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Original Article

PREVALENCE OF DEPRESSION AMONG ADULTS LIVING WITH HIV/AIDS IN URBAN-RURAL NORTHWEST SENATORIAL DISTRICT, AKWA IBOM STATE, NIGERIA

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ABSTRACT

Background: Human Immunodeficiency Virus and Acquired Immunodeficiency Syndrome (HIV/AIDS) is an important public health issue, leading to significant morbidity and mortality especially in low- and middle-income nations. In recent times, people living with HIV (PLHIV) have experienced an increase in life expectancy. Despite the attainment in longevity, neuropsychiatric disturbances, such as depression remains an important health issue of concern among people living with HIV/AIDS (PLHIV) that negatively affects their quality of life and treatment outcomes. Mental health disorders are among the most prevalent co-morbidities in PLHIV, and depression is the most common neuropsychiatric disorder among PLHIV. Disparity in the place of residence (urban and rural) is a contributory factor to the rising prevalence of depression in PLHIV. In our environment, clinical assessment, and care of depression in PLHIV have not received the necessary attention. Thus, the need to bring to the fore the magnitude of this problem and the associated factors of depression in PLHIV.

Methods: We conducted a hospital-based comparative cross-sectional study using a mixedmethods approach for data collection. The quantitative component involved 693 adults living with HIV (349 urban and 344 rural) who were receiving treatment at four selected health facilities (2 urban and 2 rural) in the northwest senatorial district of Akwa Ibom State. A multi-staged sampling technique was employed for selecting the Local Government Areas (LGAs), study sites, and participants. Data were collected using an interviewer-administered semi-structured questionnaire to assess the prevalence of depression and adherence to antiretroviral medications. Depression was measured using the Hamilton Depression Rating Scale, while adherence was evaluated using the Brief Medication Questionnaire self-report tool.

Descriptive statistics, including frequencies, proportions, medians, and interquartile ranges, were used to summarize the data, with findings presented in tables and charts. Chi-square tests and Fisher's exact tests (for cells with values less than 5) were applied to examine associations between categorical variables. Differences in means were assessed using t-tests, and non-parametric tests, such as the Mann-Whitney U test, were used where appropriate. The level of significance was set at 5%

Results: The study found that respondents aged 31-35 years were the largest age group, with rural respondents having a slightly higher median age than urban ones, though not statistically significant. A higher proportion of urban respondents were married, traders, and earned less than 10,000 naira monthly, while rural respondents had more unemployment, widowed individuals, and household members with HIV. A total of 258 (37.2%) respondents were depressed with the significantly higher prevalence in rural areas (47.1%) than urban areas (27.5%) (p<0.001), with rural respondents more likely to have severe depression. Logistic regression revealed income, living conditions, side effects from ARTs, and prior perceived depression as significant factors associated with depression in both rural and urban areas. Models explained 24% of variation in urban areas and 44.8% in rural areas.

Conclusions: the prevalence of depression among PLHIV was high, with those from rural facilities being significantly higher. The recommendation to the government and health authorities is that mental health services should be included as a core component of HIV/AIDs care and treatment services in Akwa Ibom state. Awareness and sensitization against stigma and discrimination of PLHIV need to be increased among the general population.

Keywords: HIV/AIDS, Depression, People living with HIV, Adherence, Urban, Rural

INTRODUCTION:

Depression is defined as the pathological mood disturbance of a person characterized by negative beliefs, feelings, and attitudes in relation to the environment. It refers to a common mental disorder, characterized by persistent sadness and a loss of interest in activities that one normally enjoys, accompanied by an inability to carry out daily activities. It is also characterized by feelings of guilt, low self-esteem, and loss of appetite both for food and or sleep, low energy and poor sense of coordination. The term depression can be used in three different ways: symptom, syndrome, and disease. As a symptom, it indicates the presence of other psychotic disorders. As

a syndrome, it relates to processes with the following features sadness, inhibition, guilt and stability; and as a disease, in its own right, it is a disorder mainly of biological original for which clinical prognosis and specific treatment can be established. For complete diagnosis and treatment, the three connotations of depression should be adopted so that it does not emphasize only an organic aetiology and embodies the tripartite biological, psychological and social composition of humans (Luma HN *at al*, 2017)

Approximately, 300 million people are currently living with depression, equivalent to 4.4% of the world's population (Awofala AA, Ogundele OE, 2017). It is the fourth leading cause of disability worldwide, and it will become the second leading cause of disability by 2020 (Global HIV & amp; AIDS statistics, 2019). Depression is ranked by WHO as the single largest contributor to global disability and non-fatal health loss. (Kharsany ABM, 2016)

The lifetime prevalence of depression ranges from 20-25% in women and 7-12% in men (Karim QA, 2016). Studies have revealed that depression is a significant determinant of quality of life and survival, accounting for approximately 50% of psychiatric consultations and 12% of all hospital admissions (Bashorun A, 2014). It is also known to affect people of all races with its prevalence being unequally distributed across continents, regions, and countries. For instance, the prevalence varies by WHO region, from as low as of 2.6% among males in the Western Pacific Region to 5.9% among females in the African Region (UN Joint Programme on HIV/AIDS (UNAIDS).

