Addressing the Burden, High Treatment Gap and Societal Impact of Neurological Disorders in Nigeria: The Results of a Neuro-Epidemiological Survey in a Rural Riverine Community of Southwest Nigeria

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Authors' contributions

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ABSTRACT

Background: Over the last few years, there has been a steady increase in the incidence of neurological diseases in Nigeria particularly stroke, epilepsy and dementia. Therefore, it was needful to determine the current burden imposed by such disorders in Nigeria especially in the rural communities. This survey was carried out in Ilie community, Southwest Nigeria. The aim of this report is to address   some of the findings of the survey including the high treatment gap, social issues and societal impact of these common neurological disorders on the community.

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Methods: The study was carried out in a remote community known as Ilie which is located in Osun state, Nigeria**.** Ilie ward was screened from door to door, to identify people who had suffered from Neurological Disorders (ND) (lifetime prevalence).In determining the prevalence of ND, a two-phase cross-sectional study design was adopted. The first phase involved the demographic data collection from each screened household and the administration of WHO screening questionnaire for ND by the trained field interviewers. The second phase was the clinical examination of the participants who were positive during the first phase of screening by the neurologists to confirm the diagnosis of the identified neurological disease. Social issues such as access to education, employment opportunities and marital prospects as well as treatment issues were also assessed.
Results: In the first phase, the numbers of individuals screened were 2212, all from 231 households. The female participants accounted for 1111(50.3%) and males were 1101(49.7%), therefore the females were slightly more than the males. Thirty-three (33) cases of ND were detected giving a point prevalence of 1.9% and epilepsy was discovered to be the commonest. Traditional medicine as well as spiritual healing was the mainstay of treatment.
Conclusions: The burden of neurological disease was still high in this rural community of Southwest Nigeria and knowledge, social and treatment issues were still present.

1. INTRODUCTION

Non-communicable diseases (NCDs) such as neurological conditions have been shown to have increased significantly in sub-Saharan Africa over the last few years [1]. However there is paucity of information regarding the current burden imposed by ND in the rural areas of sub-Saharan Africa, as well as treatment/management issues and societal impact of these disorders.

In Africa, the majority of studies on the epidemiology of neurological disorders (ND) are hospital-based [2]. The lack of free access to public health system among the majority of the studied populations made the results of these studies appear biased.

Likewise there is no mandatory medical report practice in such populations, neither is the available resources adequate nor is the health infrastructure in these areas well developed, thus making the seemingly notable rise in neurological disease prevalence more likely to be mere underestimates.

Population –based studies have been directed to ascertain the true burden of ND over the last three decades worldwide and according to the findings of these studies, there has been a significant increase in the burden of neurological diseases [3]. Nevertheless, the major challenges experienced in developing countries include the economic limitation, logistic difficulties to perform neuro-epidemiological studies and limitation of access to rural areas by the neurologists. These have significantly constituted a major challenge to the implementation and integrity of such studies and complicating their implementation [3-5]. To the best of our knowledge, only one comprehensive population-based neurological study was carried out in rural Nigeria by Osuntokun over three decades ago [6]. Over the last few years, there has been a steady rise in the incidence of neurological diseases in Nigeria particularly epilepsy, stroke, dementia [7] as well as in other developing nations [8].

The burden imposed by ND in the sub-Saharan Africa can be considered disproportionate as compared to developed countries, with conditions like stroke being on the rise in even younger age groups, causing significant negative impact on the economy [9]. Complete care, being holistic, surpasses just administration of medication, rather takes into consideration the whole being, addressing psycho-social as well as biological implications of disease, treating all with equal merit. Therefore this study was aimed at uncovering the significant psychosocial effects and treatment gap of common neurological disorders such as epilepsy, stroke, dementia, and Parkinsonism, with epilepsy being the main and primary target, in the Ilie community.

2. METHODS

2.1 Location of Study and the Population

The study was carried out in a rural community called Ilie, which is located in the rain forest of Olorunda LGA, Osun state, Nigeria. Owing to the successful track record of previous surveys on schistosomiasis and intestinal helminthiasis done

in Ilie, it was therefore a good choice for this research. The research team felt this will facilitate community entry and moreover, the LAUTECH Teaching hospital where the principal investigator worked also has an outreach health post in Ilie which will undoubtedly provide manpower and services for the survey. Ilie remains a single electoral ward under the local government area called Olorunda. It is an agrarian community which consists of the main village known as Ilie and a constellation of satellite hamlets or farm settlements numbering 23 comprising of 20-70 inhabitants. The Ilie community consists of about 2268 inhabitants according to 1991 National Population Commission census (NPC census 1991). The major ethnic group of Ilie are the Yorub as with other minor ethnic groups in Nigeria which include the Gwaris, Tivs and Ibiras.

