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Prevalence of Epilepsy in Port Harcourt, Rivers State.

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ABSTRACT
Epilepsy is the most common neurologic diseases in developing countries including Nigeria. It is an important health problem in these countries, where its prevalence can be up to 57 per 1000 population. The aim of this study was to determine the prevalence of epilepsy in Port Harcourt, Rivers State, Nigeria from 2010-2015. The study was analytical in design, retrospective in approach. Hospital records were accessed and epilepsy case files were reviewed and recorded. A total of 1179 epilepsy case files were found and reviewed. The prevalence was then calculated and expressed per 1000 of the population. The outcome of the research reported a prevalence rate of 0.8/1000 (at CI=95%, 0.29-1.31). 60.39% of the cases were males and 39.61% were females. Highest percentage of the cases were within the age group 21-30 (33.08%) and the lowest percentage were within the elderly 61 and above. Almost half of the epileptic cases were students (49.19%), 28.84% of the cases were working and 21.97% of the cases neither work nor school. Psychosis was reported in 7.8% of the cases and 57.61% of the psychosis cases were males while 42.39% were females.The prevalence rate of epilepsy in Port Harcourt, Rivers State, Nigeria from 2010-2015 is low compared to those of developing countries. The low prevalence might be as a result of the many health Institutions in the city.

Keywords: epilepsy, Seizure, Prevalence and Port Harcourt.

INTRODUCTION
Epilepsy is the most common non-infectious neurological disease in developing countries, including Nigeria[1]. It is estimated that the condition affects approximately 50 million people worldwide, around 40 million of them living in developing countries[2]. Epilepsy is an important health problem in developing countries, where its prevalence can be up to 57 per 1000 population. The prevalence of epilepsy is particularly high in Latin America and in several African countries, notably Liberia, Nigeria, and the United Republic of Tanzania. According to the International League Against Epilepsy (ILAE), approximately 50 out of every 100,000 people develop epilepsy each year in industrialized nations, and there are twice as many people in developing nation, such as Nigeria. From the small number of community-based studies available, the point prevalence of epilepsy varies from 5.3 to 37 per 1000 in Nigeria[3].

Parasitic infections, particularly neurocysticercosis, are important etiological factors for epilepsy in many of these countries. Other reasons for the high prevalence include intracranial infections of bacterial or viral origin, perinatal brain damage, head injuries, toxic agents, and hereditary factors. Many of these factors are, however, preventable or modifiable, and the introduction of appropriate measures to achieve this could lead to a substantial decrease in the incidence of epilepsy in developing countries.

The prevalence of epilepsy in industrialized countries is about 3-9 per 1000 population.
Most of the prevalence data available for developing countries are based on community surveys of rural populations. Such surveys, in general, have employed a two-phase design;

- The first phase consisting of screening interviews by field workers, and
- The second phase comprising medical evaluation by neurologists.

But this study was a retrospective one based on records from hospitals.

The National Institute of Mental Health (NIMH) defines prevalence as the proportion of a population who have or had a specific characteristic in a given time period. This characteristic is usually an illness, a condition or a risk factor in the field of medicine.

Prevalence is calculated if one has information on the characteristics of the entire population of interest. It is

estimated if one has information on the samples of the population of interest. As stated by the National Institute of Mental Health (NIMH), prevalence is expressed as a percentage (5%, or 5 people out of 100), or as the number of cases per 10,000 or 100,000 people, depending on how common the illness or risk factor is in the population. Prevalence can also be expressed per 1000 of the population[4].

Prevalence is measured and reported in several ways according to the time frame for the estimate. Shakirullah[4] stated that point prevalence is the proportion of a population that has the characteristic at a specific point in time while period prevalence is the proportion of a population that has the characteristic at any point during a given time period of interest (one year is the commonly used time frame) and lifetime prevalence is the proportion of a population who, at some point in life up to the time of assessment, has ever had the characteristic.

Osuntokun[1] researched on the prevalence of epilepsy in Nigerian Africans. The research was carried out in Igbo-Ora, a large Nigerian town with a population of about 20,000. The outcome of the research reported 101 individuals (48 males and 53 females) who suffered from active epilepsy (5.3 cases/1,000) on prevalence day. The highest age-specific prevalence ratios occurred in those below age 20. The most common of the identifiable seizure types was complex partial seizures (52 cases).

A research on the prevalence of epilepsy was carried out in Udo, a rural community in Edo State, Nigeria. It was a community based study, and was reported a prevalence rate of 6.2 per 1,000 among the residents[5].