Human Immunodeficiency Virus and Acquired Immunodeficiency Syndrome (HIV/AIDS) is a major pandemic that has remained an important public health challenge causing significant morbidity and mortality in low and middle-income nations. It has had devastating and deleterious effects on the health and economy of nations, adversely affecting the socio-economic development of such nations with a resultant increase in poverty and reduced life expectancy.

In 2018, 37.9 million people were living with HIV globally with an estimated 1.7 million new infections as of the end of 2018 (UNAIDS, 2014). AIDS-related deaths at the end of the same period were 770,000 bringing the total number of people who died from AIDS-related illness to 32.0 million since the inception of the pandemic (UNAIDS, 2014). Sub-Saharan Africa (SSA) which is home to just 12% of the global population, accounts for 71% of the global burden of

HIV infection (UNAIDS, 2014). Ten countries, mostly in southern and eastern Africa, viz. South Africa (25%), Nigeria (13%), Mozambique (6%), Uganda (6%), Tanzania (6%), Zambia (4%), Zimbabwe (6%), Kenya (6%), Malawi (4%) and Ethiopia (3%), account for almost 80% of all people living with HIV worldwide as embedded in Global HIV & amp; AIDS statistics(UNAIDS, 2014).

Nigeria with the second largest HIV epidemic in the world and one of the highest rates of new infection in SSA has 3.2 million people currently living with the virus.(Bashorun A, 2014) The overall adult HIV prevalence in Nigeria has however experienced a decline from 3.4% in 2012 to 2.9% to 1.9% as reported in the 2018 Nigeria HIV/AIDS Indicator and Impact Survey (NAIIS)(NAIIS, 2018). This observed decline is largely attributable to the enormous benefits of antiretroviral therapies (ARTs).(NAIIS, 2018) The 2018 NAIIS report also revealed the southsouth region of Nigeria as having the highest prevalence of HIV/AIDS with a rate of 3.1% compared to the Northwest with a prevalence of 0.6%.(NAIIS, 2018). This survey further revealed that Akwa Ibom State, which is the site for this study, has the highest prevalence of HIV/AIDS infection in the country with a prevalence rate of 5.5%. With the advent of highly active antiretroviral therapy (HAART)-more than three decades now, morbidity and mortality due to HIV/AIDS has significantly reduced resulting in an increase in life expectancy. For people living with HIV who are optimally treated with ARTs, their life expectancy may approach that of HIV-uninfected population. Despite the attainment in longevity, neuropsychiatric disturbances, such as depression remains an important health issue of concern among people living with HIV/AIDS (PLHIV) that negatively affects their quality of life and treatment outcomes (Kharsany ABM, Karim QA).

A complex relationship exists between depression and HIV infection. Depression is both a risk factor and a consequence of HIV infection. In PLHIV, factors that contribute to depression include the presence of co-morbid health conditions, having to cope and adjust to the prospects of the illness and death, neurobiological changes related to the persistent central nervous system HIV infection, social stigma, sexual dysfunction and the side effects of ART. Depression as an illness could inspire behaviours that would increase the likelihood of acquiring HIV infection that is because it predisposes people to risky sexual behaviour which can lead to the acquisition of the

virus; the virus, in turn, can cause direct damage to the brain resulting in depression (Abah RC, 2014).

Additionally, depression in PLHIV is also known to cause absenteeism at the workplace, decrease productivity in all endeavours, resulting in tremendous negative effects on the socioeconomic development of a nation (Abah RC, 2014). People who suffer from depression are nearly 28 times more likely to miss work because of emotional instability (Sabitu K, et al 2014). This may result in their constituting a burden to themselves, family and society at large.

Disparities in the place of residence (urban and rural) has been shown to be a contributory factor to the rising prevalence of depression in PLHIV (Phillips A.2013). Globally, rural environments pose unique challenges and opportunities to health and wellbeing. Studies has shown that HIV care in rural areas is substandard compared to HIV care in urban areas: PLHIV in the rural communities experience greater obstacles to care, see less experienced HIV providers, and are less likely to receive ARTs or prophylaxis against Pneumocystis pneumonia compared to their urban counterparts (Phillips A.2013). Accordingly, research has shown that mortality in rural persons living with HIV is higher than their urban counterparts (Nakagawa F, 2013). Furthermore, the prevalence of depression in PLHIV in the rural communities is higher than their counterparts in urban communities and their understanding and perception of depression differ among both study population (Nakagawa F, 2013). One study hypothesized that inadequate social support was a major contributor to depression in PLHIV in rural areas and the support services for HIV care in rural areas and the support services for HIV care in rural communities are absent or weak (Nyongesa MK).

Depression and HIV/AIDS co-morbidity pose significant challenges to public health, particularly in resource-limited settings. However, there is a notable paucity of information comparing adherence and associated factors between rural and urban populations affected by this dual burden in Akwa Ibom State, Nigeria. This lack of data creates a critical gap in understanding the interplay between depression and HIV/AIDS within different geographical contexts in Nigeria, where socioeconomic and cultural disparities may influence health outcomes.