The area is a core agrarian community with subsistence farming and fishing as the major occupations. The Ilie community has some challenges that include the lack of some basic amenities such as standard hospitals, good refuse and sewage dumping and access to good roads. The educational structures in this community include 3 primary school structures hosting about 407 pupils and one secondary school.The sampling method adopted for the main Ilie village was the convenient sampling method and that of satellite farm settlement was a simple random sample technique. The sampling units were farm settlements and the sampling frame was a list of farm settlements numbering 23. A simple random sample of 13 of such settlements was selected for the study. All the units in the selected farm settlements were then screened. Houses in the selected units were numbered accordingly. The selected clusters were Aba Esa, Shola, Gaa Fulani, Owe, Ilosin, Okeyelu, Temidire, Ibigbami, Ilu Otun, IlosiOke, Balogun, Idi Iya and Iludun. The survey of all clusters selected was done from January 2013 to April 2013 in two phases.

2.2 General Study Design

In the determination of ND, there was an adoption of a two-phase cross-sectional study design. The first phase consists of the collection of demographic data from each household that has already been screened, and the application of WHO standardized ND screening questionnaire [8] by interviewers who were trained in the field. The second phase is the clinical examination of the participants by the neurologist. These are participants who were

positive to the first phase screening. The examination by neurologists is to confirm the diagnosis of the neurological disease. Provision of demographic data from the selected members of household was obtained from a household leader who was chosen from the family as the most enlightened family member who is also considered to be the most well -informed about the health status of all the members of that family.

2.3 Screening Phase

2.3.1 The screening questionnaire

In an attempt to identify the individual participant who had suffered from ND (lifetime prevalence) in Ilie ward, door to door screening was done. Twelve standardized questions and 4 simple task was initially applied as per the WHO Neuroscience research protocol for a quick evaluation for tremor, ataxia and motor or sensory deficit.

2.4 Methodology

The field interviewers who were in charge of the screening include the resident doctors in community medicine and internal medicine, medical students, community health workers and nurses. In an attempt to minimize intra and inter-observer variation, the field interviewers were trained for 7 days by the principal investigator before the study. The training entailed ND presentation, role plays of interviewers, and recommendations on epidemiological surveys. The field interviewers were divided into teams of 3 members each; each was made up of a community health worker who was to facilitate contact with participants based on the acquired knowledge of the community. The organization of the interviews involved: the arrival of the team of field interviewers to the house and the immediate identification of the house leader; the household questionnaire (HQ) was handed to the household leader by one the interviewer who then wrote down a list of all the household inhabitants, whether present or absent; the 2 remaining interviewers applied the WHO questionnaire to all inhabitants present in the household. All information was built on database. Subjects who answered 'yes' to one of the questions or were unable to perform any of the simple tasks were considered as 'suspect' of suffering from ND.

2.5 Neurological Examination

All subjects who were classified as 'suspects' during the event of the screening phase were

given a neurological examination. Neurological examination was performed by a certified neurologist or by a senior resident doctor concluding residency in internal medicine that was always supervised by a neurologist. Neurological patients who were confirmed and required follow-up were appropriately referred to the LAUTECH Outpost medical centre in Ilie or the LAUTECH Teaching Hospital Osogbo.

2.6 Diagnostic Criteria

The diagnosis of epilepsy was based on the epidemiologic definition of epilepsy by the International League against Epilepsy in 1993.The diagnosis of stroke was according to WHO definition as a condition characterized by rapidly developing symptoms and signs of a focal brain lesion, with symptoms lasting for more than 24hrs, with no other apparent cause than ones of vascular origin'. The peripheral nerve disorders were diagnosed based on at least 2 of the following criteria: (a) absent or reduced reflexes of the deep tendon; (b) muscle weakness and distal wasting; (c) sensory deficit specific in the type and distribution. The global delay in motor and cognitive learning were criteria for psychomotor delay. This excluded dyslexia, with the age of onset before 18years and in addition to any of the following two features: social skills, home living (DSM-IV), limitation in self-care, community use, health and safety, self-direction, leisure and work associated with deficits or impairments in communication and self-care, Diagnoses were without psychometric evaluation but based on solely clinical grounds. Dementia was diagnosed with memory impairment as the major feature in addition to one of the following features: agnosia, apraxia, aphasia, or disturbances in functioning executively in a clear state of consciousness. The diagnoses of essential tremor, idiopathic torsion dystonia, generalised muscular dystrophy, cervical spondylosis and febrile convulsions were made on clinical grounds and radiological evidence wherever available by the neurologist.