[2]also carried out a research on Epidemiology of epilepsy in developing countries. The prevalence data were obtained through community surveys of rural populations. The researched reported a high prevalence of epilepsy up to 57 per 1000 population, particularly in Latin America and in several African countries, notably Liberia, Nigeria, and the United Republic of Tanzania. Parasitic infections, particularly neurocysticercosis, were reported as important etiological factors for epilepsy in many of these countries. Other reasons for the high prevalence according to the research include; intracranial infections of bacterial or viral origin, perinatal brain damage, head injuries, toxic agents, and hereditary factors.

MATERIALS AND METHODS

Study Design

This research is an analytic research which applied a retrospective approach to determine the prevalence of epilepsy in Port Harcourt, Rivers State. The population of the study consist of all inhabitants of the city of Port Harcourt, Rivers State. The National Population Commission as of 2010 compiled the population of Port Harcourt to be 1,390,895 people. The Area of study was the University of Port Harcourt Teaching Hospital, Alakhia and the Neuropsychiatric Hospital, Rumugbo, all in Port Harcourt, Rivers State, Nigeria.

Determination of Sample Size: The sampling technique used for this research was the purposive sampling, a type of non-probability sampling, where only epilepsy cases constitute the sample. The Taro Yamane size determination formula was used to determine the minimum sample size (n) required for the study. The Taro Yamane formula is given as follows;

$$n = \frac{N}{1 + N(e)^2}$$

n = Minimum sample size,
N = Population size (1,390,895),
e = Significant level (0.05).

$$n = \frac{1{,}390{,}895}{1 + 1{,}390{,}895\,(0.05)^2}$$

$$= 399.88,$$

$$\approx 400.$$

Inclusion and Exclusion Criteria: Epilepsy case files from 2010-2015 of all ages, sex, occupation and place of origin that resides in Port Harcourt were included in this study. Also, cases of psychosis associated epilepsy were also included in the study. Epilepsy cases that were recorded outside 2010-2015 were excluded. Also epilepsy cases that do not reside in Port Harcourt were excluded from the study. Seizure cases as a result of other causes other than epilepsy were not reviewed in the study.

The research was analytical in design and involved a review of medical records of epileptic cases. The hospital registers for the years 2010, 2012, 2013, 2014 and 2015 were thoroughly scanned through and epilepsy cases file numbers were recorded. The epilepsy case files for the years mentioned above were sorted out using the case file numbers. Case files of those living outside Port Harcourt were removed and the case files were counted and reviewed. Information on the case files such as the year the case was first reported, the age of the subject when the case was first reported, the sex of the subject, the occupation of the subject, and the diagnosis on the case file were recorded. The data recorded in notebooks, were entered into Microsoft excel 2013 sheet, and grouped into age, sex, occupation, diagnosis and year.

Calculation for the Prevalence of Epilepsy in Port Harcourt

The prevalence was calculated in the form of percentage, then expressed per 1000 of the population.

It was calculated as follows;

$$\text{Prevalence (\%)} = \frac{\text{Sample size} \times 100}{\text{Population size}}$$

$$\text{Prevalence (per 1000)} = \frac{\text{Sample size} \times 1000}{\text{Population size}}$$

Calculation for Percentage Distribution of Epilepsy with Sex

The frequency of epilepsy between the sexes was expressed in percentage of the sample size. It was calculated as follows;

$$\text{Percentage of male cases} = \frac{\text{No. of male cases in the sample size} \times 100}{\text{Sample size}}$$

$$\text{Percentage of female cases} = \frac{\text{No. of female cases in the sample size} \times 100}{\text{Sample size}}$$

Percentage Calculations for the Frequency Distribution of Epilepsy with Age

Microsoft excel was used to calculate the mean, median, mode standard deviation and variance of the ages. The minimum and maximum ages were also determined using Microsoft excel.

The relationships between epilepsy and age groups were expressed in percentage. They were calculated as follows;

$$\text{Percentage of cases in age group y} = \frac{\text{No. of cases in age group y} \times 100}{\text{Sample Size}}$$

Where y represents age group in question.

Calculations for Percentage Frequency of Epilepsy with Occupation

The frequency of epilepsy among the occupations of the subjects was expressed in percentage. They were calculated as follows;

$$\text{Percentage of cases working} = \frac{\text{No. of cases in the working class} \times 100}{\text{Sample size}}$$

$$\text{Percentage of cases Schooling} = \frac{\text{No. of cases in the student class} \times 100}{\text{Sample size}}$$

Percentage of cases not working/schooling was calculated as follows;

100% – (Percentage of cases working + Percentage of cases schooling).