The study aims to offer valuable insights into the prevalence of depression among PLHIV in rural and urban areas, enabling healthcare providers to develop a heightened awareness and suspicion

of depression in this population. This is critical for ensuring early diagnosis and the initiation of appropriate management strategies that can improve overall outcomes for PLHIV.

Additionally, the findings from this study will provide evidence-based data for policymakers, non-governmental organizations, and international health agencies to design targeted interventions that address the unique challenges faced by PLHIV in rural and urban settings. By investigating perceptions of depression among PLHIV, the study will also shed light on the stigma associated with both HIV/AIDS and mental health conditions. It will explore how these perceptions influence health-seeking behaviors and highlight strategies suggested by PLHIV themselves to address their mental health needs effectively.

Our study seeks to determine and compare the prevalence of depression among adults living with HIV/AIDS in rural and urban areas of selected health facilities in the North-West Senatorial District of Akwa Ibom State, Nigeria, during the period of May to July 2021. The findings will contribute significantly to addressing the dual burden of depression and HIV/AIDS, improving the quality of life for affected individuals, and guiding public health interventions in Nigeria.

Specific objectives

To determine the prevalence of depression among PLHIV in selected rural and urban health facilities in north-west senatorial district, Akwa Ibom state.

To identify the factors associated with depression among PLHIV in selected urban and rural health facilities in north-west senatorial district, Akwa Ibom state

To explore the perception of depression among PLHIV in the selected urban and rural health facilities in north-west senatorial district, Akwa Ibom State.

Materials and Methods

Study Area: The study was conducted in the northwest senatorial district of Akwa Ibom state, Nigeria. Akwa Ibom state is one of the six (6) states that make up the South-South geopolitical zone of Nigeria with its administrative headquarters in Uyo. It was created on the 23rd of September 1987 by the military administration under General Ibrahim Babangida. The state is also a part of the Nigeria's Niger Delta region, which is an agglomeration of the nine oil-producing states in the country alongside Abia, Bayelsa, Cross River, Delta, Edo, Imo, Ondo, and

Rivers States. The state occupies a landmass 7,249km2 bounded by Abia State, the Atlantic Ocean, Cross River, and Rivers state in the north, south, east, and west respectively. Geographically, the state lies between Latitudes 40 32' and 50 33' north and longitudes 70 35' and 80 25' East. The state has 31 LGAs constituting 4% of the country's aggregate of 774 LGAs. It has three dominant languages: Ibibio, Annang, and Oron with minor sub-groups Eket, Ibeno, Itu Mbonuso and the Andonis.Christianity is the predominant religion. There are three senatorial districts in Akwa Ibom state: Akwa Ibom north-east (Uyo senatorial district), Akwa Ibom northwest (Ikot Ekpene senatorial district), Akwa Ibom south (Eket senatorial district). Akwa Ibom state has a total of 462 public health facilities, out of which 106 are health post, 312 primary health centers (PHCs), 43 secondary health facilities and 2 tertiary hospitals. The northwest senatorial district has a projected population of 1,327,783.215 It is made up of 10 LGAs: Abak, Essien Udim, Etim Ekpo, Ika, Ikono, Ini, Obot Akara, Oruk Anam, and Ukanafun. It is bounded in the north by Ikono LGA and Abia state, In the south by Ikot Abasi and Mkpat Enin LGA, In the west by Abia state and in the east by Ikono LGA and Abia state. 215 The people of this district are predominantly Christians and are traders and farmers by occupation. This senatorial district has a total of 64 health facilities that offer HIV services. Akwa Ibom state has the highest prevalence of HIV/AIDs in Nigeria with a prevalence of 5.5% compared to 1.9% prevalence seen in Nigeria.

Study Design: This study was a comparative cross-sectional study that utilized a mixed method of data collection

Study Population: The study population comprised PLHIV currently accessing care in ART-certified treatment centres in north-west senatorial district, Akwa Ibom State.

Inclusion Criteria: Participants aged 18 years and above of both sexes and who had been accessing treatment in the selected health facilities for at least one month.

Exclusion Criteria: Lack of cognitive ability to give consent and who were unconscious or critically ill.

Sample size determination: The sample size formula for comparing two proportions was used to estimate the difference in proportions between two independent populations.

n (per group)= $(Z\alpha + Z\beta)2 \times [P1 (1-P1)+P2(1-P2)](P1-P2)2$

Where,

P1 = proportion of people living with depression among PLHIV in rural area of Sagamu 23.1%.155 = 23%

P2 = proportion of people living with depression among PLHIV in urban area 33.1% = 33% (Expected prevalence rate to detect a 10% difference among PLHIV accessing treatment in the rural areas).

 $Z\alpha$ = critical value of the normal distribution at 95% confidence level (i.e., for a confidence level of 95%, α is 0.05 and the critical value is 1.96). $Z\beta$ = critical value of the Normal distribution at β (for a power of 80%, β is 0.2 and the critical value is 0.84). Thus, using values obtained from the Nigerian study; P1=0.23, P2 = 0.33.

