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Medical History and Clinical Characteristics of People with Epilepsy Attending Two Tertiary Hospitals in Southeast Nigeria: A Review of 150 Adults

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The key to accurate classification of epilepsies is the accurate characterization of seizure types and clinical history. Accurate clinical characterization of seizures is important in selecting candidates who are more likely to benefit from radio-imaging. Few studies have addressed the clinical characteristic of seizures in people living with epilepsy (PWE) in southeast Nigeria. A total of 150 cases of epilepsy were reviewed with a male to female ratio of 1.7:1. P=0.96. The mean age of the patients was 33.6(16.4) years. The peak age group of the patients was 20-29 years with a smaller peak after 50 years. The mean age-of-onset was 30.9(15.3) years, earlier in females than males. P=0.01. The peak age onset was 0-9 years. More than half of the PWE (54%) reported that seizures could occur at any time of the day while 4(2.7%) said they had seizures on awakening. Seventy (46.7%) could never predict the onset of seizures. Sixty-eight(45.3%) had experienced multiple seizures within a week in the past and 54(36%) had experienced prolonged seizures lasting more than 10 minutes.

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Overall, 78(52%) reported a history of bodily injury but only 12(8%) considered their injury as severe. The commonest medication used 114(76%). In conclusion, there is second peak of age-of-onset after 50 years in epilepsy patients attending a hospital clinic in southeast Nigeria. About 46.7% could predict the onset of seizures. PWE also reported high rates of possible status epilepticus and seizure clusters, high rates of injury.

Keywords: Epilepsy; Seizures; age of onset; injury; Nigeria.

1. INTRODUCTION

Epilepsy is a common neurologic disorder in Nigeria with an estimated prevalence of about 8 per 1000[1]. The prevalence of epilepsy varies within the country and between different age groups[1-3]. Worldwide, about 1 in 26 people will develop epilepsy during their but this proportion is affected by several factors[4,5]. In a systematic review and meta-analysis of incidence studies, the pooled incidence rate of epilepsy was 61.4 per 100,000 person-years (95% CI 50.7–74.4)[5].

Epilepsies are classified into four broad types: generalized, focal, combined generalized and focal, and unknown[6]. The key to accurate classification of epilepsies is the correct evaluation of seizure types and clinical history. This is important especially is resource poor areas where access to radiological investigations and electroencephalogram maybe limited. Proper clinical evaluation is also important in in selecting candidates who are more likely to benefit from imaging. Furthermore, thorough medical history and seizure identification and evaluation is important in syndromic classification of epilepsies.

In adult neurology clinics thorough clinical evaluation of PWE maybe limited by several factors. Firstly, relevant childhood history may be lost because for some, the age of first presentation may be in adulthood. Secondly years of multiple seizures make it difficult for patients to present a chronological order of seizure-related events. Added to this are problems related to memory, mood and other psychiatric disorders that may be seen in some of these patients. Busy clinics that not only treat all neurological disease, but also most medical diseases make it almost impossible to take accurate history of patients in the clinic[7]. Thus, case notes are usually brief and unhelpful. Furthermore, in PWE who experience multiple seizure types or had sustained injuries or have other comorbidities, these may not be documented in their medical history unless otherwise sought by the doctor. A widespread problem encountered in the management of epilepsy in Nigeria country is non-adherence, use of non-orthodox means of treatment and poor practice of epilepsy in most communities[8-10]. These factors predispose to late presentations, possible history of status epilepticus and seizure clusters[11]. Finally, seizure characterization in normal hospital settings in Nigeria may be confounded by lack of appropriate terminology in local languages. Thus, clinicians may find it difficult to classify seizures. The age-of-onset epilepsy in most adults is usually before adulthood[12], however with high rates of risk factors such as stroke and traumatic head injuries, there is some basis to suspect a changing pattern of age-of-onset of epilepsy in SSA hence the need for this study. The aim of this study is to document the medical history and clinical characteristics of seizures in adults with epilepsy in Enugu southeast Nigeria. Few studies have addressed the clinical characteristic of seizures in PWE in southeast Nigeria[13-15].

