Pattern and Distribution of Neurological Disorders Among Patients That Attended Federal Medical Centre, Asaba, Nigeria Between 2015-2019.

Ezunu Okechukwu Emmanuel[1*], Akpekpe John[1], Yusuf Yakub[1], Ogunniyi Adesola[2], Ige Fred[3], EzunuNgozi Esther[4], Ogbutor Udoji Godsday[5], Guobadia Emwinloghosa Kenneth[6,7]
[1]Neurology Unit, Medicine department, Federal Medical Centre, Asaba, Nigeria.
[2]Neurology Unit, Medicine Department, University College Hospital, Ibadan, Nigeria.
[3]Neurosurgery Unit, Department of Surgery, Federal Medical Centre, Asaba, Nigeria.
[4]Nursing Department, Federal Medical Centre, Asaba, Nigeria.
[5]Physiotherapy department, Federal Medical Centre, Asaba, Nigeria.
[6]Department of Administration, Federal Medical Centre, Asaba, Nigeria
[7]Department of Statistics, University of Benin, Benin, Nigeria.
***Corresponding Author**

ABSTRACT

Introduction; Sub-Saharan Africa is facing a dramatic rise in non-communicable diseases (NCDs) including neurological conditions. Shaping the distribution of neurological disorders in our environment is needed to enable healthcare planning**.** We assessed the pattern and distribution of neurological disorders among patients that attended Federal Medical Centre, Asaba, Nigeria between 2015-2019.

Methods: The records of all patients seen in the Adult Neurology unit of Federal Medical Centre, Asaba, Nigeria were reviewed retrospectively for the years 2015 to 2019, and diagnoses, as made by the Consultant, were obtained, analyzed, and Classified based on International Classification of Diseases-10(ICD-10).

Results: The total number of Neurological Disorders was 806 representing 15.9% of total Medical admissions. Episodic and paroxysmal disorders (ICD?10) accounted for 50.3% of the diagnoses. Epilepsy and stroke were the most common neurological diseases, Of the 806 patients seen during the period, 94.1% had neurological disorders. Correlation of Age and sex showed a predominance of neurological diseases among those, older, greater than 40 years (65.8%) males (53.1%).

Conclusion: Epilepsy, stroke and movement disorders are among the commonest neurological disorders in our setting and emphasis need to be placed on early detection, effective treatment, and early prevention of these disorders.

Keywords: Pattern, neurological disorders, Asaba-Nigeria,

INTRODUCTION

A recent report by World Health Organization shows that more than one billion persons globally live with neurological problems[1,2]. The Burden of disorders Worldwide predicted that neurological diseases remain the most incapacitating problems in the world and the second cause of mortality and accounted for about 16.8% of all deaths[3,4]. This can be elucidated by the rise in neurodegenerative illness due to prolonged life expectancy. The problems of neurological disease are greater in developing countries due to many factors such as the lack of manpower and healthcare facilities. There are several reports on the prevalence of neurological disorders in the community. In Uganda, a 3.3% occurrence was stated for neurological diseases [5] and another study in Tanzania enumerated 15.6% of neurological disorders[6]. The prevalence of neurological disorders in Africa has been the topic of many studies[7,8]. For these studies, various screening

instruments were used, which may explain the differences in stated prevalence. These results indicate the challenges in conducting epidemiological studies in this environment[8]. The effect of Neurological problems has contributed considerably to morbidity and mortality globally. Stroke is the second leading cause of mortality after ischemic heart disease worldwide. The problems of neurological disorders in Africa have been increasing over the years[5]. The disorders have caused up to 92 million disability-adjusted life-years (DALY) in 2005 and were estimated to be 103 million in 2030 globally[6]. The annual incidence of cerebrovascular disease has been projected to be 316 per 100 000, and a prevalence of up to 315 per 100 000 with a three-year fatality of up to 84% in poor countries of the world[7]. The yearly age-adjusted rates of stroke per 100,000 people in Africa, the 15 to 64 age group averaged 49 per 100,000, four times the rates in advanced countries[9]. A crude stroke incidence rate of 244 per 100,000 person-years was reported. It was estimated that 1,070 Disability Adjusted Life Years (DALYs) were lost due to cerebrovascular disease annually[9]. Presently, information is scarce on this topic in our environment, and most stroke deaths in the region are believed to occur at home[9] due to inadequate access to healthcare. Neurological disorders contribute about 11·6% of global Disability Adjusted Life Years (DALYs) and 16·8% of deaths from all causes, neurological diseases continue as the leading group cause of DALYs and the second leading group cause of Mortality Globally[4]. This study was embarked on to determine the pattern of neurological diseases at the Federal Medical Centre, Asaba, Delta State, Nigeria. Although the burden of primary outcome measure in many research studies, the cost and societal impact of diseases are largely controlled by the disability they cause; this is principally true of neurological disorders since the years lost to disability from neurological and musculoskeletal disorders are greater than that of all other categories of diseases[42]. The findings in this study will enable us to compare our report with those elsewhere globally. This will serve as a model for planning and caring for neurological diseases in our environment.