Calculations to Determine the Percentage of Subjects Associated with Psychosis

The proportion of subjects who have epilepsy associated with psychosis was expressed in percentage. It was calculated as follows;

$$\frac{\text{No. of cases in the epilepsy + psychosis class} \times 100}{\text{Sample size}}$$

Statistical Analysis

The data were presented in the form of bar chart, percent prevalence and prevalence per 1000. The prevalence was reported with 95% confidence level and the confidence interval was calculated using the McCallum Layton Stat calculator 2016. Chi Square was used to analyse the relationships between the groups. This was carried out using IBM SPSS Statistics 22.

Chi Square was calculated using IBM SPSS Statistics 22. The formula for calculating Chi Square is given below;

$$X^2 = \sum (\text{Observed value} - \frac{\text{Expected value})^2}{\text{(Expected Value)}}$$

Degree of freedom, df = –

RESULTS

The outcome of the research, reported a prevalence rate of 0.08% or 0.8/1000 (CI= 95%, 0.29-1.31) i.e. 0.8 out of every 1,000 people in Port Harcourt develop epilepsy from 2010-2015. The results are presented in the tables and charts below.

Table 1: Showing Results for the Percentage and Frequency Distribution of Epilepsy from 2010-2015.

Year	2010	2012	2013	2014	2015	Total
Frequency	218	246	220	174	321	1179
Percentage (%)	18.49	20.87	18.65	14.76	27.23	100

The table shows that the highest prevalence was reported in 2015 and the least was reported in 2014.

Table 2: Showing Results for the Percentage and Frequency Distribution of Epilepsy with Sex.

Sex	Female	Male	Total
Frequency	467	712	1179
Percentage (%)	39.61	60.39	100

From the table above, a higher percentage of the epilepsy cases were males (60.39%).

Table 3: Showing Results for the Percentage and Frequency Distribution of Epilepsy with Age.

Age Group	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	Total
Frequency	121	303	390	223	80	46	9	5	1	1	1179
Percentage (%)	10.26	25.70	33.08	18.91	6.79	3.90	0.76	0.42	0.08	0.08	100

The table above shows that the highest percentage of the epilepsy cases were within the age group 21-30 while the least percentage of the cases were within age group 71-80 and 81-90.

Table 3: Showing Results for the Percentage and Frequency Distribution of Epilepsy with Occupation.

Occupation	Not Working	Students	Working	Total
Frequency	259	580	340	1179
Percentage (%)	21.97	49.19	28.84	100

From the table above, the highest percentage of the epilepsy cases were students (49.19%) while the least percentage were not working (21.97%).

Table 4: Showing Results for the Frequency and Percentage Distribution of the Diagnosis.

Diagnosis	Epilepsy	Epilepsy + Psychosis	Total
Frequency	1087	92	1197
Percentage (%)	92.20	7.80	100

The table above shows that 7.80% of the epilepsy cases has psychosis associated epilepsy.

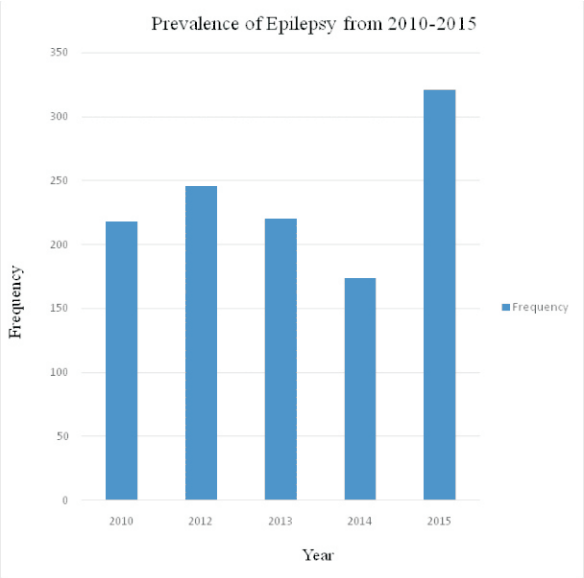

Figure 1: Representation of the Frequency Distribution of Epilepsy from 2010-2015.

