Prevalence of active convulsive epilepsy in an urban slum in Enugu South East Nigeria

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ABSTRACT

Purpose: To determine the prevalence of active convulsive epilepsy and treatment gap in two Urban slums in Enugu South East Nigeria.
Methods: A 3 phase cross-sectional descriptive study was done to survey individuals $\geq$15 years in 2 slums in Enugu, South East Nigeria.
Results: The prevalence of epilepsy was 6.0 (95% CI: 5.9–6.0) per 1000 (men 4.4/1000, 95% CI: 2.3–6.4, women 7.8/1000, 95% CI: 4.9–10.4), p = 0.06. The peak age of active convulsive epilepsy was 40–44 years (11.2 per 1000) with two smaller peaks at 25–29 and $\geq$50 years. The age and sex adjusted prevalence using WHO standard population and 2006 Nigerian census population were 5.9 per 1000 (95% CI: 4.0–7.9) and 5.4 per 1000 (95% CI: 3.4–7.4).
Conclusion: The prevalence of epilepsy is high in urban slums in Enugu. Nationwide studies should be done to find out the true prevalence in the country.

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1. Introduction

Epilepsy is a common neurological disorder and one of the most prevalent non-communicable disorders affecting about 70 million [1] people worldwide. In the African continent, epilepsy remains a major public health problem, not only because of the impact on health but also the socio-cultural, psychological, and economic connotations. Active epilepsy is estimated to affect 4.4 million people in Sub-Saharan Africa (SSA), whilst lifetime epilepsy is estimated to affect 5.4 million with the peak in the 3rd decade of life [2]. The high prevalence of epilepsy, especially in young adults, has important consequences for both the workforce and community structures. In a recent report from South East Nigeria, the prevalence of active convulsive epilepsy was estimated to be 4.3 per 1000 (95% CI: 2.7–5.9) [3].

Despite global advances in diagnosis and treatment of epilepsy the overall estimate of treatment gap is 56/100 (95% CI: 31.1–100.0) [4]. Apart from high prevalence rate and large treatment gap, trends in SSA suggest a large proportion of symptomatic epilepsy, higher rural prevalence, low levels of awareness and high levels of stigma [1,3,5–7].

Though a number of studies provide prevalence data about epilepsy in Nigeria [3,8,9], no study has focused on special populations such as urban slum dwellers.

2. Methods

This study was carried out in Agu-Abor and Ugbodogwu slums in Enugu East Local Government Area of Enugu State, South East Nigeria. Agu-Abor has an estimated adult population of 3000–4000 while Ugbodowu has an estimated population of 5000–7000 (based on church and local records). The overall population of Enugu East Local government is 145, 905 based on 2006 census count [10]. These settlements are located at the foot of Udi hills and together occupy an area of about 2.5–5 km^2 about 1–2.5 km from the city center. The nearest tertiary hospital. Agu-abor has no

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primary health center while Ugbodogwu has in addition to a primary school a secondary school and a primary health centers. People also access care from government health institutions within the city.

3. Study design

A 3 phase cross-sectional descriptive study was performed to survey the adult population ($\geq$15 years of age). The sample size was determined using the formula. $n = DZ_{1-\alpha/2}^2 P(1 - P)/d^2$ (Lwanga and Lemeshow 1991) [11], where d = absolute precision = 0.00215 (for a sample size lower than 5%), P = prevalence of 4.3 per 1000 = 0.0043³, D = design effect = 2, $Z_{1-\alpha/2}$ = standard normal deviate corresponding to 5% level of significance (2 sided test) = 1.96. The calculated sample size was 7116. Assuming 10% attrition, a minimum sample size of 7910 was used.

The first phase of the study was preceded by sensitization meetings in the community which included both religious and elected leaders, a 4-day training program with a review of the questionnaire, demonstration of interview technique, and back-demonstration by the interviewer. The study questionnaire was forward- and back-translated into Igbo and reviewed by bilingual individuals for accuracy. A clinic-based validation of a subset of a random sample of 50 screened individuals (25 positives, 25 negatives) was assessed by a neurologist (BAE) (blinded to screening results) who conducted a complete neurologic history, physical examination, and review of prior medical records before determining if the patient met the case definition for active convulsive epilepsy. The Igbo adapted questionnaire exhibited an overall 100% sensitivity and 96% (95% CI: 96–100) specificity (see below table). A false-positive screen occurred in an individual who had experienced repeated syncope. The positive predictive value of the instrument was 96.2% (95% CI: 91–100). Validation of the screening questionnaire (Igbo version) was carried out in Neurology clinic of the department of medicine, University of Nigeria Teaching Hospital Enugu.