MATERIALS AND METHODS

This was a retrospective study conducted in the Adult neurology unit of Federal Medical Centre, Asaba over 5 years (between January 2015 and December 2019). The Federal Medical Centre, Asaba is the main tertiary referral health care facility that provides Health Care needs for Asaba and its environs within the South-South region of Nigeria. Patients with neurological diseases were referred from the primary and secondary health facilities located in Asaba, Delta, Anambra, Abia, Imo, and Edo states of Nigeria. These Adult Neurological cases were 18 years and above seen in the clinic or admitted into the medical ward through the emergency or outpatient departments of the hospital within the period. A total of 5069 patients were seen and managed in the Internal medicine Department of Federal Medical Centre, Asaba. Of these, 806 had Neurological Disorders and Non-Neurological disorders based on the 10th revision of the International Statistical Classification of Diseases and Related Health Problems (ICD?10)[10]. The neurology Unit is staffed with two full-time neurologists who had training in clinical neurophysiology. The neurologists were supported by an in-house pediatric neurologist. There are two neurosurgeons in the hospital. The final neurological diagnoses were arrived at, based on the patient's presentation, neurological examination, and also blood, cerebrospinal fluid (CSF), inclusive of oligoclonal bands, Aquaporin-4 antibodies, Acetylcholine receptor antibodies, and anti-muscle specific kinase antibodies, radiological, and/or neurophysiological studies. We extracted data from these patient's medical records and classified neurological diseases according to the 10th revision of the International classification of diseases which placed "Diseases of the nervous system" in Chapter VI[10] as follows: (1) Inflammatory diseases of the central nervous system, (2) Systemic atrophies primarily affecting the central nervous system, (3) Extrapyramidal and movement disorders, (4) Other degenerative diseases of the nervous system, (5) Demyelinating diseases of the central nervous system, (6) Episodic and paroxysmal disorders, (7) Nerve, nerve root and plexus disorders, (8) Polyneuropathies and other disorders of the peripheral nervous system, (9) Diseases of myoneural junction and muscles, (10) Cerebral palsy and other paralytic syndromes, (11) Other disorders of the nervous system. The investigations available in confirming the diagnoses included complete blood count, routine chemistries, sedimentation rate, thyroid studies, prothrombin, partial

thromboplastin time, HIV, Hepatitis, syphilis serologies, blood, urine, and stool cultures. Others were chest, skull, and spine radiography, electrocardiography, and 2D Echocardiography. The neurology unit is supported by a clinical neurophysiology laboratory. The laboratory performs electroencephalography (EEG). A 1.5Tesla MRI magnetic resonance imaging (MRI) machine, a 64-slice computed tomography (CT) scan machine, as well as Electromyography, and ultrasound machines for vascular and nerve ultrasonography, were Mandatory for our patients as the need arises. Electromyography, Computed tomography scan, and MRI were not available in the hospital at the time of study and patients were referred out to facilities within Asaba City, for the investigations. The data on age, gender, diagnosis, and outcome of treatment were collected from the admission records, and discharge summaries which were retrospectively analyzed. Modifications for potential biases such as multiple admissions and secondary diagnosis were made to correct for systematic errors. Information obtained was studied for frequency and distribution using the "Statistical Package for the Social Sciences" (SPSS version 25, Inc., Chicago, IL, USA). Mean and standard deviation (SD) were used to describe quantitative variables. Ethical permission to conduct this research was gotten from the Research and Ethics Committee and due processes in carrying out research in the hospital were observed. Financial expenses were solely the researcher's obligation.

RESULTS

There were 806 Neurological disorders seen within the period under review comprising 15.9% of the medical admissions. Of this, 428 (53.1%) were males and 378 (46.9%) were females (male: female ratio of 1.1:1). Their ages ranged from 18 years to 100 years (mean 51.5±20.2years). The largest age group was 60-79 years (32.01%). Correlation of Age and sex showed a predominance of neurological diseases among older>40 years (65.8%) males (53.1%) figures I and 2.

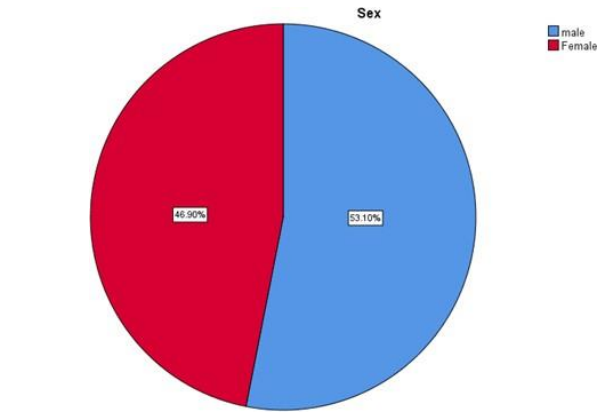

Figure1. Gender distribution of Neurological diseases among patients

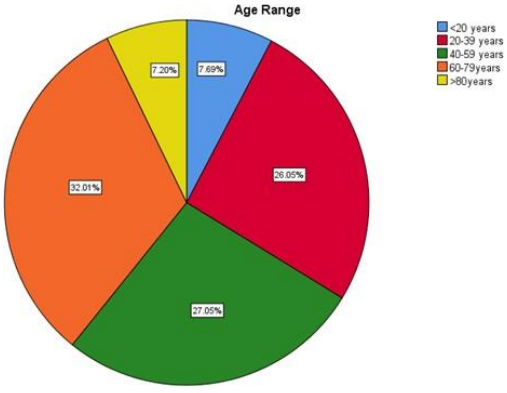

Figure 2. Age distribution of Neurological diseases among patients

Table 1: Neurological diseases diagnosed in the Federal Medical Centre, Asaba, Delta State, Nigeria for the five years of 2015-2019, classified according to ICD-10