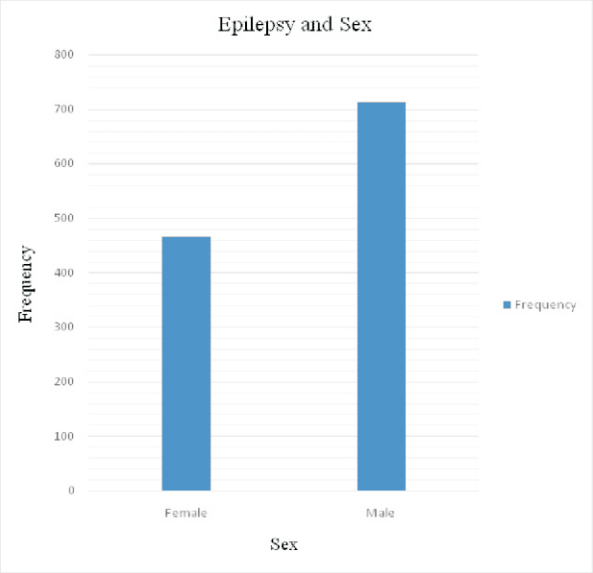

Figure 2: Representation of the Frequency Distribution of Epilepsy with Sex.

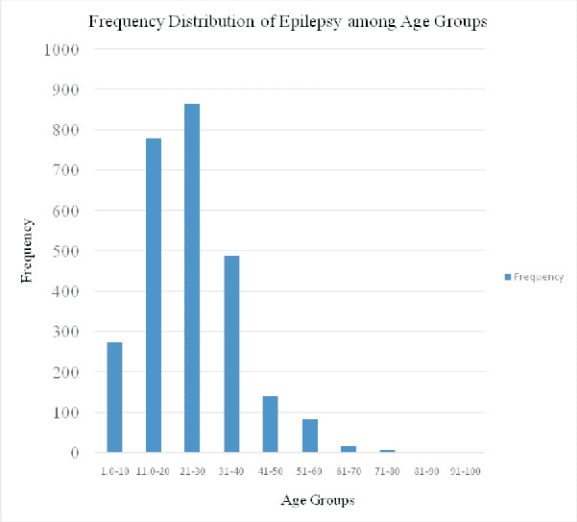

Figure 3: Representation of the Frequency Distribution of Epilepsy with Age.

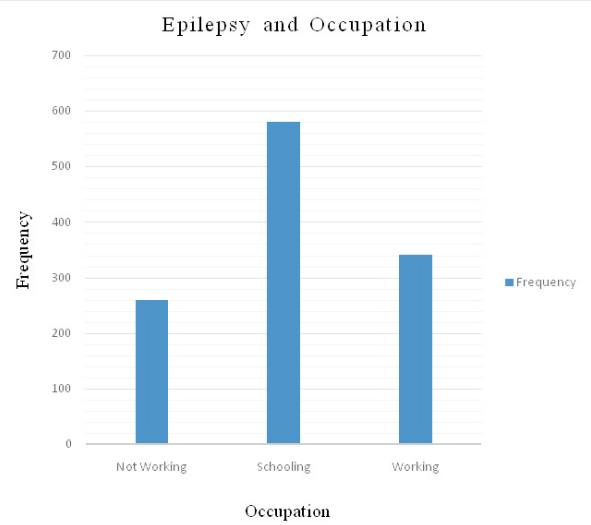

Figure 4: Representation of the Frequency Distribution of Epilepsy with Occupation.

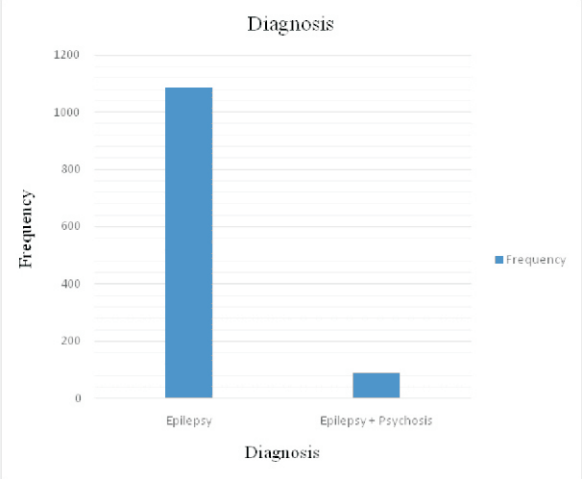

Figure 5: Representation of the Frequency Distribution of the Diagnosis.

