



INCIDENCE AND PREVALENCE OF EPILEPSY IN A MAPPED DISTRICT OF SOUTHERN NIGERIA; A PRELIMINARY STUDY

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ABSTRACT

A target population drawn from a mapped district in Bayelsa state, Nigeria was studied for the incidence and prevalence of epilepsy, base on observational data analysis at a Diagnostic Center. The data from 2016 to 2022 were investigated. In accordance with the World Health Organization selection and classification procedure for epilepsy, (114) diagnosed cases of epilepsy was identified from the data in which a total population of (217) persons aged between (< 1 year) and (78 years) was investigated. Incidence and prevalence were calculated using standard procedure, and chi-square statistical tool IBM SPSS Version 21 was applied to analyze observed data, whether the occurrence of epilepsy and its spread along different age (biological stages of development) category of the population is statistically significant or not by chance. The general incidence and prevalence of epilepsy was (0.075 or 75 cases/ 1000 people -year) and (52.5%) in that order. A predominance of epilepsy (35%) was found among children - age category (< 1 to 9 years). Meanwhile, adolescents – age category 10 to 19 years were 31% and adults – age range 20 to 59 years were 30%. The elderly – age range 60 - 65 years and above were 4%. Among participants who did not have epilepsy, 20% was children in the age range < 1 to 9 years, 30% was adolescents of age range 10 to 19 years, 28% was adults aged between 20 – 59 years, and 4% was elderly people aged within 60 to 65 years and above. The result suggests prevalence in epilepsy that requires attention of researchers, health policy managers and relevant health professionals. Also it implies predominance of epilepsy among children, which agrees with some other reports. However, the age – spread in diagnosis of epilepsy from the study population's observed data was not statistically significant.

KEYWORDS: Incidence, prevalence, epilepsy, EEG, CT-Scan, age.

INTRODUCTION

The world over, researchers, health professionals, policy makers and managers are required to pay rapt attention to the Global burden of diseases; of which, the importance will often be indicated through a regular collection and collation of data, which are then analyzed, presented for immediate use or archived for future reference and intermittently updated.

For instance in 2016, an estimate of more than 125,000 deaths was reportedly due to epilepsy, according to Global burden of disease – GBD.^[1] It was gathered that this statistics represents two to three times more death from epilepsy than other diseases.^[2] Whereas in many nations of the world, you may rarely find data on stratified, recorded cases of epilepsy or seizure disorder; in a few countries that have dense population such as Brazil, where data exist, it is either outdated or as good as absent, and in developed nations such as China, several other factors may interfere to limit the opportunity of having a robust data.^[3,4] In this respect,

the Urban, rural, high and low income earning settlements, are all not discriminated, likewise underdeveloped countries and developing nations, since the dearth of information seems to cut across these apparent dichotomies.^[5,6]

In Africa, and its sub-Saharan region where there are many underdeveloped and developing countries, the concern is even more as there are multidimensional factors which may account for the challenges that affect research on epilepsies or seizure disorders.^[7] Meanwhile, where humongous efforts may have been put in, more often than not, very lean data are generated. This may be indicated in the spread of sample sizes captured in some of the reported studies, that could be a reflection of several factors including, but not limited to, the lack of basic diagnostic equipment and tools, human resources, or reluctance of persons with probable epilepsy to seek medical attention. In some instance of such nations like Kenya, Tanzania and Nigeria, there is low data perhaps due to combination of a plethora of reasons such as fear

of stigma, concerns of financial limitation, cultural / religious interferences and outright ignorance (lack of awareness) about the disorder or its medical management.^[7, 8]

A few studies have been carried out in some communities in Nigeria, to generate statistical data on epilepsy. Even though it has been quite difficult to assess and ascertain the actual prevalence of this neurological disorder in Nigeria as with many other developing countries, Owolabi *et al* attempted and captured a prevalence estimate of 8 per 1000 people.^[9] This was arrived at through the analysis of observational data obtained from investigation carried out in nine (9) communities spread across four (4) out of the six (6) geopolitical zones of the country. In those nine studies where the data were pooled, they relied on surveys carried out from door-to-door in the selected communities.^[9] Whether the reliance on a door-to-door, questionnaire utilization approach may be preferred to other available epilepsy study tools for convenience, ease, effectiveness, efficiency or appropriateness and precision perhaps will have to be considered within perspectives.