ICD?10 classification	Frequency (%)
Episodic and paroxysmal disorders	
Epilepsy	198(24.7)
Cerebrovascular diseases	180(22.4)
Headaches	26(3.2)
Sleep disorders	
Other disorders of the nervous system	
Extrapyramidal and movement disorders	128(15.9)
Nerve, nerve root and plexus disorders	68(10.8)
Other degenerative diseases of the nervous system	30(3.7)
Polyneuropathies and other diseases of the peripheral nervous system	66(8.3)
Diseases of myo-neuronal junctions and muscle	14(1.7)
Cerebral palsy and other paralytic syndromes	
Inflammatory diseases of the nervous system	20(2.5)
Systemic atrophies primarily affecting the nervous system	6(0.7)
Demyelinating diseases of the central nervous system	2(0.2)
Non?neurological disorders	50(5.9)
Totals	**806 (100.00)**

ICD=International Statistical Classification of Diseases and Related Health Problems

A total of 806 neurological diseases were recorded from the patient's medical folder during the period from 2015 to 2019. Episodic and paroxysmal disorders (ICD?10) were the most common diagnoses accounting for about half (50.3%) of the diagnoses. A small percentage (5.9%) of the patients had non-neurological diagnoses. Epilepsy (24.7%) was the most common disorder before stroke (22.4%). Others were Extrapyramidal and movement disorders (15.9%) and Nerve, nerve root, and plexus disorders representing 10.8% Table 1.

Table 2- illustrates the diagnosis and Peak age range of the patients with the Top 5 Neurological diseases in Federal Medical Centre Asaba

AGE RANGE (YEARS)	<20	20-39	40-59	60-79	>80	TOTAL (%)
Epilepsy and Seizure disorders	22(22.2%)	50(50.5%)	19(19.2%)	7(7.1%)	1(1.0%)	99(100)
Stroke	2(2.2%)	3(3.3%)	30(33.3)	44(49.0%)	11(12.2%)	90(100)
Extrapyramidal and movement disorders	3(4.7%)	6(9.4%)	15(23.4%)	33(51.6%)	7(10.9%)	64(100)
Nerve, nerve root and plexus disorders	0(0%)	10(28.6%)	11(31.4%)	13(37.1%)	1(2.9%)	35(100)
Polyneuropathies and other diseases of the peripheral nervous system	**0(0%)**	**3(4.5%)**	**30(45.5%)**	**27(40.9%)**	**6(9.1)%)**	**66(100)**

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS |Volume VII Issue II February 2023

The modal age incidence of Epilepsy was 20-39 years and stroke 60-79 years. Others were Extrapyramidal and movement disorders 60-79 years, Nerve, nerve root, and plexus disorders 60 79 years, and Polyneuropathies and other diseases of the peripheral nervous system 40-59 years.

Table 3- illustrates the diagnosis and age range of the patients with Neurological diseases i

AGE RANGE	**18-40YEARS (%)**	**>40YEARS (%)**	**TOTAL (%)**
DIAGNOSIS			
Episodic and paroxysmal disorders			
Epilepsy and Seizure disorders	146(53.9)	52(9.8)	198(24.7)
Stroke	12(4.4)	168(31.7)	180(22.4)
Headache Disorders	16(7.8)	10(1.7)	26(3.2)
Extrapyramidal and Movement disorders	16(5.8)	112(21.1)	128(15.9)
Nerve, nerve root, and plexus Disorders	30(10.8)	56(10.4)	68(10.8)
Polyneuropathies and other diseases of the peripheral nervous system	6(3.1)	60(11.2)	66(8.3)
Other degenerative diseases of the nervous system	0(0)	30(5.5)	30(3.7)
Demyelinating Diseases of the Central Nervous system	2(0.5)	0(0)	2(0.2)
Inflammatory diseases of the nervous system	12(4.3)	8(1.4)	20(2.5)
Systemic atrophies primarily affecting the nervous system	2(0.7)	4(0.8)	6(0.7)
Diseases of myo-neuronal junctions and muscle	6(2.1)	8(1.5)	14(1.7)
Non-Neurological Disorders	28(6.6)	22(4.9)	50(5.9)
	276(100)	**530(100)**	**806(100)**

Epilepsy (53.9%), Nerve, nerve root, and plexus Disorders (10.8%), Headaches (7.8%), and inflammatory diseases of the nervous system (4.3%) occurred among younger age (1-40 years) groups. While stroke (31.7%), Extrapyramidal and movement disorders (21.1%), Polyneuropathies and other diseases of the peripheral nervous system (11.2%), and other degenerative diseases of the nervous system (5.5%) were seen in older age (> 40 years) group.