 $n=(1.96+0.84)2\times[0.23 (1-0.23)+0.33(1-0.33)](0.23-0.33)2$

 $n=(2.8)2\times[0.177+0.221](0.10)2$ $n=7.84\times0.3980.01$ n=3.1200.01 n=312.0

This gives rise to a sample size of 312. Taking into consideration an anticipated non-response rate of 10 %; adjusted sample size = n/0.9

n = 312/0.9

= 346.66

Thus, a minimum of 347 constitute the sample size for each study group.

Sampling Technique: We deployed a multi-staged sampling technique for the selection of the LGAs, Study sites, and the participants. Simple random sampling method was utilized to select the LGAs in the district for the quantitative part of this study. Of the two urban LGAs in the northwest senatorial district (Abak and Ikot Ekpene), Ikot Ekpene LGA was selected as the study site using simple random sampling (balloting method). Thereafter, from the sampling list of the rural LGAs, Essien udim was selected using simple random sampling (balloting method) as the rural LGA for this study.

From the 11 health facilities that offer HIV services in Ikot ekpene LGA, only the two facilities that offer comprehensive HIV services were selected as study facilities for this study and these were General hospital Ikot ekpene and PHC operational base Ikot ekpene. Similarly, out of the

18 health facilities in Essien udim LGAs that offer HIV services, the only two health facilities that offer comprehensive HIV Services were selected as the rural facilities for this study and these were General hospital Ikpe annang and Cottage hospital Essien udim.

Proportionate allocation was used to determine the number of participants for each facility relative to the calculated sample size. Although I had proposed to use a systematic sampling technique to recruit my participants, this was not feasible on the field because of the poor turnout of patients due to the COVID-19 pandemic which modified the protocol for treatment of PLHIV resulting in a longer refill of ART appointments and intensified community ART services. Hence, all clients who met the inclusion criteria and gave consent were consecutively recruited into the study over the study period until the allotted sample size for each facility was achieved. This was done for the selected urban and rural facilities. Where respondents refused participation, the next eligible respondent was recruited until the allotted sample sizes for each health facility was achieved.

Study Instrument for quantitative: The study instrument used for the quantitative aspect of data collection was the pre-tested, interviewer-administered, semi-structured questionnaire.

Study Instrument for qualitative: The qualitative aspect of the study employed an FGD guide that explored participants' perspectives on: Perception, understanding and experience of depression in PLHIV and factors which influence depression in PLHIV.

Pre-testing: The questionnaire was pretested among a convenient sample of 35 PLHIV. This pretesting was carried out in Abak and Etim Ekpo LGAs; both of which are similar to the study locations in terms of religious, cultural practices and beliefs. It was done to determine the adequacy (comprehension and understanding by the participants) of the questionnaire as well as to validate the questionnaire. Appropriate amendments based on feedbacks from the pretesting of the instrument were made and these included rephrasing of ambiguous questions and modification of the flow of the questions where necessary. The HAM-D tool that was used to measure depression is a standardized tool that has been validated internationally and also in Nigeria.

The face validity, content validity and internal reliability of the questionnaire were also determined. Face validity was determined by an authority in the field of psychiatry and by the researcher's supervisor. The content validity of the questionnaire was assessed by reviewing relevant literature. Internal reliability was ascertained using Cronbach's coefficient *alpha*

calculated among the 35 PLHIV. The Cronbach's alpha was used to estimate the internal consistency of the items in the questionnaire. Reliability testing for internal consistency of the HAM-D data collection instrument produced a Cronbach's alpha coefficient of 0.92 thereby indicating that the study instrument had a high internal consistency.

Data Collection Method: The study utilized both qualitative and quantitative of data collection. Five research assistants were recruited and trained to assist the principal investigator in data collection. They were recent graduates of the Community Health Officers Training School of the University of Uyo Teaching Hospital. The research assistants were trained on the administration of questionnaires, confidentiality, and the research protocol over a period of three days prior to the beginning of the study. During data collection, these research assistants were actively supervised by the principal investigator to ensure that the questionnaires were properly administered.

Quantitative Method: Data was collected using the pre-tested interviewer-administered semistructured questionnaire across health facilities in the selected local government areas over a period of twelve weeks in the month of May, June and July 2021. Before carrying out the survey, the researcher paid an advocacy visit to the study area and the selected health facilities where she met with the facility's management board, doctors and nurses to provide a detailed explanation of the objectives of the research, the methodology and how data will be obtained. This was carefully explained to the management of the health facilities. Patients were recruited when they came for their routine check-up during the data collection period in a separate and secluded room that ensured patient privacy. The purpose of the study was explained to each respondents.

Qualitative Method: Focus Group Discussion constituted the study qualitative methods of data collection. A Focus Group discussion guide was developed, reviewed, and validated to obtain relevant information on the participant's perspective of depression in PLHIV.