2.6.1 Community entry and participation

This was facilitated by our initial meeting with the traditional ruler of Ilie who then convened a meeting that comprised the council of traditional chiefs and elders of the village with whom the research team presented and discussed the aim of the project and found they were having a keen interest in the study and were ready to support our efforts mainly because the study targeted

epilepsy. The disease poses a major health concern in the community.

3. RESULTS

The total number of participants screened was 2212 from 231 households during the first phase. About 1111(50.3%) of the participants were female which thus account for a slight female predominance and the number of males was 1101(49.7%).The average age of the population studied was 26.3 ±20.2 years and the age range varied between 1- 100 years.

During the initial screening of Ilie community, 33 cases of neurologic diseases were detected at the first phase using the protocol of the World Health Neuroscience Research. See Table 1 for the display of the evaluation of the screening of the Ilie community using the WHO Neuroscience research protocol.

After the evaluation by the neurologist at the second phase, 10 individuals were confirmed to have epilepsy, thus giving a crude lifetime prevalence of 10/2212=4.5/1000 population (CI95$_%$ 2.30, 8.04).Other cases identified were: febrile convulsion (n=4), Parkinsonism(n=7), Benign essential tremor (n=2), dementia (n=2), stroke(n=2),Cervical spondylosis(n=2), generalized muscular dystrophy (n=1), Idiopathic torsion dystonia(n=1) and peripheral polyneuropathy(n=2).

This is illustrated in Table 2. The methodological approach to the survey is illustrated in Fig. 1.

4. DISCUSSION

Neuroepidemiological surveys offer insights into the burden and profile of neurological disorders ,attendant socio-economic impact on the community if properly carried out. The results obtained may be utilized in the interventional and strategic planning of the health services.

Community collaboration remains one of the most important requirements for implementing successful neuroepidemiological studies. In this study, the traditional ruler along with its council of chiefs was useful in the establishment of a good working relationship. The aim of the project was discussed and presented to the traditional council who were ready to support the study because it targeted epilepsy which remains one of the major health challenges in the community.

Table 1. Evaluation by single Items of the W.H.O neuroscience screening instrument

Items	Positive no /%	Negative no/ %
Symptom questions		
- Impaired Consciousness)	12/2212 = 0.5	2200/2212 = 99.5
- Uncontrolled movement of the limb	1/2212 = 0.1	2211/2212 = 99.9
- Absence Spell (only for children)	4/2212 = 0.2	2208/2212 = 99.8
- Paralysis or weakness of the limbs	0/2212 = 0	2212/2212 = 100
- Changes in speech	7/2212 = 0.3	2205/2212 = 99.7
- Paralysis of face	0/2212 = 0	2212/2212 = 100
- Drooping of mouth	1/2212 = 0.1	2211/2212 = 99.9
- Rigidity	7/2212=0.3	2205/2212=99.7
- Tremor of head or limbs	2/2212=0.0009	2210/2212=99.9
- Diplopia	0/2212=0	2212/2212=100
Physical Tasks		
- Holding arms extended	4/2212 = 0.2	2208/2212 = 99.8
- Distinguishing texture	4/2212 = 0.2	2208/2212 = 99.8
- Touching finger to nose	0/2212 = 0	2212/2212 = 100
- Walk heel-to-toe	0/2212 = 0	2212/2212 = 100
- Standing eye open	0/2212 = 0	2212/2212 = 100
- Standing eye closed	0/2212 = 0	2212/2212 = 100