Table 4 illustrates the distribution of the neurological disease within gender

DIAGNOSIS	**MALES (%)**	**FEMALE (%)**	**TOTAL (%)**
Episodic and paroxysmal disorders			
Epilepsy and Seizure disorders	120(28)	78(20.7)	198(24.7)
Stroke	86(20.1)	94(24.9)	180(22.4)
Headache Disorders	12(2.8)	14(3.7)	26(3.2)
Extrapyramidal and Movement disorders	70(16.4)	58(15.3)	128(15.9)
Nerve, nerve root, and plexus Disorders	32(7.5)	54(14.3)	86(10.8)
Polyneuropathies and other diseases of the peripheral Nervous system	34(7.9)	32(8.4)	66(8.3)
Other degenerative diseases of the nervous system	18(4.2)	12(3.2)	30(3.7)
Demyelinating Diseases of the Central Nervous system	2(0.5)	0(0)	2(0.2)

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS |Volume VII Issue II February 2023

Inflammatory diseases of the nervous system	10(2.3)	10(2.6)	20(2.5)
Systemic atrophies primarily affecting the nervous system	6(1.4)	0(0)	6(0.7)
Diseases of myo-neuronal junctions and muscle	10(2.4)	4(1.0)	14(1.7)
Non-Neurological Disorders	28(6.5)	22(5.9)	50(5.9)
Total	**428(100)**	**378(100)**	**806(100)**

Epilepsy (28%), Extrapyramidal and Movement disorders (16.4%), and other degenerative diseases of the nervous system (4.2%) were commoner in males with a male to female (M: F) ratio of 1.5:1, 1.1:1, and 1.3:1 respectively. However Stroke (24.9%), Headaches (3.7%), Nerve, nerve root, and plexus (14.3%) Disorders were commoner in females with F: M ratio of 1.2:1, 1.3:1, and 1.9:1 respectively.

DISCUSSION

Neurological disorders are increasingly prevalent in Sub-Saharan Africa. The finding from the study showed that neurological diseases accounted for 15.9% of all medical admissions in the Federal Medical Centre, Asaba, Nigeria. About 806 patients were admitted through our adult neurology unit, of this, 428 (53.1%) were males and 378 (46.9%) females (male: female ratio of 1.1:1). The age of patients was from 18 years to 100years (mean 51.5±20.2years). This is higher than the mean age of 44.9 years in the study conducted in Cameroon[13]. Age and sex distributions in Figures 1 and 2 showed a predominance of neurological diseases among older males greater than 40 years (65.8%), with 32.01% representing the largest age group (60-79 years). This was higher than earlier neuro-epidemiological surveys in Igbo-Ora[43], Southwest Nigeria with an age distribution of 20% and 6% above 30 years and 60 years[43]. In another survey, 60.5% and 13.4% in populations of over 30 years and 60 years in Nigeria were found respectively[43]. The increase in standards of living and improved access to immunization and healthcare may be the explanation for the trend towards a longer lifespan.

Episodic and paroxysmal disorders (Epilepsy and Seizure disorders (24.7%), Stroke (22.4%), and Headache Disorders (3.2%) were the most common diagnoses accounting for about half (50.3%) of the diagnoses in our study. Others were Extrapyramidal and movement disorders (15.9%) and Nerve, nerve root, and plexus disorders representing 10.8% in table 1. The pattern of neurological disorders seen in our review has some similarities with previous studies done in Nigeria[12] and Cameroon[13] and other parts of Africa[11]. Episodic and paroxysmal disorders (ICD?10) were most common among the group of neurological conditions, epilepsy had the highest percentage in our analysis (24.7%) and also in those from outpatients in Cairo[14], Ghana[15], and Kenya[16]. Our findings are in keeping with those from other researchers who evaluated neurological admissions and documented that epilepsy occurred most frequently[16]. Though, some authors found stroke to be the most common neurological disorder, representing the bulk of neurological admissions [17,18,19]. However, epilepsy was not as commonly seen in in-patient admissions most likely due to its chronic nature.

Consequently, the proportion of people with epilepsy will be higher in community-based studies. Epilepsy has been designated as the commonest non-infectious disease of the nervous system in Africa[20]. Infections of the central nervous system, trauma, and head injuries are some of the causes of Neurological diseases[21]. Childhood immunization against common diseases was however found to be related to a reduced risk of the diseases[22]. We found that Stroke(22.4%) and Extrapyramidal-movement disorders(15.9%) were the second and third leading diagnoses respectively, and similarly, Rufus O. Akinyemi [23] found stroke to be the second in some of the hospital-based studies he reviewed. However, degenerative spinal cord diseases(7.0%) were

the third most common diagnosis, with Extrapyramidal-movement disorders(5.6%) coming sixth. Balarabe and Kamfani[24] found Extrapyramidal-movement disorders to be fourth in their series, headache disorders fifth, and Central Nervous system infections sixth in their Neurology unit in Usman Danfodiyo University Teaching Hospital Sokoto, Nigeria. The leading Neurological disorders as documented by Tegueu et al[13] in Yaoundé were epilepsy, and intervertebral disc disorder, with stroke being the eighth most common diagnosis. Stroke, dementia, and Movement disorders were the major contributors to the overall burden of neurological disorders in western Europe[25]. In our survey, Nerve, nerve root, and plexus disorders (10.8%) and Polyneuropathies and other diseases of the peripheral nervous system (8.6%) were similar to a study done in Madagascar with peripheral Neuropathies accounting for 13.75%[13] but lower in a recent study done by Komolafe et al[12] representing(4.41%) and 2.82% respectively. In America, disorders of the peripheral nervous system, of which polyneuropathy is prevalent, accounting for more than 10% of neurology visits annually.[2]