The FGD was composed of sixteen groups: Each focused group consisted of 6-8 participants that were purposively selected. The field team included a moderator, a recorder and a note-taker. FGDs were conducted within the premises of the treatment centre in a private consulting room. Each FGD lasted for about an hour. The sitting arrangement was a round table one to ensure proper eye contact and participation. The moderator facilitated the discussion and ensured that

every member of the group participated in the discussion. The recorder ensured that digital voice recorder was in good condition, recorded the sessions, took care of the logistics and also took down notes when necessary. The note-taker took notes of verbal and non-verbal expressions of participants. The FGDs were conducted mainly in English and Pidgin English. Criteria for the selection of participants for the discussion included being able to communicate in at least Pidgin English.

Duration of Study: The study duration lasted over 24 months spanning from the proposal writing, proposal approval, data collection, analysis and report writing.

Data Management:

Dependent variable: The dependent variable in this study was depression, measured using the HAM-D tool.

Independent variables: Socio-economic and demographic factors: The social, economic and demographic factors which constituted independent variables that may likely lead to depression among HIV/AIDS patients include occupation, income, gender, age, residency status (i.e., rural or urban), marital status, education, employment status. These factors were obtained from section A of the questionnaire.

Hamilton Depression Rating Scale: The HAM-D tool was used to measure the prevalence of depression in PLHIV. This scale is a 3-point Likert scale of "absent", "occasional", and "frequent". It contains 17-items covering different aspects of depression: mood, feelings of guilt, urge for suicide, insomnia, work and interest, retardation, agitation, anxiety, somatic symptoms, genital symptoms, hypochondriasis, weight loss, diurnal variation, depersonalization and derealisation, paranoid symptoms, and obsessional symptoms. A score of "0-7" was graded as "no depression", while "8-13" was "mild depression". Moderate, severe, and very severe depression were graded as "14-18", "19-22" and ">23" respectively. This grading was further grouped into 2 categories: participants were considered "not depressed" if they had no or mild depression (\leq 13) and "depressed" if they had moderate, severe, or very severe depression (>13)

Quantitative Data Analysis: The data collection process involved the daily review of completed questionnaires by the principal investigator to identify and correct errors, omissions, and ensure completeness of entries. Following this, the questionnaires were manually sorted, coded, and

prepared for data entry. The data were then entered into a computer for statistical analysis using the Statistical Package for Social Sciences (SPSS) software, version 20.0 (IBM, New York). After entry, the data underwent a thorough cleaning process to eliminate inconsistencies and ensure accuracy.

To determine the appropriate methods for summarizing the data, a normality test was conducted. The data were subsequently analyzed using both descriptive and inferential statistical methods.

Descriptive Statistics: Frequencies, proportions, medians, and interquartile ranges were calculated to summarize the data. These statistics were presented in the form of tables and charts for clarity and ease of interpretation.

Inferential Statistics: To test associations between categorical variables, Fisher's exact test and chi-square test were employed. Additionally, t-tests were used to compare means between groups and non-parametric tests, such as the Mann-Whitney U test, were used where appropriate. The level of statistical significance for all tests was set at 5% (p<0.05), ensuring that the findings were robust and reliable.

.**Qualitative Data Analysis:** Data from the FGDs audio recordings were transcribed verbatim and content (thematic) analysis done manually. As themes emerged, they were indexed and compared with themes from subsequent interviews until a sense of attainment of saturation was achieved. The transcriptions were organized under thematic headings and later developed into a summary with illustrative quotes capturing the different ranges of opinion and perceptions. The data from the FGDs were also presented using zy-index tables to show rural-urban comparison.

Ethical Considerations: Ethical approval for the study was obtained from the University of Uyo teaching hospital health research ethical committee. Informed consent from participants with respect to voluntary participation was sought in writing. Patients were assured that non-participation in the study would not affect the provision of services to them and were assured of their freedom to discontinue the interview/discussion at any stage. After due explanations, those that expressed willingness were given an informed consent form to complete and sign.

RESULTS

Variables	Rural	Urban	Total	
	N =344,	N =349,	N=693,	Test; statistics
	frequency (%)	frequency (%)	frequency (%)	
Age (Years)				
18-25	54(15.7)	40(11.5)	94 (13.6)	
26-30	58 (16.9)	67(19.2)	125 (18.0)	χ^2 =4.480, df=6
31-35	60(17.4)	74(21.2)	134 (19.3)	P=0.612
36-40	61(17.7)	64(18.3)	125 (18.0)	
41-45	39(11.3)	37(10.6)	76 (11.0)	
46-50	33(9.6)	30(8.6)	63 (9.1)	
>50	39(11.3)	37(10.6)	76 (11.0)	
Median [IQR]	35.5 [28-43]	35 [30-43]		MWU; 0.576
Sex				
Male	120(34.9)	125(35.8)	245 (35.4)	$\chi^2 = 0.07$, df=1,
Female	224(65.1)	224(64.2)	448 (64.6)	P=0.797
Marital Status				
Single	107(31.1)	107(30.7)	214 (30.9)	
Married/Cohabiting	168(48.8)	215 (61.6)	383 (55.3)	$\chi^2 = 24.145,$
Divorced/Separated	29(8.4)	12(3.5)	41 (5.9)	df=3, P<0.001*
Widow	40(11.6)	15(4.3)	55 (7.9)	
Religion				
Christianity	341(99.1)	347(99.4)	688 (99.3)	Fisher's exact;
Islam	3(0.9)	2(0.6)	5 (0.7)	P=0.642
Tribe				
Annang	232(67.4)	189 (54.2)	421 (60.8)	$\chi^2 = 17.892,$
Ibibio	88 (25.6)	142(40.7)	230 (33.2)	df=2, P<0.001*
Others	24 (7.0)	18(4.1)	42 (6.1)	