Table 6: Showing the Chi Square Test for Relationship between Epilepsy and Age.

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	18.723[a]	9	.028
Likelihood Ratio	21.851	9	.009
N of Valid Cases	1179		

a. 8 cells (40.0%) have expected count less than 5. The minimum expected count is .08.
b. Significant at p<0.05

Table 7: Showing the Chi Square Test for Relationship between Epilepsy and Sex.

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.323[a]	1	.570		
Continuity Correction[b]	.209	1	.648		
Likelihood Ratio	.321	1	.571		
Fisher's Exact Test				.580	.322
N of Valid Cases	1179				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 36.44.

b. Computed only for a 2x2 table

c. Significant at p <0.05

Table 8: Showing the Chi Square Test for Relationship between Epilepsy and Occupation.

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.269[a]	2	.874
Likelihood Ratio	.267	2	.875
N of Valid Cases	1179		

a. 0 cells (.0%) have expected count less than 5. The minimum expected countis 20.21.
b. Significant at p <0.05.

The analysis showed that at p <0.05, there is no statistical significant association between epilepsy and sex, and between epilepsy and occupation i.e. both sexes can equally develop epilepsy regardless of their occupation. However, there is a statistical significant relationship between epilepsy and age i.e. the chances of developing epilepsy is higher in some age groups.

DISCUSSION

The outcome of the research, reported a total of 1,179 different cases of epilepsy from 2010-2015, thus a prevalence rate of 0.8/1000 i.e. 0.8 or every 1,000 people in Port Harcourt develop epilepsy from 2010-2015. It was observed that most of the cases were reported in 2015 (27.23%), followed by the year 2012 (20.87%). The least case was reported in 2014 (14.76%). In 2014, it dropped significantly to 14.76% and almost doubled to 27.23% in 2015. The increase in figures in 2012 and 2013 from 2010 must have been some lapses in the health care systems and in the government of Port Harcourt, Rivers State. The government and health care organizations in Port Harcourt should review the policies they made in 2014 and improve on it so as to reduce the risk of developing epilepsy. The rise in 2015 shows that the current medical policies are favouring epilepsy development and if nothing is done about it, it may continue to rise continuously in 2016 and afterwards.

The research reported a higher percentage of epilepsy cases in males (60.37%) and a lower percentage (39.61%) in females. The higher percentage in male cases might be as a result of male exposure to more tedious jobs that increases the risk of head trauma in

males and more consumption of alcohols and drugs by males in the society.

Results from the research showed peak in age groups 21-30 years and 11-20 years (33.08% and 25.70%. respectively). Two other peaks were seen in age groups 31-40years and 1-10years (18.91% and 10.26% respectively) but not as high as the former ones and the highest peak was among age group 21-30 years. It occurrence in the elderly was observed to be very low as very low percentages were observed in ages from 60 and above. Epilepsy affects all ages as cases as young as 2 years old and as old as 94 years old were among the samples. The mean age was 26.18, the median age was 25 and the modal age was 25. These central of tendencies statistics showed that epilepsy is more common among people between the ages 25-26 in Port Harcourt. The disease is more spread among men as it ranges from age 2-94 years old in males and age 2-72 years old in females, as observed from the research. It is most prevalent in men in their 30s and females in their 25 as the research reported a modal age of 30 and 25 years old for males and females respectively.

Also, the highest percentage of epilepsy cases were reported among the students with 49.19% of the cases reported schooling. This explains why the highest percentage of the cases fall under the age group 21-30 years as majority of the students in tertiary institutions fall under that age group. The working class constituted 28.84% and the least percentage was observed in the group not working (21.97%). Students constitute the majority of the epilepsy cases from the research, this may be due to the high tasking mental challenges they face in school and tertiary institutions. A high percentage-compared to the percentage of those working (26.00%)-of the epilepsy cases (20.34%) do not work, this may be due to the social stigma epilepsy patients face in the society. Epilepsy enlightment programs and media should be used to enlighten the society on epilepsy.