Yet, the Global Burden of Disease (GDB) study omitted this group of neurological disorders (polyneuropathy)[47]. The fact that the GBD study overlooks the impact of polyneuropathy has important consequences for patients and public health [47]. The overall prevalence of chronic primary headaches was 18.4% (95% CI), this is slightly lower than the report in a study in similar regions in Africa[5]. A higher prevalence was recorded in other parts of Africa;-Zambia (72%) [gender- and habitation adjusted 61.6], Ethiopia (21.6%), and Tanzania (23.1%). The differences in the prevalence could be attributed to different methodologies used, as well as the cultural and population characteristics of the studied patients. Chronic headaches may remain under-detected by household members and even by general practitioners. However, the availability of pain relievers as over-the-counter medicines may be playing a role in reducing the headache burden within communities. Inflammatory diseases of the nervous system (2.5%) were lower than in some previous studies as central nervous system infections accounted for 6.7%[15] and 4.4%[40] of neurological admissions from those areas. There was a reduction in CNS infections from this study compared with earlier studies in the country.

This may be related to improved immunization strategy in the country in the past decade. However, the poor socioeconomic conditions associated with Low and Medium income countries of the world are still militating against the drastic reduction of CNS infections in our society. Other less prevalent Neurological diseases were Systemic atrophies primarily affecting the nervous system (0.7%), and diseases of myo-neuronal junctions and muscle (1.7%) as was also reported by Komolafe, et al[12]. The modal age incidence of Epilepsy in our survey was 20-39 years, and stroke was 60-79 years. Others were Extrapyramidal and movement disorders 60-79 years, Nerve, nerve root, and plexus disorders 60-79 years, also Polyneuropathies and other diseases of the peripheral nervous system 40-59 years table2. A similar study from Ghana[11] reported that the modal age range for males and females was 51–60 years and 71–80 respectively with an overall median age of 59 (IQR, 49–72) years for stroke. The modal age of epilepsy and seizure disorders was between 12 and 20 years for both sexes[11]. Among patients with Parkinsonism, the male-to-female ratio was 2.1:1.0 with a median age (IQR) of 65 years (58–74) overall with no significant differences in age according to gender[11]. In Nigerians below 40 years of age, idiopathic epilepsy has been described as the commonest type[12]. This supports our findings with about 53.9% of those with Epilepsy within 18-40 years of age table3. Others were, Nerve, nerve root, and plexus Disorders (10.8%), Headaches (7.8%), and inflammatory diseases of the nervous system (4.3%) occurred among younger age (1-40 years) groups. While stroke (31.7%), Extrapyramidal and movement disorders (21.1%), Polyneuropathies and other diseases of the peripheral nervous system (11.2%), and other degenerative diseases of the nervous system (5.5%) were seen in older age (> 40 years) group. Dementia and stroke were the largest contributors to the burden of neurological disorders after the age of 70 years in both sexes[25], stroke was the strongest contributor between ages 40 years and 89 years in central Europe and between ages 50 years and 89 years in eastern Europe[25]. The neurological disorders identified in the elderly population in our study and Yaoundé-Cameroon are similar to the world trend as well as the bulk of tropical countries[27].

Degenerative disorders of dementia, Parkinson's disease as well as stroke, and intervertebral disc disorders occur commonly[27]in a study of the elderly population in Cameroon. This is likely to be connected with the advanced age of the study population (the mean age was 68.83 years). The age distribution of Nigerians, with most of the population being within the first to third decade of life[28], may have contributed to our finding of neurological disorders occurring more in this age group(53.1%) from 18-40 years of old. That may however not be the only basis for this distribution. Epilepsy, our most common diagnosis, has a bimodal age incidence being high in the first year of life and in the elderly[12]. In Nigeria however, life expectancy is 55.75 years[29] and the probability is that many in the population do not get to become elderly before they die. This may have influenced the age distribution we found in our study. Epilepsy (28%), Extrapyramidal and Movement disorders (16.4%), and other degenerative diseases of the nervous system (4.2%) were commoner in males with a male to female (M: F) ratio of 1.5:1, 1.1:1, and 1.3:1 respectively. However Stroke (24.9%), Headaches (3.7%), Nerve, nerve root, and plexus (14.3%) Disorders were commoner in females with F: M ratio of 1.2:1, 1.3:1, and 1.9:1 respectively table4. Some neurodegenerative diseases including Alzheimer's disease (AD), Parkinson's disease (PD), and multiple sclerosis (MS), are more prevalent and have a distinct presentation in women compared to men[45].

Hormonal contraception can influence the risk of stroke, and migraine headaches which alter throughout the menstrual period. The female (3.7%) dominance of headache manifestation found in our study is similar to earlier studies that cut across cultures and geographical locations[24], this is possibly due to hormonal influence and factors related to health-seeking behavior of the female gender, particularly for headache disorders. Primary headaches are more common in women. There is information regarding MS symptoms fluctuating in reaction to different phases of the menstrual cycle[45]. In another study among ischemic stroke patients, males were more predominant than females which were 147(54.2%) cases and 124(46.3%) cases respectively[46]. While among patients with Intracerebral Hemorrhage, males were more than females which were 191(59.5%) cases and 130(40.5%) cases respectively. For other neurological disorders like transverse myelitis patients males were slightly more predominant than females which were 8(57.1%) cases and 6(42.9%) cases respectively[46]. Same for multiple sclerosis patients males were more than females which were 7(63.6%) cases and 4(36.4%) cases respectively.