Table 2.The description of the neurological diseases identified in the Ilie community

| S/N	Diagnosed diseasse	No of cases	Crude prevalence rate and 95% CI	Gender distribution		Treatment mode
				Male	Female	
1	Epilepsy	10	4.5/10000(2,30,8.04)	5	5	5 on herbal medication 3 on both herbal / AED 2 on AEDs
2	Parkinsonism	7	3.16/1000(0.82,5.50)	6	1	Herbal medications
3	Febrile Convulsion	4	1.8/1000(0.03,3.57)	3	1	Herbal medications (cow urine concoction)
4	Dementia	2	0.9/1000(-0.34,2.15)	1	1	Not on any medication home bound
5	Cervical Spondylosis	2	0.9/1000(-0.34,2.15)	1	1	Simple analgesics
6	Peripheral Neuropathy	2	0.9/1000(-0.34,2.15)	2	0	Herbal Medications
7	Stroke	2	0.9/1000(, -0.34,2.15)	1	1	Not on any medication
8	Idiopathic torsion dystonia	1	0.45/1000(-0.433,1.33)	1	0	AED & Herbal Medication
9	Generalized Muscular dystrophy	1	0.45/1000(-0.433,1.33)	1	0	Not on any medication
10	Essential tremor	2	0.9/1000(-0.34,2.15)	1	1	Not on any medication
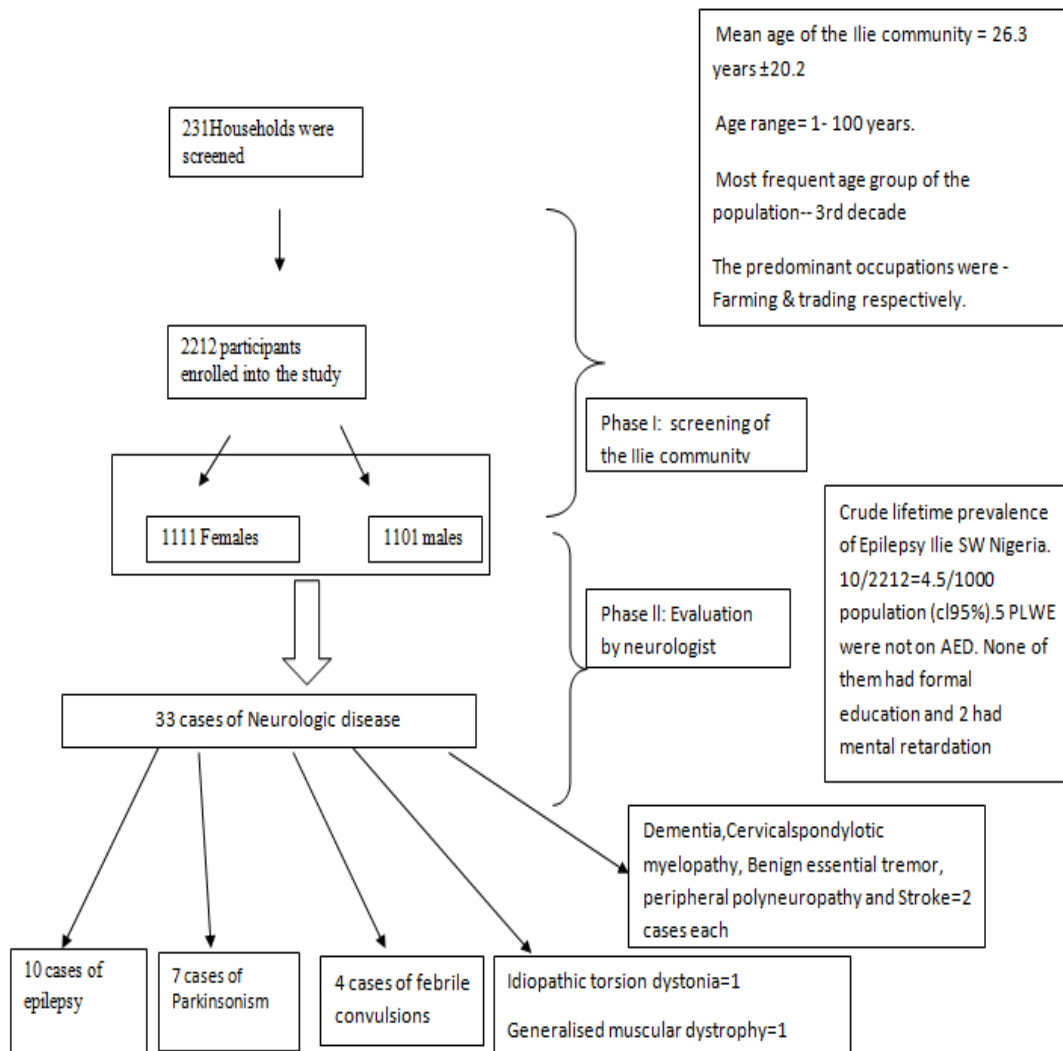
Fig. 1. The Ilie flow study design

