			
Movement disorder					
Yes	460	61.61± 11.583	-12.528	<0.001*	-11.356 - -8.283
No	4436	51.79 ± 16.392			
Lumber spondylosis					
Yes	92	61.79 ± 11.557	-5.998	<0.001*	-12.322 - -6.251
No	4804	52.50 ± 16.290			
Cervical spondylosis					
Yes	50	53.80 ± 12.989	-5.22	0.602	-5.242 - 3.038
No		52.70 ± 16.292			
Parkinson's disease					
Yes	276	64.68 ± 10.401	-12.694	<0.001*	-14.625 - -10.712
No		52.01 ± 16.264			
Vascular dementia					
Yes	84	64.36 ± 9.184	-7.279	<0.001*	-15.094 - -8.688
No		52.47 ± 16.282			
Alzheimer's dementia					
Yes	41	68.80 ± 15.457	-6.310	<0.001*	-21.260 - - 11.181
No		52.58 ± 16.197			
Migraine headache					
Yes	124	38.84 ±12.693	9.718	<0.001*	11.362 - 17.105
No		53.07 ± 16.181			
Tension headache					
Yes	56	48.00 ±15.341	2.182	0.029*	0.485 - 9.048
No		52.77 ± 16.259			
Secondary headaches					
Yes	24	38.67 ± 14.502	4.251	<0.001*	7.604 - 20.624
No		52.78± 16.235			

T-Statistics: Students Test Statistics, P-value: Probability value, 95%CI: Confident Interval, SD; Standard Deviation
*Significant p-value

The commonest neurocognitive disorder was vascular dementia (46.7%), followed by Alzheimer's dementia (22.8%), minimal cognitive impairment (15.6%), post-traumatic cognitive impairment (4.5%), presenile dementia (3.9%), Parkinson's disease with dementia (2.2%), and HIV-associated dementia (2.2%). Less common neurological presentations were; meningoencephalitis, spinocerebellar ataxia, multiple sclerosis, sleep disorder etc.

Stroke and seizure disorder were commoner in women (52.2%) vs. 47.7%); (p=0.434) and (52.5% vs. 47.5%); (p=0.785) respectively, while movement disorder was more in men (67.8% vs. 32.2%); p=0.001. The sex distribution of other neurological presentation are as shown in table 2.

Stroke was commoner in older persons, while seizure disorder was seen more in younger ones. Table 3 shows the participants' neurologic diagnoses as well as their mean ages, whereas Figure 6 shows the top 10 neurological illnesses observed in outpatient neurology clinics.

Discussion

Patients aged 41-50 accounted for nearly a fifth of outpatient visits, while those aged 51-60 accounted for around a quarter, with approximately a third aged over

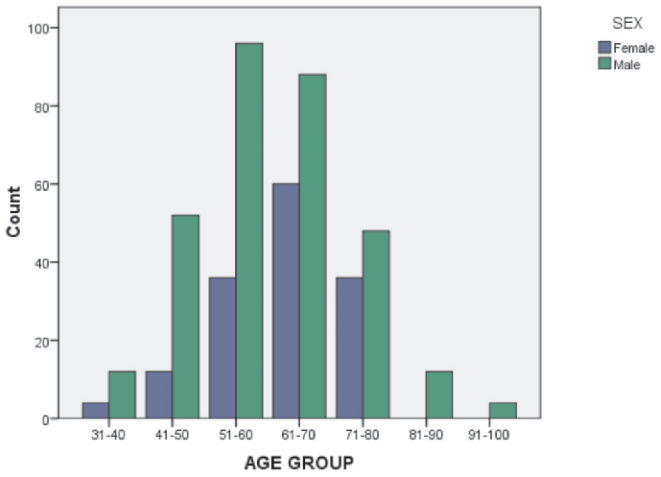
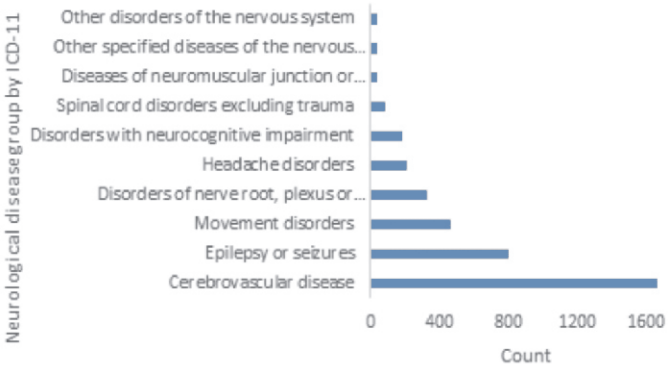