2. METHODS

This cross-sectional study was performed in the medical out-patient clinics of the University of Nigeria Teaching Hospital Enugu and Enugu State University Teaching Hospital. Data were collected from epilepsy register of PWE attending the medical outpatient clinic of both hospitals. All patients gave their consent before recruitment into the epilepsy register. Data was retrieved from the register using a structured questionnaire that included socio demographic variable, medical history, seizure characteristics including frequency per day or week, presence of aura (initial non-motor symptoms that may directly precede seizures), history of seizure related injuries, as well as other variables. Patients with psychogenic seizures or suspected psychogenic seizures were not included in the data register and thus were also excluded from the index study. Questionnaires were filled by the key investigator or research assistants. Based on the available information in the database, PWE with cognitive impairment and those with single

epileptic seizures were not included in the current study. Cases with incomplete clinical data or illegible data were also excluded. Ethical clearance was obtained from the ethics committee of the teaching Hospitals.

Sample size was calculated using the Cochrane formula [16]: $N= (z^2pq)/e^2$. Where N is the required sample size, z is the 95% confidence level and e the desired level of precision of 0.05. p is 6.4% which the estimated prevalence of migraine in Enugu[20] and q is the value 1-p.

$N = (1.96)^2$ (0.064x0.936)/0.0025 =81.4. Assuming 90% response rate, to compensate for attrition a minimum of 89 patients were selected from the pool of medical outpatients registered in the unit.

2.1 Statistical Methods

The SPSS version 22 (IBM Corporation, New York, USA) was used for database management and statistical analysis. Data were presented in tables. The statistical methods included Student's *t*-test for unpaired observations and chi-squared test for comparison of categorical data. Medical history, types of seizures and seizure characteristics were calculated as the percentage of participants. Mean and median were calculated and values were presented as graphs where applicable. In all, $p < 0.05$ was regarded as statistically significant. Conclusions were drawn at this level of significance at 95% confidence level.

3. RESULTS

A total of 150 cases of epilepsy were reviewed. Eighty-one (54%) were males and 69 (46%) were females with a male to female ratio of 1.7:1. P=0.96. The mean age of the patients was 33.6±16.4 years. The peak age group of the patients was 20-29 years with a smaller peak after 50 years. Fig.1. Males were older by approximately 7 years. $p <0.01$. The level of education and occupational status of the patients are shown on Table 1. Most PWE stopped at secondary school level and about 6.7% were retired and 36.7% were unemployed.

3.1 Seizure Characteristics

The mean age-of-onset was 30.9(15.3) years, earlier in females than males. P=0.01. The median age on onset was 17 years: males 18 years and females 12 years. Table 1. Graphical representation of age-of-onset in depicted in Fig. 1. The peak age onset was 0-9 years followed by 10-19 years. There was a third peak in the age-of-onset after 50 years. Other reported seizures characteristics are shown in Table 2. Most patients presented to the hospital less than one week after their last seizure (44%, (66/150)). Eighty-one patients (54%) reported that seizures could occur at any time of the day while 4(2.7%) said they had seizures on awakening. Immediately after a seizure, majority of the patients 119(79.3%) felt tired and sleept off, 14(9.3%) said they will be back to normal and 4(2.7%) described being aggressive or very irritable.

Although 70(46.7%) could never predict the onset of seizures, most of those who could, always did so 51.4% (26/80). Table 2. For the who could predict the onset of seizures, most gave a history of non-motor onset, especially sensory phenomenon 16(10.7%). Other seizures characteristics documented clinically were the frequency of multiple seizures in a week 68(45.3%) and history of prolonged single seizures 54(36%). In 94 (62.7%) People with Epilepsy (PWE) seizures were always similar and 21(14%) reported a family history of epilepsy.

Table 3 shows specific symptoms associated with seizures, medical comorbidities, and risk factors/seizure related injuries. The commonest signs/symptoms described by the patients were: severe headaches 5(9.1%), black outs 5(9.1%), stomach discomfort, weakness, dizziness 4(7.3%) each. Hypertension 61(40.7%) and stroke 11(7.3%) were the most reported medical comorbidities. Overall, 78(52%) reported a history of bodily injury but only 12(8%) considered their injury as severe (necessitating hospital care). Most injuries were bruises 62(41.3%) and were located on the face, scalp and mouth 37(24.7%). Burns occurred in 12 cases (8%) while fractures, dislocation and loss of tooth were also reported. Between 9.3% to 30.7% of the patients were exposed to factors that could cause severe injury or death during seizures. Table 3, 4th column. The prescription pattern among the patients revealed that carbamazepine is still the commonest medication used 114(76%). Fig. 2.