Table	1:	Socio-	demos	graphic	Chara	cteristics	of	Res	pondents
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MWU=Mann Whitney U; *=statistically significant (p<0.05) others; Oron, Igbo, Efik

Table 1 shows the socio-demographic characteristics of the respondents by treatment location. People aged 31-35 years made up most of the respondents (134, 19.3%): 60(17.4%) in rural and 74(21.2%) in urban areas. The median age of rural respondents was slightly higher (35.5 [28-43]) than that of urban respondents (35 [30-43]), but this difference was not statistically significant. In both locations, a higher proportion of the respondents were female: 224(65.1%) in rural sites and 224(64.2%) in urban areas. Compared to rural respondents (164, 48.8%), a higher proportion of urban respondents were married/cohabiting (215, 61.6%), while a higher 59 proportion (40, 11.6%) of rural respondents were widowed compared to urban respondents (15, 4.3%). This

difference was statistically significant (p<0.001). In both treatment locations, nearly all respondents were christians (341,99.1% in rural and 347,99.4% in urban areas). Furthermore, a significantly higher proportion of the rural respondents were of the Annang tribe (232,67.4%) compared to 189(54.2%) of the urban respondents, whereas 142(40.7%) of urban respondents were of Ibibio tribe compared to 88(25.6%) of rural respondents (p<0.001).

	Rural	Urban	Total	Tests; statistics
	N=344,	N=349,	N=693,	
	frequency (%)	frequency (%)	Frequency (%)	
Level of education				
None	6 (1.5)	7(2.0)	13(1.9)	
Primary	86 (25.1)	97(27.8)	183 (26.4)	Fisher's exact;
Secondary	185 (53.9)	192(55.0)	377 (54.4)	P=0.444
Tertiary	67(19.5)	53(15.2)	120 (17.3)	
Occupation				
Unemployed	76(21.1)	49(14.0)	125 (18.0)	
Traders	106(30.8)	168(48.1)	274 (39.5)	χ^2 =29.767, df=6;
Student	22(6.4)	31(8.9)	53 (7.6)	P<0.001*
Farming	33(9.6)	19(5.4)	52 (7.5)	
Artisan	55(16.0)	37(10.6)	92 (13.3)	
Business	26(7.6)	25(7.2)	51 (7.4)	
Professional	26(7.6)	19(5.4)	45 (6.5)	
Monthly income (Naira)				2
<10,000	170(49.4)	254(72.8)	424 (61.2)	$\chi^2 = 40.551$, df=3;
10,000-29,000	121(35.2)	71(20.3)	192 (27.7)	P<0.001*
≥30,000	53 (15.4)	24 (6.9)	77 (11.1)	
Living status			100 (25 0)	
Alone	89(25.9)	91(26.1)	180 (25.9)	2 21 1 5 10 1
With spouse	$1^{7}(4.9)$	15(4.3)	32 (4.6)	$\chi^2 = 21.15$, df=4,
With spouse and	145 (42.2)	193(55.3)	338 (48.8)	p<0.001*
children	48(14.0)	31(8.9)	/9 (11.4)	
With relatives	45(13.1)	19(5.4)	64 (9.2)	
Others				
Other HIV Positive				
nousenoid member?	$\left \begin{array}{c} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 $	52(15.2)	142 (20 6)	$x^2 - 12.74$ df $- 1$
I es	90(20.2)	33(13.2)	143 (20.0)	$\chi = 12.74, \text{ ul}=1$
INU	234(13.8)	290(04.8)	330 (79.4)	F<0.001 **

Table 2: Socio-economic and household Characteristics of Respondents

*=statistically significant; Others: Friends, roommates who are not relatives.

Table 2 illustrates the socio-economic and household characteristics of the respondents. Majority of the respondents had secondary level of education (377, 54.4%), with a higher proportion of rural respondents having tertiary education (67, 19.5%) compared to urban respondents (53, 15.2%). Majority of the respondents were traders (274, 39.5%) with a significantly higher proportion of urban respondents being traders (168, 48.1%) compared to rural respondents (106, 30.8%). A higher proportion of rural respondents were unemployed (76, 21.1%) while 49(14.0%) of urban respondents were unemployed (p<0.0001).

A significantly higher proportion of urban respondents earned less than 10,000 naira (254, 72.8%), compared to 170(49.4%) of rural respondents (p<0.001). Overall, only 77(11.1%) earned 30,000 naira and above in both study groups. Majority of the respondents lived with their spouse and children (338, 48.8%), although a higher proportion of urban respondents (193,55.3%) lived with their spouses and children compared to rural respondents (145,42.2%). This difference was statistically significant (p<0.001). A significantly higher proportion of respondents who resided in rural areas had household members with HIV (90,26.2%) compared to 53(15.2%) of those residing in urban areas (p<0.001).