There are now, novel methods and tools that have been evolving over the recent years, for the diagnostic investigative studies of seizure disorders to arrive at closest par with precision. They include Blood Test, Imaging and monitoring tools such as Electroencephalogram - EEG, Computer Tomography scan - CT scan, and Magnetic resonance Imaging - MRI, away from the conventional general Medical History-taken approach. In this approach, a neurologist relies on physical examination and information derived from response to sets of questions that may not necessarily be adequate for precise diagnosis or classifications of epilepsy.^[10] A blood sample may be subjected to series of blood analysis such as complete blood count and chemistry panel, as a means to detect if an individual has epilepsy, and the appropriate medication he would respond to. Meanwhile, with the innovation of EEG, a person's brain wave patterns can be studied to detect whether he has seizure, and if the seizure is as a result of epilepsy or even predict whether a seizure is likely to occur; and CT scan, MRI procedure can further detect the exact brain tissue(s) affected.^[10,11]

However, with the evolving of some of these novel advances, with more sophisticated tools for the detection/diagnosis and invariably research studies on epilepsy, it is not devoid of challenges. Some of these challenges common to most developing and underdeveloped climes include; concerns on whether the equipment are available and where or how the populace can have access to the tools, as well as its affordability. Another pertinent concern is the adequacy of human resource operating these procedures. These factors enumerated above and perhaps more may have indirect impact on researchers, the quality of research, as well as

data generation in such climes. The choice of tools and study designs may also be restricted to what is practically available, affordable and operational. Hence in cognizance of the challenges mentioned, and the glaring need to generate credible data in developing climes, this research was carried out in a district of Bayelsa state.

Bayelsa is one of the five south southern states of Nigeria, in the south - south geopolitical zone of the country referred to as Niger Delta region, and endowed with the natural mineral resource – Crude Oil and gas deposits in particular. Its population at the last general census carried out in 2006 by the National population commission was estimated at 1,704,515 and projected to become 2,537,400 people by 2022; that are living in different communities of the eight recognized local government areas of the state. These local government areas are further grouped into three senatorial districts designated as Bayelsa Central senatorial district, Bayelsa East senatorial district and Bayelsa West senatorial district of the state. According to the national population commission statistics, the population spread by each senatorial district is 1,121,400 for Bayelsa Central, 736,500 for Bayelsa East and 679,500 for Bayelsa West Senatorial district. The state capital city and local government area by the census is 524,400.

At the time of designing and prosecuting this study, there has not been a published report on the incidence or prevalence of seizure disorders in the state. The reported meta analytical study to estimate the prevalence of epilepsy for national statistic, which cited pooling of data from the Niger Delta Region, did not include any from Bayelsa state in particular; also, the analysis was base on door-to-door survey using questionnaires.^[9]

In this study, we concentrated on a popular, centrally located, reasonably equipped and much patronized radio diagnostics referral center, located in the capital city of the state (Yenagoa, which is also part of the Bayelsa Central Senatorial district), to which many private and public health facilities in the communities around the localities and districts refer patients for EEG, CT-scan, amongst other diagnostic procedures.

METHODOLOGY

The methodology adopted is in line with standard practice and procedure as reeled by world health organization, WHO and the international league against epilepsy, ILAE. Observational data was accessed, /obtained from Silhouette Radio diagnostic Consultants Center - a reputable referral center, collated and analyzed. The choice of this center is partly because it is located in the capital city of the state and receives referrals/ patronage of different private and public health facilities from communities /localities in and around the state capital Yenagoa, as well as from other senatorial districts. Also, there are some modern tools and equipment in the center that are used during procedures, which can give more precise information required to

make diagnosis towards treatment plans or when necessary, for generating accurate estimate of data towards research and planning.

Data were collated and analyzed, which consisted of relevant medical records of individuals that were on referrals from different health facilities and clinics to the diagnostic center for various procedures, including but not limited to Electrocardiography, CT-scan, and electroencephalography (EEG). The EEG diagnostic procedure would assist to either rule out or confirm epilepsy primarily, and then other possible conditions associated with the brain and nervous system. The data generated from the EEG procedure were subjected to re-examination by experts in the diagnosis and treatment of neurological disorders, to certify that any individual actually has epilepsy.

Also, from the participants'/patients' records they were classified into four categories following WHO classified age brackets in the order stated. Two age ranges, i.e. individuals of the age range less than 1-year (infant) and 2 - 9 years (child) were both categorized as children, while those in age bracket 10 – 19 years were categorized as adolescent. The participants within age 20 – 59 years were considered to be adults, while elderly or old category were those participants whose age was within 60 – 65 years and above. All the participants were investigated to see if age bracket might be a factor that influences the spread or outcome of the diagnosis being either normal or seizure disorder status. The data were analyzed, and the statistical tool applied was the Chi-square goodness of fit test. Consideration for significance level was $p < 0.05$.

The incidence of epilepsy was computed by dividing the number of confirmed new epilepsy cases by the total number of people registered that went through the EEG scrutiny in the case reports/medical records and multiplied by the Timeframe; i.e. Incidence = (New Cases)/ (Population X Timeframe)

The chi-square goodness of fit analysis of the relationship between the different age categories and having epilepsy or not is shown below;

	CHILD (< 1 – 9 yrs)	ADOLESCENT (10-19 yrs)	ADULT (20-59 yrs)	ELDERLY (60 yrs & above)
EPILEPSY	40	35	34	5
NORMAL	19	26	24	5

X_2 VALUE = 2.111532464575
Df = 3
P-value = 0.549583192933
 X_2 critical value (table) = 7.815

In the study population, individuals who were referred from hospitals or health facilities within Bayelsa central senatorial district were (100%), and (Nil) from other senatorial district. Eleven (11%) of the participants were referred from private hospitals, while those from

The prevalence of epilepsy was computed by dividing the number of confirmed epilepsy by the total number of people registered, who underwent the diagnostic procedures in the medical records.