4. DISCUSSION

The index study has described the medical history, seizure patterns and other characteristics

Table 1. Age and gender distribution of the patients

Gender	Male (%)	Female (%)	Total (%)	p-value
N (%)	81(54)	69(46)	150(100)	0.96
Age (years)	-	-	-	-
Mean age (sd)	36.9(17.4)	29.7(14.4)	33.6(16.4)	<0.01
Median age	30	25	27	
Level of education	-	-	-	-
No education	12(14.8)	6(8.6)	18(8.3)	
Primary	16(19.8)	4(5.8)	20(13.3)	
Secondary school	33(40.7)	41(59.4)	74(49.3)	
Tertiary	20(24.7)	18(26.1)	38(25.3)	0.02
Occupation	-	-	-	-
Students	11(13.6)	22(31.9)	33(22)	
Employed	33(40.7)	22(31.9)	55(36.7)	
Unemployed	16(19.8)	13(18.8)	29(19.3)	
Retired	9(11.1)	1(1.4)	10(6.7)	
Not indicated	12(14.8)	11(15.9)	23(15.3)	

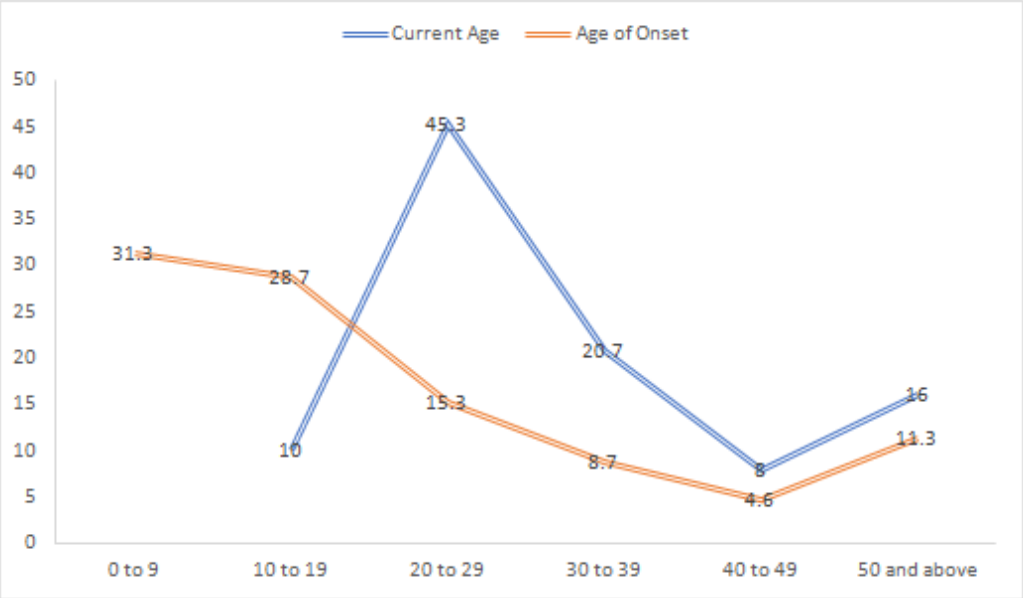

Fig. 1. Age distribution of age current age and age-of-onset of epilepsy in the patients

of seizures in PWE attending a hospital clinic in Nigeria. Despite advances in diagnostic technologies the diagnosis of epilepsy remains largely clinical and depends on careful history taking. Studies from Nigeria has shown that local differences in the prevalence of epilepsy exist because of genetic, environmental, and social risk factors associated with epilepsy[1-3,17,18-21]. This is typified by the increased frequency of motorcycle related head injuries leading to traumatic brain injury and stroke in the country[22-25]. Thus, there is need for a through clinical characterization of the seizures in PWE living with epilepsy because of the changing risk factors for epilepsy.

There is an earlier onset of epilepsy in females than males and a third peak of age-of-onset after 50 years. For most PWE seizures could occur at any time but about 46.7% could predict the onset of seizures especially the non-motor types. About 45.3% reported a history of repetitive seizures within a week and 54(36%) reported prolonged seizures. About 21(14%) reported a family history of epilepsy. Hypertension and stroke were the commonest medical comorbidities reported. About 52% reported having physical bodily injury in the past although they were frequently mild. Most injuries were bruises 41.3% and were located on the face, scalp, and mouth 37(24.7%). Burns occurred in 12 cases (8%)

while fractures, dislocation and loss of tooth were also reported. Up to 30.7% of the patients were frequently exposed to factors that could cause severe injury or death during seizures. Carbamazepine was the commonest medication used 114(76%).