Epilepsy

The male preponderance observed in our study 28% with an M: F ratio of 1.5:1 was different in an earlier study from southeast Nigeria[23]where females predominated and their average age of patients was 35.8 (SD ± 9.6) years. This age did not correlate well with findings by Beghi E et al, with a peak at 20–29 years and a subsequent decrease, with a ratio of 7.17 (95% CI 4.67–11.01) in individuals aged 60 years or older[30], it concludes that prevalence of the disease tends to increase with age. This shows that Epilepsy has a bimodal distribution according to age with peaks in the youngest individuals and the elderly[30]. The study also revealed that the peak age prevalence occurred within the age group of 20-39 years which constituted 50.5%, followed by the age group of < 20 years which constituted 22.2%. The finding in this study supported the report from Balarabe et al[24] and International League Against Epilepsy Commission on epidemiology, that epilepsy is a common neurological disorder in the world[31], and approximately 80% of cases occur in developing countries [24] where the burden of socioeconomic costs by epilepsy are enormous, with little or no access to medical facilities or treatment. This has a deleterious effect on the psychological, cognitive, and social functioning of those who are affected.

Stroke

Stroke was the second most common neurological disorder in our study. This corroborated findings of a study from the western part of the country[12] and an earlier study in Ghana by Albert Akpalu et al[15] indicated that stroke was fourth in their series and accounted for 11.1% of neurological admissions. This

was supported by Cheryl D B et al[37]. We found that females (24.9%) were more susceptible than males (20.1%) with F: M ratio of 1.2:1. In the United States, the lifetime risk of stroke is higher in women (20%–21%) than in men (14%–17%), for a 55-year-old individual. Previously, limited research suggested that the absolute number of deaths from stroke in women was greater than in men, but the incidence and mortality rates were greater in men[39]. Our observed trend of increasing stroke prevalence among women differs from some studies[15,44]. Credible reasons for these findings include the fact that more women seek health care compared to men. The mean age of 58 years reported by Divyant and Amit[32] in a study on clinical profile and risk factors among 140 stroke patients in a tertiary care hospital in Bareilly; also corresponded well with the mean age of 57 years reported by Manorenj et al[33]. We found that the modal age of patients with stroke was in the range of 60-79 years. In a systematic review[34], the mean age of stroke in all countries was 64.4 years (95% CI: [62.9, 65.8]). This supported our study and also alluded to the fact that patients with stroke in Low Middle-Income Countries were significantly younger than those in High-Income Countries (63.1 years vs. 68.6 years, $p < 0.01$)[34] this is due to difference in Health care Access and Quality Index(HAQ).

Movement disorders

The modal age of onset was (23.4%) at 40-59 years, (51.6%) at 60-79 years, and (10.9%) over 80 years of age (table 2), among patients with Extrapyramidal and Movement disorders. This was similar to another study where 27.7%[35] had an age at onset between 50 and 59 years, 27.7% between 60 and 69 years, and 18.7% had an age at onset of 70 years or older. It concluded that the severity of motor and non-motor features, the impairment of striatal binding, and the levels of CSF biomarkers increase with age at onset. Another study done in Nigeria showed a mean (standard deviation) age of onset was 60.5(9.1) years of secondary Parkinsonism reported by Lukasz M. Milanowski, et al [36]. Males were in majority in our study as was reported in the previous study[35, 36]. This may be accounted for by methodological differences between the studies.

CONCLUSION

Epilepsy, Stroke, and Movement Disorders are common Neurological disorders and these have become increasingly prevalent in our environment. The disabling rather than fatal nature of many neurological disorders, the stigma associated with brain disorders, and the enormous difficulty in gathering epidemiologic data have resulted in their being underreported and neglected in Sub-Saharan Africa. The high proportion of DALYs(disability-adjusted life years) and deaths attributable to neurological disorders can be explained in part by the long life expectancy in Europe, despite an overall decrease in age-standardized rates, by the increasing incidence and the increasingly long duration of aging-related diseases[26]. This neglect represents an unfortunate paradox since neurological, psychiatric, and substance abuse disorders make up at least 28.5% of YDL (one full year of healthy life lost due to disability or ill health). These impact the global burden of disease and are responsible for an even greater proportion of persons living with a disability.

RECOMMENDATIONS

1. Greater emphasis needs to be placed on early detection, effective treatment, and early prevention of Neurological disorders, especially in Low and Middle-income countries of the world
2. Advocacy should be encouraged through the provision of education, publications, consultation, and evaluation services in poor resource settings to address this malady.
3. Innovative research must be supported at the governmental level in the areas of BRAIN HEALTH.