Figure 5: Age and sex distribution of participants with movement disorder



ICD-11; International Classification of Diseases 11th Revision

Figure 6: 10 leading neurological diseases in outpatient neurology clinic

60, which is higher than the 20.5% found in Cameroon[9] and the 26.2% found in Ivory Coast [10] but lower than the 42.8% found in the Niger Delta.[11] Furthermore, in contrast to a report from Dhaka, Bangladesh,[12] where 59.7% of neurology admissions occurred after the age of 40, approximately four-fifths of our participants were over the age of 40.

The study subjects' mean age was 53 years, comparable to reports from Kano,[13] Niger-delta, [11] Europe, [14] but higher than those from Lagos, [15] Abakaliki, [16] Yaoundé, Cameroon, [17] Bangladesh, [12] and Pakistan. [18]

During the study period, 3,012 (79.9%) participants presented with neurological problems; stroke, epilepsy, movement disorders, neuropathies, headache, neurocognitive impairments, spinal cord disorders etc. The remaining 20% had non neurological conditions had non-neurological conditions such as hypertension, osteoarthritis, diabetes mellitus, and benign prostatic hyperplasia etc.

Stroke follow-up was the most common reason for neurology outpatient clinic attendance, consistent with previous findings in Kano,[13] Lagos,[15] Cameroon,[17] Ghana,[19] Tanzania,[20] Myanmar,[21] United States,[22] Bangladesh, [12] and Nepal, Southeast Asia. [23]

Low- and middle-income countries like Nigeria account for 70% of strokes and 87% of stroke-related deaths globally. [24] A population-based study in Nigeria showed a lower stroke prevalence of 131/100,000 compared to the global average of 24,900/100,000. [25]

Stroke prevalence research in Nigeria is critical for better healthcare delivery planning, helping stroke survivors in recovery, and understanding what rehabilitation and care they require.

Amongst our subjects, seizure disorder was the second commonest cause of presentation, consistent with reports from Yaoundé, Cameroon, [17] Ghana, [19] and Sudan, [26] but in contrast with reports from Enugu, [27] the United Kingdom, [28] Saudi Arabia, [29] and Eritrea, [30] where seizure disorder was reported as the commonest neurological outpatient presentation. Stroke and seizure disorder were the most common diagnoses seen in outpatient neurology clinics in Ile Ife,[31] and Bangladesh.[12] Epilepsy affects 50 million people globally, with 80% domiciled in low- and middle-income countries. [32]

Movement disorders was common in our study participants, similar to reports in Lagos,[33] Ghana,[19] Bangladesh,[12] UK,[34] India,[35] Pakistan[18] and Saudi Arabia. [29] The prevalence of movement disorders varies across regions and populations. Factors such as aging population, lifestyle changes, environmental toxins, genetic predisposition, diagnostic advancement, and disease definitions may contribute to their rise. Implementing preventive strategies could help in mitigating the morbidity associated with this disorder.

Headache was a less common presentation among respondents, unlike reports from Pakistan,[18] UK,[34] India, [35] and Karachi,[36] where it was reported as the most common presentation in neurological outpatient clinics. Neurocognitive impairment was common among our respondents, which matches previous findings in a rural community in southwest Nigeria,[37] Lagos,[38] Abakaliki.[39] Dementia, there severest stage of neurocognitive impairment affects 50 million people globally, with a projected rise to 82 million by 2030 and 152 million by 2050. Cognitive impairment is caused by various diseases; Alzheimer's, vascular dementia, diabetes, hypertension, stroke, Parkinson's, depression, pregnancy, HIV/AIDS, heart failure, head injury, sickle cell disease etc. The diverse neurological conditions in neurology outpatient clinics worldwide are influenced by a multifaceted interplay of genetics, environment, demographics, healthcare systems, and research priorities.

The limitations of the study include the fact that the study design provides less evidence, and some important statistics could not be done. Because this was a cross-sectional study, the findings may not be representative of the entire country. Furthermore, because this was a retrospective study, incomplete data was a barrier, and larger research is needed to confirm these findings.

Conclusion

A wide range of neurological illnesses were seen at this clinic. The high frequency of these disorders in Jos, north central Nigeria necessitates the development of local capacity for optimal care.

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