Scores/Grades	Rural, n=344,	Urban, n=349,	Total, n=693	Tests/Statistics
	Frequency (%)	Frequency (%)	Frequency (%)	
None (0-7)	95(27.6)	189(54.2)	284 (41.0)	
Mild (8-13)	87(25.3)	64(18.3)	151 (21.8)	Fisher's exact
Moderate (14-18)	61(17.7)	91(26.1)	152 (21.9)	P<0.0001*
Severe (19-23)	42(12.2)	4(1.1)	46 (6.6)	_
Very Severe (>23)	59(17.2)	1(0.3)	60 (8.7)	-
Median score [IQR]	12[7-20]	7[3-14]		MWU; P<0.0001*

Table 3: Grading of depression among respondents

MWU=Mann Whitney; *= statistically significant

Table 3 shows the grades of depression of urban and rural respondents using the HAM-D scale. Overall, about two-fifths of the respondents did not experience depression (284, 41.0%). While a little above half of urban respondents had no depression (189, 54.2%), only 95(27.6%) of rural respondents did not experience depression. Similarly, a higher proportion of rural respondents had very severe depression (59, 17.2%) compared to 1(0.3%) of the urban respondents. This difference was statistically significant (p<0.0001). The median depression score for urban respondents was 7, significantly lower than for rural respondents (12); p<0.0001).



Figure 1: Prevalence of depression among respondents in Urban and Rural Facilities.

The prevalence of depression among study respondents shows that nearly half of rural respondents were depressed (47.1%) compared to 27.5% of urban respondents. Bivariate analysis revealed that this difference was statistically significant ($\chi 2=28.100$, p<0.0001). Overall, over a third of the respondents were depressed (37.2%).

Table 4:Summary of participants responses in the Focus Group Discussions (FGD) inrural and urban facilities studied

	Rural	facilit	ies						Urbar	n facilit	ties					
Constructs	FGD	2	3	4	5	6	7	8	FGD	2	3	4	5	6	7	8
explored	1								1							
Understanding and experience	++	+	+	++	++	+	+	+	++	++	++	+++	+++	++	++	++
of depression																
Factors/barriers affecting respondents																
Stigmatization and discrimination	+++	++	+++	++	++	+++	+++	+++	+++	+++	+++	+++	++	+++	+++	+++
Absence of family support	+	++	+	++	+	+	+	+	++	+++	++	++	++	++	+++	++

Sudden	+++	+++	++	++	+++	++	+++	++	++	+++	++	++	++	++	++	++
awareness of																
infection																
Having to take	++	++	++	+	++	++	++	++	++	++	++	++	++	++	++	++
lifelong																
medications																
Drug interactions	+	+	+	++	+	+	+	+	-	+	-	-	-	+	-	-
from																
medications																
Effects of																
depression																
Poor adherence	+	+	+	+	-	+	+	+	-	-	+	++	-	-	-	+
to treatment																
Substance abuse	-	+	+	-	-	+	+	-								
Poor	+	-	-	-	-	-	-	+	+	++	-	-	-	++	+	-
productivity																
Increased	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
hospitalization																
Social	-	+	-	+	-	-	+	-	+	-	+	-	-	-	+	+
withdrawal																
Suicidal ideation	+	-	-	+	-	-	-	+	+	++	+	-	+	++	+	-
Management of																
depression																
Access to mental	-	-	+	+	-	-	+	-	-	-	+	-	-	-	+	-
health services																
Social support	+	+	+	+	+	+	+	+	+	+++	+	+	+	+	+	+
Government	++	+	+	+	++	+	++	+	+	+	+	++	+	++	++	+
support																

Keys

- +++ Frequently expressed opinions by participants
- ++ Often expressed by participants
- + Sometimes expressed by participants
- Rarely or never expressed by participants

Table 5: Binary Logistic Regression Model For factors associated with depression among Urban Respondents

Variables	Odds	95% CI		P value
	ratio			
		Lower	Upper	
Sex				
Male	1			
Female	1.526	0.838	2.779	0.167
Education				
None	1			
Primary	0.512	0.106	2.482	0.406
Secondary	0.258	0.046	1.447	0.124
Tertiary	0.371	0.038	3.654	0.396

Monthly income				
<n10,000< th=""><th>1</th><th></th><th></th><th></th></n10,000<>	1			
N10,000-N29,000	0.230	0.100	0.531	0.001*
≥N30,000	0.163	0.034	0.777	0.023*
History of Chroni medical condition	С			
No	1			
Yes	9.042	2.208	37.034	0.002*

*=statistically significant

Binary Logistic Regression Model for factors associated with depression in Urban Facilities

Independent variables that showed significant association on chi-square analysis were put in a logistic model and include, sex, educational status, monthly income, history of chronic health condition, experience of side effects from ARTs, and adherence to treatment. This model was statistically significant (p<0.001) and explained 24.0% of the observed variations.