REFERENCE

1. Thierry Adoukonoua,b,?, Laurine Adogbléb, Mendinatou Agbétou, et al: Prevalence of the major neurological disorders in a semi-urban community in northern Benin; eNeurologicalSci 19 (2020) 100242.
2. James J Sejjvar: Global burden of neurological disease, what`s in a name; Vol 16, Issue 11.P858-859, NOVEMBER 01, 2017.
3. 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, Lancet Neurol. 16 (11) (2017) 877–897.
4. GBD 2016 Neurology Collaborators†:Global, the regional, and national burden of neurological disorders, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016; THE LANCET, Neurology; Volume 18, Issue 5; May 2019, Pages 459-480.
5. Kaddumukasa M., Mugenyi L., Kaddumukasa M.N., Ddumba E., Devereaux M., Furlan A., Sajatovic M., Katabira E. Prevalence and incidence of neurological disorders among adult Ugandans in rural and urban Mukono district; a cross-sectional study. *BMC Neurol.* 2016;16 (1):227.
6. Dewhurst F., Dewhurst M.J., Gray W.K., Aris E., Orega G., Howlett W., Warren N., Walker R.W. The prevalence of neurological disorders in older people in Tanzania. *Acta Neurol. Scand.* 2013;127(3):198–207
7. E. Philip-Ephraim, K.I. Eyong, S. Chinenye, U.E. William, R.P. Ephraim: The Burden of Inpatient Neurologic Disease in a Tropical African Hospital; Can J Neurol Sci. 2013; 40: 576-579.
8. Olufemi Samuel Akodu, Tinuade Adetutu Ogunlesi, et al: Neurological diseases at the Pediatric Neurology Clinic in a semi-urban Nigerian tertiary hospital; SUDANESE JOURNAL OF PAEDIATRICS 2022; Vol 22, Issue No. 1.
9. Mandy Maredza, Malanie Y Bertram et al: Disease burden of stroke in rural South Africa: an estimate of incidence, mortality, and disability-adjusted life years; BMC Neurology (2015) 15:54 DOI 10.1186/s12883-015-0311-7.
10. International Statistical Classification of Diseases and Related Health Problems 10th Revision. Switzerland: World Health Organization; Fifth edition, 2016. https://apps. who. int/iris/handle/10665/246208
11. Sarfo FS, Akassi J, Badu E, Okorozo A, Ovbiagele B, Akpalu A, et al. Profile of neurological disorders in an adult neurology clinic in Kumasi, Ghana. eNeurologicalSci 2016;3:69?74.
12. MA Komolafe, OF Owagbemi, TI Alimi: The Distribution and Pattern of Neurological Disease in a Neurology Clinic in Ile-Ife, Nigeria; Nigerian Journal of Clinical Practice ¦ Volume 21 ¦ Issue 11 ¦ November 2018, [Downloaded free from http://www.njcponline.com on Thursday, January 31, 2019, IP: 197.90.36.231.
13. Tegueu CK, Nguefack S, Doumbe J, Fogang YF, Mbonda PC, Mbonda E, et al. The spectrum of neurological disorders presenting at a neurology clinic in Yaoundé, Cameroon. Pan Afr Med J 2013; 14:148.
14. Walaa M, El Naggar, Marian Y Girgis: Spectrum of Neurological Disorders Encountered at The Neuropediatric Outpatient Clinic at Children's Hospital, Cairo University; PSJ 2021, 1(1); 11-14. DOI:10.21608/cupsj.2020.48820.1008.
15. Albert Akpalu, Patrick Adjei: Neurological disorders encountered at an out-patient clinic in Ghana's largest medical center: A 16-year review; eNeurologicalSci 24 (2021) 100353.
16. Jonathan A Abuga, Symon M Kariuku et al: Neurological impairment and disability in children in rural Kenya; Developmental Medicine & Child Neurology2022, 64: 347–356.
17. Valery L. Feigin, MD et al: Burden of Neurological Disorders Across the US From 1990-2017 A Global Burden of Disease Study; JAMA Neurology February 2021 Volume 78, Number 2, pg 167-176