The age distribution of PWE in the index study reflects the population of epilepsy patients seen in the adult neurology clinic and may not reflect the age distribution of epilepsy in the community. The current data showed that most PWE started having seizures as children. The wide range in the age-of-onset is supported by the pattern of risk factors for epilepsy reported by the patients of which stroke and traumatic head injury were some of the commonest (Table2). These

Table 2. Gender distribution of seizure characteristics

Gender	Male (%)	Female (%)	Total (%)	p-value
Age of onset				
Mean age (sd)	26.3(21.7)	14.4(14.9)	20.9(15.3)	0.01
Median age	18	12	17	
Last seizure attack				
< 24 hours	17(21)	18(26.1)	35(23.3)	
1-7 days	22(27.2)	12(17.4)	34(22.7)	
1-4 weeks	15(18.5)	12(17.4)	27(18)	
1-6 months	12(14.8)	11(15.9)	23(15.3)	
>6 months	8(9.9)	8(11.6)	16(10.7)	
Do not remember	7(8.6)	8(11.6)	15(9.9)	0.7
Time of most seizures				
Anytime	43(53.1)	38(55.1)	81(54)	
Only when awake	12(14.8)	13(18.8)	25(16.7)	
While asleep	17(21)	14(20.3)	31(20.7)	
Before falling asleep	3(3.7)	1(1.4)	4(2.7)	
Fever	1(1.4)	1(1.4)	2(1.3)	
What happens after seizures				
Sleep/tired	65(80.2)	54(78.3)	119(79.3)	
Back to normal	9(11.1)	5(7.2)	14(9.3)	
Confused	6(7.4)	7(10.1)	13(8.7)	
Aggression or irritability	1(1.2)	3(4.3)	4(2.7)	
Prediction of seizures				
Always	19(23.5)	17(24.6)	36(24)	
Often	10(12.3)	15(21.7)	25(16.7)	
Rarely	7(8.6)	12(17.4)	19(12.7)	
Never	45(55.6)	25(36.2)	70(46.7)	0.07
Signs of impending seizure				
Motor	8(9.9	8(11.6)	12(8)	
sensory	7(8.6)	9(13)	16(10.7)	
Psychic	2(2.5)	2(2.9)	3(2)	
Autonomic	6(7.4)	8(11.6)	14(9.3)	
Automatisms	3(3.7)	4(5.8)	7(4.7)	
Unexplainable	9(11.1)	15(21.7)	24(16)	
Others	1(1.2)	3(4.3)	4(2.7)	
Other seizure characteristics				
History of multiple seizures in a day	39(48.1)	29(42)	68(45.3)	0.45
History of prolonged seizures > 10 minutes	31(38.3)	23(33.3)	54(36)	0.53
Seizures are usually similar	48(59.3)	46(66.7)	94(62.7)	0.35
Family History	16(19.8)	5(7.2)	21(14)	0.03
Total	81(53.3)	69(46.7)	150(100)	

Table 3. Distribution of symptoms, signs, medical history, and risk factors for epilepsy*

Signs and symptoms at onset	N (%)	Medical comorbidities and risk factors for epilepsy	N (%)	History of injury and risk factor s for injury	N (%)
Motor		Hypertension	61(40.7)	History of injuries	78(52)
Up rolling of the eyes	2(3.6%)	Stroke	11(7.3)	History of severe injuries	12(8)
Stiffness of the hand	2(3.6%)	Diabetes	4(2.7)	Location of injury	
Jerking of the limbs	1(1.8%)	Head injury	32(21.3)	Face, scalp and mouth	37(24.7)
Non-Motor		Cognitive decline	5(3.3)	Upper limbs	20(13.3)
Headache	5(9.1%)	Alcohol abuse	4(2.7)	Lower limbs	10(6.7)
Black outs	5(9.1%)	Mental retardation	4(2.7)	All parts of the body	11(7.3)
Stomach discomfort	4(7.3%)	Meningitis	3(2)	-Type of injury	
Weakness	4(7.3%)	HIV	3(2)	Bruises	62(41.3)
Dizziness	4(7.3%)	Brain surgery	2(1.3)	Burns	12(8)
Confusion	3(5.5%)	Headache (severe)	2(1.3)	Nail puncture injury	1(0.7)
Yawning	2(3.6%)	Psychiatric disorders	2(1.3)	Loss of tooth	1(0.7)
Fear/anxiety	2(3.6%)	Blindness	1(0.7)	Fracture	1(0.7)
Feeling of loneliness	1(1.8%)	Down's Syndrome	1(0.7)	Joint dislocation	1(1.3)
Sweating	1(1.8%)	Rheumatoid arthritis	1(0.7)	Headache (severe headache)	1(1.3)
Ringing in the ear	1(1.8%)	Pituitary tumor	1(0.7)	-Risk factors for injury	
Body pains	1(1.8%)	No significant history	121(80.7)	Cooking with open fires	46(30.7)
Abnormal behavior	1(1.8%)			Fetching well water	23(15.3)
Feeling of cold	1(1.8%)			Working with sharps	22(14.7)
Fear/calmness	1(1.8%)			Climbing trees	14(9.3)
Double vision	1(1.8%)				
Bad smell	1(1.8%)				