Results of validation study of the Igbo version of the questionnaire.

|	True positives (%) (a)	False positives (%) (b)	False negatives (%) (c)	True negatives (%) (d)
Epilepsy	25 (100)	1	0	24

Diagnostic accuracy = (a + d)/N = 98%.
Sensitivity = a/(a + c) = 100%.
Specificity = d/(b + d) = 96%.
Positive predictive value = a/(a + b) = 96.2%.
Negative Predictive value = d/(c + d) = 100.

During the second phase of the study, a door-to-door survey by teams of trained research assistants was performed. In this phase the research instrument for screening neurological disorders in the community by Osuntokun et al. [9] was administered to identify persons with at least one life time episode of convulsion. Each questionnaire had a unique identification number and the three letter initials of the subjects clearly written on them during the house to house interview. Using a simple random sampling technique all consecutive consenting individuals in each of the settlements were interviewed until the minimum sample size was reached. The WHO STEPS instrument [12] was used to collect data on selected socio-demographic characteristics and lifestyle behaviors. The inhabitants of Agu-abor were surveyed over a 4-week period (August 12–September 9, 2013), while Ugbodogwu inhabitants were surveyed between November 25 and December 21, 2013. A positive history of convulsions at this stage resulted in the invitation of the individual to the clinic for the third phase of the study.

The third phase of the study was conducted at temporary clinics at the study sites. Cases identified during the second phase were interviewed by the primary investigator and a doctor not below the rank of a senior registrar in the department of medicine. The 2nd and 3rd stages ran concurrently and lasted for 6 weeks. Only subjects who had at least one lifetime episode of convulsion who reported to the clinic were included in this stage.

The exclusion criteria were refusal to participate and lack of basic knowledge of Igbo language. A minimum age of 15 years was chosen during the design of the study for three reasons: (1) to avoid recruiting students (primary and junior secondary) who were having end of year examinations at that time; (2) the anticipated difficulty in getting consent from parents; (3) the validation study was performed only in subjects within the same age group. The study of active convulsions was chosen to reduce the possibility of recall bias especially among older individuals. Non Igbos were excluded in view of the questionnaire only being validated in Igbo. Furthermore all the investigators and community health workers were Igbos.

Flow chart.
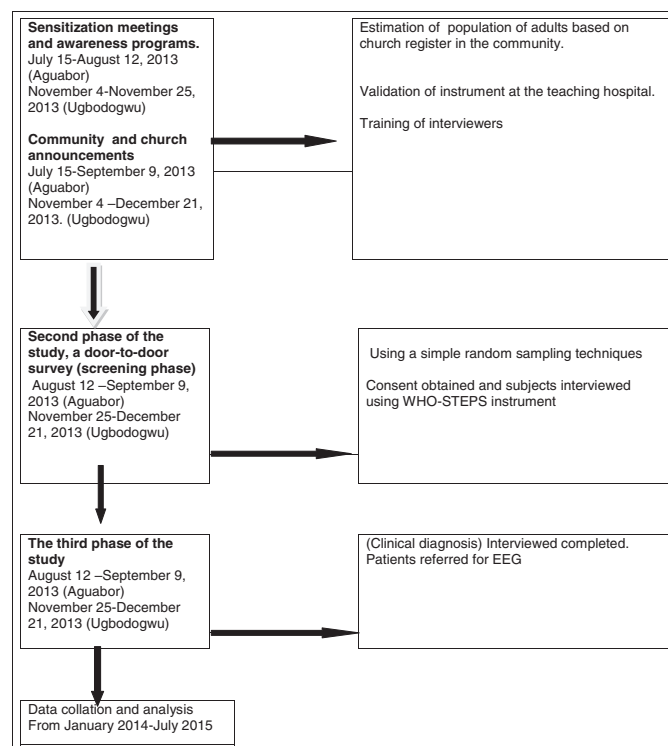
The study protocol was reviewed on behalf of State (Enugu State) Ministry of Health by the Ethics committee of the Enugu State University of Science and Technology Teaching Hospital and University of Nigeria Teaching Hospital, Enugu. All participants gave their informed consent after reading or having the consent form read for them.

To encourage subject participation free basic medical checks such as blood pressure, fasting blood glucose, urine analysis and electrocardiogram were offered to all for free at the clinic. During the third phase all cases with a history of a convulsion were reviewed.

4. Case definition

An active epilepsy case was defined as anyone on treatment for epilepsy or with a history of recurrent seizures with the most recent occurring in the past 5 years if the seizure(s) was not