Result of the research showed that psychosis associated epilepsy occurs in 7.80% of epileptic cases i.e. 78 out of every 1,000 epileptic cases have psychosis associated with epilepsy. Psychosis associated epilepsy is more frequent in male epileptic cases (57.61%) and less frequent in female epileptic cases (42.39%). The minimum age of the psychosis associated epilepsy cases was 4years old and the maximum age was 71years old. This result shows that only a small number of epileptic cases have mental issues contradictory to the societal view of epilepsy in this part of the world. The higher prevalence in the male epileptic cases as compared to the female epileptic cases might be due to more consumption of hard drugs by male in the society.
From the findings of the research the prevalence rate of epilepsy in Port Harcourt, Rivers State, Nigeria from 2010-2015 is 0.8/1,000. This is quite low compared to the proposed figure put by Akinsulore[3], 5.3-37/1000 prevalence rate of epilepsy in Nigeria. [1]reported a prevalence rate of 5.3/1000 in a rural community in Igbo-Ora, Longe *et al.* stated a prevalence rate of 6.2/1000 in Udo, a rural community in Edo State.

Osakwe[6] documented a prevalence rate of 20.8/1000 in a rural community in Benue State and 4.7/1000 in a semi-urban area in Ebonyi State. Senanayake[2] reported a prevalence rate of 57/1000 in developing nations. Mustapha[7] reported a prevalence rate of 4.5/1000 in a rural riverine community in south-east Nigeria. In the most recent studies[8], recounted a prevalence rate of 4.3/1000 in a sub urban community in south-east Nigeria and Ezeala-Adikaibe[9] reported a prevalence rate of 6.0/1000 in an urban slum in Enugu. The result from the research is significantly lower than the previous studies mentioned above. This may be due to the following reasons; the studies mentioned above were carried out in rural and semi urban communities where there are not many well equipped medical facilities and health care systems like Port Harcourt, which is a well-defined urban area and all the studies mentioned above were community based studies, where a door-to-door survey were carried out unlike the approach in this research which is analytical using retrospective approach. The difference in methodology could have resulted in the difference in results. However, the result from the study is line with Shakirullah[4] findings in Sudan where a prevalence rate of 0.9/1000 was reported.

The result of the research showed that a higher percentage of males are affected by epilepsy (60.39% of the cases are males and 39.61% are females) therefore, a higher prevalence is reported in males. This is in line with the findings of Sridharan research on prevalence and pattern of epilepsy in India where a higher prevalence was reported in males. This result also corresponds with Nwani[8] findings on the epidemiology of active epilepsy in suburban community, southeast Nigeria where a higher prevalence in males was reported but the result contradicts the findings of Ezeala-Adikaibe[9] on the prevalence of active convulsive epilepsy in Enugu where a higher prevalence was reported in females.

This findings of the research shows a higher prevalence among the younger citizens (30 and below), this corresponds with Osuntokun[1] findings on the prevalence of epilepsy on Nigerian Africans, Sridharan[10] findings on the prevalence and pattern of epilepsy in India, Osakwe[6] findings on epilepsy prevalence, potential causes and social beliefs in Ebonyi state and Benue State, Nigeria. The result however was not in line with Ezeala-Adikaibe[9] findings on the prevalence of active convulsive epilepsy in Enugu where a peak prevalence was reported among age group 40-44 years, though it was in line with Ezeala-Adikaibe[9] findings which also reported a high prevalence rate among age group 25-29 years.

From the result of the research, 7.8% of epilepsy cases have psychosis associated epilepsy and reported a higher prevalence of psychosis associated epilepsy in males. The former is in line with Clancy[11] findings that 6% of epilepsy cases are associated with psychosis in a research titled; the prevalence of psychosis in epilepsy. But Tunde-Ayinmode[12] in a research; prevalence and clinical implications of psychopathology in adults with epilepsy seen in an outpatient clinic in Nigeria, reported a higher percentage of psychosis in female epileptic cases-contradictory to the findings of the research. The difference in results might have been due to the differences in the population ratio of males and females in areas the research were conducted.

CONCLUSION

In conclusion, the prevalence rate of epilepsy in Port Harcourt, Rivers State, Nigeria from 2020-2015 is comparable to the prevalence rate proposed by the International League Against Epilepsy (ILAE) for developed countries, 1/1000. This very low prevalence rate from 2010-2015 can be attributed to access to many health institutions and facilities in the city of Port Harcourt. Quite a high percentage of the epilepsy cases neither work nor school, this is evidence

that the disease affects ones social life. Epilepsy enlightment programs should be set up all over the city of Port Harcourt to reduce the stigmatization of the patients of epilepsy so they can go about their normal social life. Also, parents and well-wishers of the patients should ensure they go for regular counselling on the social aspects of their life. Finally, the percentage of psychosis in epilepsy is quite low according to the research, knowledge of this to the public will also help reduce the stigmatization of epilepsy.

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