**More than one case may occur; **History of severe headaches*

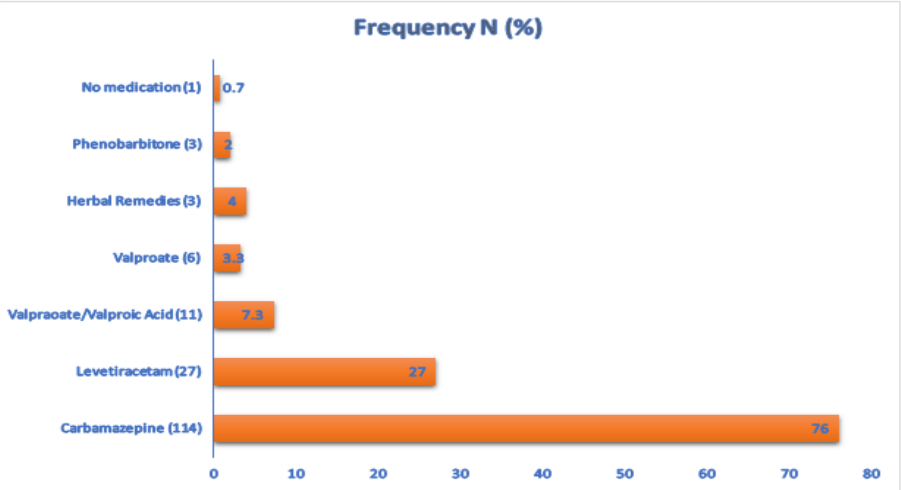

Fig. 2. Frequency of antiepileptic medications currently used by the patients

disorders are more likely to occur within midlife and old age. It is important also to note that age-of-onset of epilepsy may not be accurate in cases on non-motor seizures and nocturnal seizures. It often takes an occurrence of a generalized tonic clonic seizure for the patient to come to the clinic. The line graph of the ages on-onset and current age shows that although most patients started having seizures before 20 years (60%) the peak current age of PWE was 20-29 years (45.3%). As earlier stated, this reflects the age group seen in our clinics and not necessarily the time lag before presentation. The second peak in the age-of-onset corresponds to the second peak of current age thus suggesting that at this period in life most people came to the hospital after the onset of seizures. The presence of a family history of epilepsy was reported in 14% of PWE. Documenting family history of epilepsy may be easier in hospital-based studies like ours than in community-based studies because of social stigma. Our finding is higher than what was reported by Ogunrin[21] and Osuntokun[26] in earlier studies. The distribution of educational status of PWE does not really differ from what is obtained in the general population where most people are secondary school graduates[3]. One may presume that the reason for this pattern may be age distribution of the population because at 17 to 20 years most have just completed their secondary school education (which is also reflected on the occupational status of the subjects).

The duration of seizure freedom in the study showed that most seizures occurred within a week before presentation to the hospital. Probably these subjects reported to the clinic because of a recent ictus and nor really because they had medical appointments. Although in our clinic we frequently ask patients to come if there is an unexplained breakthrough seizure, nevertheless this cannot explain all cases. Documented seizure freedom of more than 6 months was reported by 10.7%. It has been noted that it is not uncommon for patients in our region not to attend clinic if they are seizure free[13,14].