The refusal rate among the study population was low because the health workers at the local level were involved; this thus favored the acceptance of the rural population. The screening questionnaire, the World Health Organization Neuroscience Research protocol [8] that has been used in many countries to survey the prevalence of neurological diseases, was found to be a valid instrument which required only minor changes where necessary when it was then retested for this field study. It was translated forth and back to Yoruba language which is the main language of the population studied. Major expenditure during the course of this study included transportation (i.e. vehicle maintenance, petrol, etc.) and stipends and feeding of the health care workers.

The overall point prevalence of neurological diseases was 1.49% in this study which was much lower than the 3.3%obtained in a similar but bigger survey in Uganda [9]. This may be due to the small sample population size of the study and exclusion of other common neurological conditions such as headache and Central Nervous system (CNS) infections/infestations which were not sought for in this survey. Headache was intentionally left out of this survey because the principal investigator felt characterizing headache in this rural environment may be a tall order because it is a common somatic complaint because of the malaria endemicity and the inability of the natives to properly characterize it may be a hindrance. Epilepsy may also have been underestimated

because some people still hide the diagnosis because of stigma-related factors. It is also possible that many people living with epilepsy (PLWE) in the Ilie community might have died much earlier even before the commencement of our study because of the high rate of mortality associated with epilepsy in Africa. The prevalence of epilepsy was 4.5/1000 in this study which was rather low when compared to the figures from previous studies in the rural Africa [10].

Parkinson`s disease is a common neurological disease globally. Its prevalence rises with age [11]. Parkinson's disease was ranked 11th by The Global Burden of Disease Study in 2015 [12]. In this study, the crude prevalence rate for Parkinson's disease was 3.16/1000. This is higher than the findings from published studies from Nigeria with prevalence rates ranging from 0.01-0.024/1000 [13] but lower than values in Copiah County US with crude prevalence ratios of : 3.41/1000 (blacks) and 3.52/1000 (whites) [14]. Farming and physical activities may account for the comparatively lower prevalence. Preference for herbal treatment among the affected subjects in this study may be as a result of the low level of knowledge on the available treatments.

The crude prevalence of febrile illness in the study was 1.8/1000 which is lower than the values of 11.6/1000 and 20.5/1000 obtained in earlier studies in rural populations in Nigeria and Tanzania respectively [15,16]. The current fight against malaria which is an endemic cause of fever in children in Africa, with different programmers such as the Roll Back Malaria, distribution of insecticide treated net and availability of antimalarials may be responsible for the reduced prevalence in this study. However, herbal preparations and cow urine concoctions are still the commonly agents used to treat convulsion.

The health ramifications of dementia are quite significant. The burden of the problem however remains largely unknown in most developing countries. In this study the crude prevalence of Dementia was 0.9/1000 which is lower than findings in earlier studies in Nigeria [17,18]. In a study conducted among the 2494 elderly individuals resident in the Idikan community in south west of Nigeria by Ogunniyi et al, the prevalence of dementia was determined among these elderly cohorts using the screening instrument for dementia among community for the selection of participants for clinical assessment in the second stage. The results showed that an overall age-adjusted prevalence rate of dementia was 2.29% while that of Alzheimer's disease was 1.41% [18]. This was in contrast with a study in Indianapolis that involved2212 African Americans and using similar methodology. These rates were significantly higher in the latter study at 8.24% and 6.24%. [18].In developing countries where old age homes are not too common, family members bear the responsibilities of caring for the patient with dementia, often with severe psychological, economic and financial strain. [19,20]. Similarly, some caregivers may need to limit their work obligations, due to the time requirements involved [21].

Cervical spondylosis adversely affects the quality of life amongst sufferers as a direct consequence of its heavy disease burden and morbidity. There is paucity in studies done to determine community-based prevalence and associated factors of this condition [22]. The crude prevalence as reported in this study was 0.9/1000.