18. Philip?Ephraim EE, Eyong KI, Chinenye S, William UE, Ephraim RP. The burden of inpatient neurologic disease in a tropical African hospital. Can J Neurol Sci 2013; 40:576?9.
19. Eze CO, Kalu UA. The pattern of neurological admissions in the tropics: Experience at Abakaliki South?Eastern Nigeria. Niger J Med 2014;4:302?5.
20. Awa Ba-Diop, Benoit Marin, et al: Epidemiology, causes, and treatment of epilepsy in sub-Saharan Africa; Lancet Neurol. 2014 October; 13(10): 1029–1044. doi:10.1016/S1474-4422(14)70114-0.
21. Chenyu Ding, Yuying Wu, et al : Global, Regional and national Burden and attributable risk factors of neurological disorders: The Global Burden of Disease Study 1990-2019; Frontiers in Public Health, 29 November 2022, pg 1-14
22. JC Okoro, NC Ojinnaka, et al: Sociodemographic influences on immunization of children with chronic neurological disorders in Enugu, Nigeria; Trials in Vaccinology 4 (2015) 9–13.
23. Rufus O. Akinyemi, Bruce Ovbiagele, Olaleye A. Adeniji et al: Stroke in Africa: the profile, progress, prospects, and priorities; Nature Reviews | NEUROlOGY, volume 17 | October 2021, pg 634-656
24. Balarabe S A, Kamfani J M: Relative Frequencies of Neurological Disorders in Northwestern Nigeria: A Retrospective Study; Annals of African Medicine ¦ Volume 18 ¦ Issue 2 ¦ April-June 2019.
25. Gunther Deuschi et al: the Burden of Neurological diseases in Europe; an analysis for the Global Burden of disease study 2017. THE LANCET (Public Health), VOLUME 5, ISSUE 10, E551-E567, OCTOBER 2020.
26. Global burden of neurological disorders: challenges and opportunities with the available data. *Lancet Neurol.*2019; **18**: 420-421,
27. Callixte KT, Clet TB, Jacques D, Faustin Y, François DJ, Maturin TT. The pattern of neurological diseases in elderly people in outpatient consultations in sub-Saharan Africa. BMC Res Notes 2015; 8:159.
28. Population and Housing Census. Abuja: National Population Commission, Nigeria; c2006. Available from: http://www. population.gov.ng/. [Last accessed on 2016 Aug 06].
29. Nigeria Life Expectancy 1950-2023; https://www.macrotrends.net/countries/NGA/nigeria/life-expectancy.
30. Beghi E et al: Aging and Epidemiology of Epilepsy; Neuroepidemiology 2018;51:216–223.
31. Nicola Specchio, Elaine C. Wirrell, Ingrid E. Scheffer et al: International League Against Epilepsy classification and definition of epilepsy syndromes with onset in childhood: A position paper by the ILAE Task Force on Nosology and Definitions; Epilepsia. 2022;63:1398–1442.
32. Divyant R, Varshney Amit V. Stroke: The study of clinical profile and risk factor in tertiary care hospital. IJSR 2016; 5:187?8.
33. Manorenj S, Inturi S, Jyotsna B, Savya VS, Areli D, Reddy B, et al. Prevalence, pattern, risk factors and outcome of stroke in women: A clinical study of 100 cases from a tertiary care center in South India. Int J Res Med Sci 2016;4:2388?93.
34. Mohammad H R et al: Younger age of stroke in low-middle income countries is related to healthcare access and quality; Annals of Clinical and Translational Neurology 2022, Volume 9; Issue 3, 415-427.
35. Gennaro Pagano et al: Age at onset and Parkinson's disease phenotype; Neurology 2016 Apr 12; 86(15): 1400–1407.
36. Lukasz M. Milanowski , Olajumoke Oshinaike, et al : Early-Onset of Parkinson`s Disease Screening in Patients from Nigeria; Frontiers in Neurology; January 2021, Volume 11, Article 594927, pg 1-7
37. Cheryl D B, Seemant Chaturvedi, et al: Sex differences in stroke: Challenges and opportunities; J Cereb Blood Flow Metab; 2018 Dec; 38(12): 2179–2191.
38. Kathryn M R, Tracy E M, et al: The Impact of Sex and Gender on Stroke; Circulation Research. 2022;130:512–528
39. Barker-Collo S. Bennett D.A et al: Sex Differences in Stroke Incidence, Prevalence, Mortality and Disability-Adjusted Life Years: Results from the Global Burden of Disease Study 2013, Neuroepidemiology 2015; 45:203-214.

40. Jibrin Sammani Usman, Amina Isa Umar: PATTERN OF NEUROLOGICAL DISORDERS MANAGED IN NEUROLOGY CLINICS IN KANO, NIGERIA; Yenagoa Medical Journal Vol. 4 No. 2, April 2022.pg 10-19.
41. Harvey A Whiteford, Alize J Ferrari et al: 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.
42. Murray CJ, Atkinson C, Bhalla K, Birbeck G, Burstein R, Chou D, et al. The state of US health, 1990?2010: Burden of diseases, injuries, and risk factors. JAMA 2013; 310:591?608.
43. Folajimi Morenikeji Otubogun, Rufus Akinyemi, Sola Ogunniyi: Burden of adult neurological diseases in Odeda Area, Southwest Nigeria; BMJ Neurol Open 2020;2:e000062. doi:10.1136/bmjno-2020-000062.
44. Yali Wang, Yue Dai, et al: Sex difference in the incidence of stroke and its corresponding influence factors: results from a follow-up 8.4 years of rural China hypertensive prospective cohort study; Lipids in Health and Disease (2019) 18:72, pg 2-10.
45. Hrayr Attarian, Jan Brandes, Rima Dafer, Elizabeth Gerard, and Barbara Giesser: Sex Differences in the Study of Neurological Illnesses; Behavioural Neurology; Volume 2015, Article ID 676531, 2 pages http://dx.doi.org/10.1155/2015/676531.
46. Tauhidul Islam Chowdhury, Mohammad Shah Jahirul Hoque Choudhury et al: Trend of Hospital Admission and Outcome Study of Patients Admitted in a Neurology Unit at a Tertiary Care Neuroscience Hospital in Bangladesh; Journal of National Institute of Neurosciences Bangladesh, July 2018, Vol. 4, No. 2, pp: 69-7.
47. Melissa A. Elafros, Michelle P Kvalsund et al: The Global Burden of Polyneuropathy—In Need of an Accurate Assessment; *JAMA Neurol.* 2022;79(6):537-538. doi:10.1001/jamaneurol.2022.0565.

ACKNOWLEDGMENTS

We are grateful to the Management and staff of the Federal Medical Centre, Asaba for their permission through the Ethics Committee and Record Department in making available the information needed for this work to the Research Team. We would like to thank members of the Department of Internal Medicine, for providing constructive criticism on every aspect of the manuscript and for moral support.

Financial support and sponsorship

Nil

Conflicts of interest

There are no conflicts of interest