The timing of most seizures, prediction seizure and semiology of aura are helpful hints in the classification of seizures and localization of seizure focus[27,28]. Based on the index study about 46.7% may have purely generalized epilepsy and the rest focal epilepsy. Certain forms of epilepsy may cause seizures especially at night when the patient is asleep while syndromes of febrile seizure plus may often be triggered by fever[29-32]. Although most patients with generalized seizures sleep off after seizures or report tiredness, in absence seizures, focal aware and unaware seizure, and myoclonus they may return to normal almost immediately. The report of aggression or irritability and possibly prolonged confusion may be due to post ictal psychosis[31,32]. Thus, differentiating these patients into categories is helpful in the proper management of PWE as these may predispose to trauma. This is particularly important in pregnant women and nursing mothers. The symptoms and signs associated with focal seizures are also helpful in localizing seizure focus. Psychic experiences, autonomic and automatisms are frequent features of temporal lobe epilepsies and rarely frontal lobe epilepsies. In the absence of MRI or even CT, proper

documentation of seizure semiology is helpful in both drug selection and triaging patients who may benefit from other forms of treatment.

A large proportion of PWE in this study reported history of possible status epilepticus and cluster seizures. Documenting the true prevalence of status epilepticus and cluster seizures from the index study will be limited by the ability of onlookers to time seizure considering that seizures are often dramatic and may initially elicit emotional rather than logical response from on lookers. Status epilepticus and seizure clusters may result from several factors such as: non-adherence, concurrent illness (example febrile illnesses) or simply the progression of epilepsy[33-35]. It is generally recommended that in frequent cases of unexplained status and cluster seizures that the patient should be revaluated to rule of new onset comorbidities. The pattern of injury among the patients showed that most were minor however, burns, fractures and dislocations were documented[36-39]. Many PWE in Nigeria and other parts of sub-Saharan Africa are exposed to injury during seizures due to several reasons including social role expectations, peer pressure or simply ignorance. Seizure related injuries have been documented in other studies and increases the burden of epilepsy on the sufferers and caregivers[40].

Carbamazepine was found to be the commonest anti-seizure medication prescribed for the patients. The common use of carbamazepine across Nigeria has been documented in other studies[41-45]. However, there is gradual increases in the use of newer antiseizure medications.

5. CONCLUSION

The index study has described an earlier onset of epilepsy in females than males and a second peak of age-of-onset after 50 years. For most patients' seizures could occur at any time but about 46.7% could predict the onset of seizures especially the non-motor types. PWE reported high rates of possible status epilepticus and seizure clusters. Although most patients (52%) reported having physical bodily injury in the past, they were frequently mild. Burns occurred in 12 cases (8%) while fractures, dislocation and loss of tooth were also reported. Up to 30.7% of the patients were frequently exposed to factors that could cause severe injury or death during seizures. Carbamazepine was the commonest medication used 114(76%).

6. LIMITATIONS

The current study has some limitations. Clinical characteristics was based solely on patient's history. This method is prone to recall bias and not very objective because patients may not volunteer all the information. The study is purely hospital based and our findings may not represent findings from the community. All information were given by caregivers and the patients who may find it difficult in describing the details of their seizures due to limited vocabulary to express specific signs and symptoms in local languages.

DISCLAIMER

The patients recruited in this study were routine outpatients who consented to participate in the study. The research was not funded by the producing company rather it was funded by personal efforts of the authors.

CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the authors.

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Owolabi LF, Owolabi SD, Taura AA, Alahaji ID, Oguniyi A. Prevalence and burden of epilepsy in Nigeria: A systematic review and meta-analysis of community-based door-to-door surveys. Epilepsy Behav. 2019;92:226-234.
2. Nwani PO, Nwosu MC, Asomugha LA, Enwereji KO, Arinzechi EO, Ogunniyi AO. Epidemiology of active epilepsy in a suburban community in Southeast Nigeria: A door-to-door survey. Niger J Clin Pract 2015;18:527-33.
3. Ezeala-Adikaibe B A, Orjioke C, Ekenze O, Ijoma U, Onodugo O, Molokwu O et al. Prevalence of active convulsive epilepsy in