In another breadth, we considered some of the concerns about the wideness in disparities that are usually recorded and reported in association with comparisons of many researches on diseases' prevalence during meta – analysis.^[13] This has been attributed to the differences in methodology as stated in the review of Spronk *et al.*, which showed how applying the point prevalence, or period prevalence or even contact prevalence could each slightly reflect changes for final outcome in the result of similar epidemiological studies.^[13] In cognizance of the difficulty or limitation in determination of at-risk population which would have been recommended highly for reference in epidemiological investigation, we applied the point prevalence operational procedure.

RESULTS ANALYSIS

When all observed data on epilepsy from the center were collated and analyzed, it was found that out of (217) individuals who underwent the EEG and CT-Scan which could either confirm or rule out epilepsy, (44 =39%) was female and (70 =61%) male. One hundred and fourteen (114, = 57%) had epilepsy, while (86, = 43%) were not diagnosed for epilepsy. The other 17 did not meet the inclusion criteria – either they had outright cerebral palsy, or the records of their vitals were incomplete. Among those with epilepsy, 35% was children between (< 1 to 9 years), and 31% was adolescents aged between (10 to 19 years), whereas 30% was adults of 20 to 59 years and 4% was elderly within 60 - 65 years and above. Meanwhile, among participants who did not have epilepsy, 20% was children, 30% was adolescents 28% was adults and 4% was elderly.

government health facilities was (89%). Twenty-three (23%) were referrals from tertiary health facility (the Teaching Hospital) in the state and 73% were referred from either secondary or primary health facilities. Meanwhile, all 100% of the referrals were from health facilities in Yenagoa, the capital city of the state.

DISCUSSION

Globally, epilepsy has been adjudged from research findings to affect over sixty-five million persons, as the

number four (4) commonest among neurological category of disease conditions.^[14] The Centers for Disease Control and prevention asserted that in the United States, a minimum of 3.4 million persons have epilepsy, and among these, children and older individuals are more.^[15]

Meanwhile, it is glaring and becoming more widely reported that there is scarcity of research data on epilepsy in developing countries, coupled with apparent challenges associated with the generation of far reaching, credible data which could enhance the management and treatment of seizure disorders in some climes.^[3,4,5,6,12]

The current study was embarked upon, as preliminary in a proposed series of phased-designed research, in contribution to the development of archive of epilepsy related information - in order to generate credible data that can be referenced in Bayelsa State, which is located in the south southern region of Nigeria. It is hoped that this will contribute to facilitation of better health care planning, adequate funds allotments, accessible treatment and management for people living with epilepsy and even prevention programmes.

The general prevalence estimate of epilepsy for the covered district of Bayelsa in focus was 52.5%, and the incidence rate is 75 cases per 1000 - year. Two (2%) of the number were children within age brackets of less than 1 to 1 year. Children between 2 and 9 years are (33%). Adolescents from 10 to 19 years are (31%) while adults 20 to 59 years are (30%) and the elderly, 60 to 65 years and above are (4%).

In the face value of this study, prevalence of epilepsy was predominant among children of less than 1 year to 9 years, i.e. 35% of the whole diagnosed epilepsy cases. This agrees with report of Center for Disease Control and prevention that more children were recorded among 3.4 million people with epilepsy in the United States. But the least prevalence in this study was found among the elderly, which contradicts a report that elderly people have high cases of epilepsy, similar to children.^[15] It has been asserted that people are more prone to the development of epilepsy from childhood.^[16] which lessens during adulthood, and may either disappear or climax at older age.^[17] Some study has it reported that epilepsy can actually develop at any age of an individual.^[18]

However, to further buttress our findings, it is worth noting that in the studies of de la court and others, they reported that increasing age (which peaks at 20 – 29 years) is linked with increase prevalence in epilepsy^[19]; Also, around age 60 years and above, there is decrease prevalence that is corroborated by our study in which the elderly - 60 to 65 years and above but not beyond 78 years had decreased prevalence (the least among the categories). In their study, it is at age of 85 – 94 years,

that prevalence of epilepsy is increased.^[19] In this case, no one in our study population is within the category.

We attempted to analyze observed data, for the association between the biological stages of development (captured as age – spread) and diagnosis of epilepsy or normal EEG from the study population. The relationship observed did not seem to be statistically significant at $p < 0.05$. Although, the sample size for the current study is limited to only one center; the results were comparable with some previous reports, from reputable organization such as Center for Disease Control and Prevention. The result also suggests prevalence of epilepsy that requires attention of researchers, health policy managers and relevant health professionals in the state.

Regarding treatment prospects, the current investigated prevalence estimate of epilepsy shows first time diagnosis of seizure disorder, and no previously reported/recorded use of antiepileptic drug by the participants or patients. This is a positive achievement towards adequate management and treatments plans for health policy managers, health professionals and agencies. Also, in the future phases of the study design, this can form a foundation for prospective investigation of treatment response as well prevention.

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