Stroke is a common medical emergency especially among older adults and men with consequent morbidity and mortality. Community based studies on stroke in Nigeria are quite few. In this study the crude prevalence of stroke was 0.9/1000. This was in keeping with prevalence of 1.31/1000 as reported by Sanya et al. [23] in the north central part of Nigeria. The exact incidence of stroke in Nigeria is not known. However, the stroke registry in Ibadan reported an incidence of0.21/1000 in 1977 [24]. Osuntokun et al obtained a prevalence ratio of 0.58/1000 in 1987 (6) in a rural settlement in the Southwest of Nigeria. A sustained rise in stroke prevalence has been reported in subsequent studies in Nigeria. Values obtained from studies among rural dwellers in South eastern and South southern Nigeria were 1.63 and 8.51/1000 [25,26] respectively.

A house to house survey carried out by Danesi et al in Lagos, Nigeria, revealed a prevalence of stroke of 1.41/1000 [27].Knowledge about stroke management is still poor among the respondents as none of them were on any specific treatment. Poor health care facilities and inadequate medical personnel may be responsible. Primary prevention strategies for stroke can reduce its occurrence with the added benefit of a relatively low cost of implementation.

Firstly, there is urgent need to correct the widespread false beliefs on stroke via national educational campaign programs. The populace needs more enlightenment campaigns on the primary risk factors such as hypertension, smoking, excessive consumption of alcohol, diabetes etc). There is also a need to educate them on the modes of presentation as well as the need to present early for medical care and the expected recovery pattern.

Essential tremor remains one the most common movement disorders. The prevalence however varies globally. In sub-Saharan Africa, the data showing the prevalence of essential tremor is limited. In Nigeria, Okubadejo et al. [28] found a crude prevalence of 12 per 1000 in a rural community which is higher than 0.9 per1000 found in this study. Adequate management is still a major challenge in tackling Essential Tremor [28].

In many of the subjects with neurological challenges in our survey, the mainstay of therapy was the alternative medicine and the traditional medicine (such as religious practices, herbs, etc.) They may be considered as being more culture friendly, closer to their indigenous orientation, are more holistic and preserving an optimum subtlety of the Afrocentric character [29].

The patient perceived these interventions to be uniquely suited to their culture, ways of thinking and their belief's orientation which is in contrast to western medicine. Similarly they are considered to be more accessible, more plentiful locally, and more accepted ways of dealing with their diseases and state of the health [29]. In this survey, none of the respondents with epilepsy were attending a routine clinic nor receiving any regular antiepileptic therapy for the control of their seizure. In this current study, half of the number of PLWE was not on any standard AED. This may be due to difficulty with medication access, socio-economic factors, cultural influence, loss to follow-up, as well as associated stigma. All of the PLWE had no formal education despite the presence of primary schools and a secondary school in the community. Five of them were not married despite of their marriageable age and two out of the ten people living with epilepsy had severe mental retardation.

In Nigeria, most of the diseases primarily affecting the brain including stroke and epilepsy are thought to result from affliction by malevolent spirits. To a large extent, this presumption causes most patients with stroke or seizure disorders to consult treatment from the traditional healers /spiritual healers, rather than from orthodox centers. A survey conducted by Danesi and Adetunji which comprises of 265 patients with epilepsy residing in Lagos, showed that 47.6% of study participants were using solely African traditional medicine, 20.4% used the spiritual healing, about 24.1% were combining both the spiritual healing and the traditional medicine and about 7.5% employed other forms of alternative medicine before seeking the orthodox treatment [30]. Upon the hospital treatment initiation, only 14.6% of the group who had engaged in the use of the African traditional medicine went on with such treatment, while those who continued with the spiritual treatment were more than 66%. These findings suggested that a lot of these patients persisted with these alternative treatments as a result of the perceived benefits it affords them. The authors concluded that the management and treatment of epilepsy using the alternative medicine particularly the spiritual healing remain relevant in Africa. A recent study done in the northern Nigeria by Kabir et al. [31] found that 47% of respondents employed spiritual healing as a preferred method of epilepsy treatment, followed by the allopathic medicine (34%) while only19% used traditional medicine.

Two community-focused studies in western Nigeria and the rural central Ethiopia revealed that only 1.6%and 3.9%of epileptic patient were treated using the orthodox antiepileptic drugs respectively (32). It was identified that erratic drug supply posed a major challenge among 75.6% of patients with epilepsy in a low-income countries when compared with only 17.7% epileptic patient in high-income countries [32]. The use of low-priced drugs remains critical because about 73% of the continent population survive on an arguably less than $2 a day [33]. The Bamako Initiative that was adopted by African ministers of health in 1987 has made essential drug supply on a regular basis (including phenobarbital) possible, and thus improving accessibility [34].