an urban slum in Enugu South East Nigeria. Seizure 2016;35:100–105

4. Ettore Beghi. The Epidemiology of Epilepsy. Neuroepidemiology 2020;54: 185–191.
5. Fiest K, Sauro K, Wiebe S, Patten S, Kwon C, Dykeman J et al. Prevalence and incidence of epilepsy: A systematic review and meta-analysis of international studies. Neurology 2017;88(3):296-303.
6. Scheffer IE, Berkovic S, Capovilla G, Connolly MB, French J, Guilhoto L, et al. ILAE classification of the epilepsies: Position paper of the ILAE Commission for Classification and Terminology. Epilepsia. 2017;58(4):512-21.
7. Onwuekwe IO, Ezeala-Adikaibe B. Prevalence and Distribution of Neurological Disease in a Neurology Clinic in Enugu, Nigeria. Ann Med Health Sci Res. 2011;1(1): 63–67.
8. Fadare JO, Sunmonu TA, Bankole IAB, Adekeye KA, Abubakar SA. Medication adherence and adverse effect profile of antiepileptic drugs in Nigerian patients with epilepsy Neurodegener Dis Manag. 2018;8(1):25-36.
9. Danesi M A, Adetunji J B. Use of Alternative Medicine by Patients with Epilepsy: A Survey of 265 Epileptic Patients in a Developing Country. Epilepsia. 1994; 35(2):34-51.
10. Ezeala-Adikaibe BA, Achor JU, Nwabueze AC, Agomoh AO, Chikani MO, Ekenze OS et al. Knowledge, attitude and practice of epilepsy among community residents in Enugu, South East Nigeria Seizure. 2014;23:882–888
11. Espinosa-Jovela C, Toledano R, Aledo-Serranob A, García-Morales I, Gil-Nagel A. Epidemiological profile of epilepsy in low income populations. Seizure. 2018; 56:67-72.
12. Camfield P, Camfield C. Incidence, prevalence and aetiology of seizures and epilepsy in children. Epileptic Disord. 2015 ;17(2):117-23.
13. Onwuekwe IO, Onodugo OD, Ezeala-Adikaibe BA, Aguwa EN, Ejim EC, Ndukuba K et al. Pattern and presentation of epilepsy in Nigerian Africans: a study of trends in the southeast**.** Trans R Soc Trop Med Hyg. 2009;103(8):785-789.
14. Enwereji K, Nwosu M, Ogunniyi A, Nwani P, Asomugha AL, Enwereji E. Epidemiology of stroke in a rural community in Southeastern Nigeria. Vasc Health Risk Manag. 2014;10:375-388.
15. Ekenze, O, Ezeala-Adikaibe B A, Onodugo O D, Chime P, Orjioke O, Mbadiwe N C, et al. The Prevalence of Stroke Survivors in Urban Slums in Enugu, Nigeria. Open J Prev Med. 2019;9: 51-67.
16. Cochran WG. Sampling Techniques, 2nd Ed., New York: John Wiley and Sons, Inc;1963.
17. Ogunrin O. Epilepsy in Nigeria – A review of etiology, epidemiology and management. Benin J Postgrad Med. 2006;8(1):27-5.
18. Ogunrin O A, Obiabo O Y, Obehigie E. Risk factors for epilepsy in Nigerians – a cross-sectional case–control study Acta Neurologica Scand; 2013. Available:https://doi.org/10.1111/ane.12192
19. Ogunrin OA, Adeyekun AA. Profile of Post-traumatic Epilepsy in Benin City, Nigeria. West Afri J Med. 2010;29(3):153-7
20. Ojinnaka NC, Akpan MU, Aronu AE. Posttraumatic Epilepsy among Epileptic Children Seen in a Pediatric Neurology Clinic in Enugu, Nigeria-A Descriptive Study. J Epilepsy. 2016;2:105. DOI:10.4172/elj.1000105
21. Ogunrin OA, Adeyekun A, Adudu P. Etiologies of epilepsy and health-seeking itinerary of patients with epilepsy in a resource poor setting: Analysis of 342 Nigerian Africans. Seizure 2013;22:572–576.
22. Onwuchekwa RC, Echem RC. An epidemiologic study of traumatic head injuries in the emergency department of a tertiary health institution. J Med Trop. 2018;20:24-29.
23. Shour AR , Holmes B, Ameh EA, Olaomi OO, Anguzu R , Cassidy LD. Motor vehicle accident is a risk factor for traumatic head injury among children in Abuja: analysis of the first trauma registry in Nigeria. Pan Afr Med J. 2019;33:215.
24. Adeleye AO, Ogun MI. Clinical Epidemiology of Head Injury from Road-Traffic Trauma in a Developing Country in the Current Era. Front. Neurol. 8:695. DOI: 10.3389/fneur.2017.00695
25. Wahab KW. The Burden of Stroke in Nigeria Int J Stroke. 2008;3(4):290-292.
26. Osuntokun BO. Epilepsy in the Developing Countries The Nigerian Profile. Epilepsia.1972;13: 107-111.

27. Manford M, Fish R, Shorvon D. An analysis of clinical seizure patterns and their localizing value in frontal and temporal lobe epilepsies. Brain. 1996;119 :17-40.
28. Di Bonaventura C, Giallonardo AT, Fattouch J, Manfredi M. Symptoms in focal sensory seizures Clinical and electroencephalographic features. Seizure. 2005; 14:1—9
29. Whitehouse W. Febrile convulsions/seizures and related epileptic syndromes. In Gonzalo A, Antonio V (Eds). Introduction to Epilepsy. Cambridge University Press: PA. 2012;156-157
30. Shorvon S. Handbook of Epilepsy Treatment. 3rd ed. Wiley-Blackwell Oxford. 2010;69-70.
31. Hilger E, Zimprich F, Pataraia E, Aull-Watschinger s, Jung R, Baumgartner C, Bonelli S. Psychoses in epilepsy: A comparison of postictal and interictal psychoses. Epilepsy Behav. 2016;60:58-62.
32. Chaudhury S, Rohatgi S, Murthy PS, Soren S, Bakhla AK, Kiran C. A clinical study of post-ictal psychoses. Saudi J Health Sci. 2015;4:99-103.
33. Sánchez S, Rincon F. Status Epilepticus: Epidemiology and Public Health Needs. J. Clin. Med. 2016;5(8):71
34. Kariuki S M, Kakooza-Mwesige A, Wagner RG, Chengo E, White S, Kamuyu G, et al. For the SEEDS Writing Group. Prevalence and factors associated with convulsive status epilepticus in Africans with epilepsy. Neurology 2015; 84(5):1838-1845
35. Newton CR, Kariuki SM. Status epilepticus in sub-Saharan Africa: new findings. Epilepsia 2013;54(suppl 6):50–53.
36. Boschini LP, Tyson A F, Samuel JC, Kendig C E, Mjuweni S, Varela C et al. The Role of Seizure Disorders in Burn Injury and Outcome in Sub-Saharan Africa. J Burn Care Res. 2014;25(6):e406-e412.
37. Ezeala-Adikaibe B A, Achor J U, Onwukwe J, Ahamefule A. Seizure related injuries among outpatients in two tertiary hospitals in South East Nigeria. Ann Trop Med Public health 2012;5:340-343.
38. Lagunju I A, Oyinlade A O, Babtunde OD. Seizure-related injuries in children and adolescents with epilepsy. Epilepsy Behav. 2016;54:131-134
39. Mukuku O, Nawej P, Bugeme M, Nduu F, Mawaw PM, Luboya ON, Epidemiology of Epilepsy in Lubumbashi, Democratic Republic of Congo. Neurol Res Int ; 2020. ID 5621461.
Available:https://doi.org/10.1155/2020/5621461
40. Bhalla K, Harrison JE, Shahraz S, Fingerhut LA; Global Burden of Disease Injury Expert Group. Availability and quality of cause-of-death data for estimating the global burden of injuries. Bull World Health Organ. 2010;88:831–838.
41. Ogundele SO, Dawodu CO. Adherence to Anti-Epileptic Drugs at a Tertiary Health Center in a Developing Country- a Cross-Sectional Study. Inter J scien Res. 2013;2:2277 – 8179.
42. Nwani PO, Asomugha LA, Arinze EO, Ewereji KO, Nwosu MC, Oguniyi A. Patterns of antiepileptic drug use and seizure control among people with epilepsy in a suburban community in southeast Nigeria. Afri J Neurol Sci. 2012;31:21.
43. Jang M, Sakadi F, Tassiou NR, Abass CF, Grundy SJ, Woga A, et al. Impact of Poorly Controlled Epilepsy in the Republic of Guinea Epilepsy Project Seizure. 2018;61:71–77.
44. Achor JU, Nwefoh EC, Ezeala-Adikaibe BA, Ezeruigbo CFS, Agomoh AO. Anti epileptic drug prescription in a psychiatric hospital outpatient clinic in Southeast Nigeria. Open Journal of Psychiatry. 2017;7:294- 306.
45. Ogboi SJ, Babajide F, Ademola O, Ogunrin O, Agu U. Evaluation of Factors Influencing Medication Adherence in Patients with Epilepsy in Rural Communities of Kaduna State, Nigeria. Neuroscience Med. 2011;2:299-305.

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