In the Nigerian context, patients with epilepsy suffer serious social deprivations as well as discriminations in education, employment, housing, marital life and other areas of daily living [35]. This was clearly demonstrated in this study going by our findings. In Nigeria, the public still perceived epilepsy as a highly communicable

disease with an associated high level of stigmatization [36]. This negative socio-cultural attitude continues to have a deleterious impact on the management of epilepsy, contributing to the development of complications and poor prognosis [31]. Similarly, marital and occupational challenges are among the worst nightmares of people living with epilepsy with a significantly destructive impact on daily living [37,38,39].

Based on the above discussion, there is a need for a multi-prongedstrategy to combat the treatment gap of epilepsy in sub-Saharan Africa. Serious advocacy for epilepsy to raise the awareness of this disease condition as a non-communicable disease is needed urgently at the international level. The perception of epilepsy as a non- fatal and non-disabling condition is incorrect. Moreover, the mortality rate of people living with epilepsy has been shown to be higher than that of general population by about 2-3 times [40]. Status epilepticus (prolonged uncontrolled convulsions) is a common cause of death. The suicide and the sudden unexplained death in epilepsy (SUDEP) are some of the other known causes. Some of the several complications of uncontrolled epilepsy include poor educational achievement (illiteracy), low rates of employment, and reduction in the quality of life [41]. Disability rates as well as associated costs are also higher. In 1997, there was an initiative of the Global Campaign against Epilepsy, which was aimed to bring epilepsy "out of the shadows", promoting awareness of the disease [42]. More epidemiologic research need to be done in the sub-Saharan Africa to document further the socio-economic impact of epilepsy. This will hopefully be relevant for policy makers as well as funding agencies [43].

A non-optimal drug supply mechanism has been implicated to be a major problem in three-quarters of low-income countries [44]. A cohort study conducted in a rural area of Cameroon in 2001, showed that only17.6% of the 91 participants were taking at least an antiepileptic drugs everyday [45]. In an agrarian region of Burundi, a study of 352 people living with epilepsy showed only 18 of the patients (5.1%) were taking anti-epileptic medications (all on Phenobarbital) [46]. WHO recommended medication for first line of treatment of epilepsy is phenobarbital. It is arguably the cheapest of such drugs, with an average cost of $0.12 only per daily defined dose (100mg) (WHO 2005). The

second commonly prescribed drug, phenytoin, is comparatively more expensive $0.50 per daily defined dose (300mg). Despite the fact that Phenobarbital has some significant drawbacks as a first-line anti-epileptic, it is perhaps the only drug with a wide acceptance among patients in the rural communities because most patients will have to pay for their drugs out of their pockets with little or no assistance from the government in sub-Saharan Africa [37]. The National Bureau of Statistics revealed in 2010 that 60.9% of Nigerians were living in "absolute poverty" [40]. Approximately 100million Nigerians live on less than $1 a day [33].

The rate of utilization of orthodox health care is abysmally low among the low socioeconomic class due to low level of education, poor knowledge and limited economic power. These are some of the reasons, many sufferers of stroke and epilepsy seek cheaper modes of treatment in spiritual homes (like churches, mosques), herbal houses, chemists etc.

Poverty contributes to non-adherence to treatment of known risk factors like hypertension, diabetes & hypercholesterolemia as the drugs are fairly expensive and most patients cannot afford continuity in their purchase.

Coverage of all citizens in the National Health Insurance Scheme will tackle this problem.

The scope of the National Health Insurance in Nigeria has to be expanded to cover the poor segments of the population which are most often vulnerable to epilepsy and other neurological challenges.

5. CONCLUSION

In conclusion, bridging the current gap in epilepsy and other neurological disorders care requires a lot of efforts in disseminating culturally sensitive information about these disorders and the need to seek early and proper medical care . In most communities, especially the rural settlements, people with neurological disorders are discouraged from seeking appropriate treatment due to the fear, social stigmatization and isolation, pervading superstitious beliefs, reliance on traditional healers, and the presumed high cost of treatment. Efforts should be directed towards empowering patients by improving their knowledge through community-based education programs. This will hopefully enhance drug compliance, improve the outcome of neurological

disorders, and reduce stigmatization to the barest minimum.

CONSENT AND ETHICAL APPROVAL

Ethical approval was obtained from the Research and Ethics review committee of LAUTECH Teaching Hospital Osogbo for the purpose of the study. The consent of the participants was also obtained before being enrolled in the study.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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