Respondents earning between 10,000 and 29,000 naira, and 30,000 naira or above were significantly less likely to be depressed (OR-0.230 and 0.163 respectively) compared those earning below 10,000 naira (p=0.001 and 0.023 respectively).

Table -6: Binary Logistic Regression Model For factors associated with depression among Rural Respondents

Variables	Odds ratio	95% CI		P value
		Lower	Upper	
Ages of respondents	0.992	0.960	1.024	0.616
Educational status				
None	1			
Primary	2.167	0.180	26.110	0.543
Secondary	4.348	0.374	50.517	0.240
Tertiary	2.572	0.210	31.548	0.460
Living companions				
Alone	1			
With others	0.375	0.174	0.899	0.012*
Employment status				
Unemployed	1			
Employed	0.601	0.297	1.215	0.156
History of Chronic				
medical condition				
No	1			
Yes	0.777	0.214	2.823	0.702

Perceived depression				
prior to HIV diagnosis				
No	1			
Yes	0.838	0.437	1.469	0.538
Side effects to ARTs				
No	1			
Yes	18.567	7.283	47.335	0.000*
Adherence				
Good	1			
Poor	1.467	1.262	1.832	0.010*

*=statistically significant

Omnibus test of model coefficients for model: χ^2 =138.317, P<0.001. Nagelkerke R square=0.448

Binary Logistic Regression Model for factors associated with depression in Rural Facilities

Independent variables that were put in the model included age, educational status, living companions, employment status, history of chronic health condition, perceived depression prior to HIV diagnosis, experience of side effects from ARTs and adherence to treatment. This model explained 44.8% of the variations seen in the result and was statistically significant (p<0.001).

Table 6 shows that living with others led to a significantly lower likelihood of having traits of depression by 62.5% (OR-0.375; 95% CI-0.174-0.899; p=0.012) when compared to living alone. Having side effects of ARTs led to a higher likelihood of having depression on binary logistic regression (OR-18.567; 95% CI-7.283-47.335; p=0.000).

DISCUSSION

This study set out to determine and compare the urban and rural prevalence of depression among adults living with HIV/AIDS in selected health facilities in north-west senatorial district, Akwa Ibom state, Nigeria. This study further assessed the factors associated with depression in both locations, using a mixed method approach of data collection. The study provides an estimate of the public health burden of depression among PLHIV in Akwa Ibom state which will help to guide policy, as well as advocacy efforts.

A high rate of depression was found among the respondents (37.2%), similar to a study in Ekiti state, where they recorded a slightly higher prevalence of depression (39.6%) using the Hospital anxiety and depression scale. This is however, higher than the prevalence reported in studies

conducted in Abuja (28.2%) and Ethiopia (20%). Furthermore, the prevalence in this study was also higher than a pooled prevalence of 31.2% reported in a systematic review on depression among PLHIV in SSA. This systematic review included 30 studies from 10 countries in SSA (three studies were from Nigeria). Another systematic review conducted in SSA found the pooled prevalence estimates of depression to range between 9% and 32% among PLHIV. These variations in the prevalence of depression in PLHIV may be due to differences in sample size, the population being studied, the study period, inclusion criteria and measurement tools used to assess depression. Furthermore, the COVID-19 pandemic may also have contributed to the high rate of depression seen in this study. The pandemic brought with it unprecedented fear and anxiety particularly in PLHIV as having HIV as an underlying co-morbid condition compromises the immune system and poses a greater risk of them contracting the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV 2). This may have been further worsened by the attendant social restrictions, lockdowns, school and business closures, loss of livelihood, and shifting priorities of governments in their attempt to control COVID-19 (World Health Organization). Outbreaks. This caused an increase in the number of people with depressive symptoms globally, of which PLHIV were not exempted. Being the state with the highest prevalence of HIV/AIDS in Nigeria, the rate of depression seen in this study is alarming and points to a major public health concern in Akwa Ibom state and the need to incorporate the management of depression in HIVcare guidelines in the state.

Furthermore, when compared to the general population, the rate of depression among PLHIV in this study is very high. A study conducted in Nigeria in 2010 reported the lifetime and 12-month estimates of major depressive episodes as 3.1% and 1.1% receptively in the general population. According to a meta-analysis conducted across most countries of the world, the average prevalence of depressive disorders in the Nigerian population was found to be 5.21% (3.69% for MDD and 1.52% for Dysthymia). This is about 7 times less than that found in our study. To corroborate with our observations, a Cameroonian study reported that 33.7% of PLHIV had moderate-to-severe depression compared to 19.8% among seronegative controls and this difference was statistically significant. There are several possible explanations for the higher prevalence of depression among PLHIV in this study population. Firstly, HIV infection is a lifelong disease with the associated socio-economic difficulties of living with a chronic illness.

Secondly, the PLHIV could have possibly suffered from more losses, in form of death of spouse or HIV-positive friends and even loss of social support from friends and relatives as a result of stigma and discrimination. Furthermore, some of the anti-retroviral medications play a role in the etiology of depression as one of their side effects. Distress from the physical complications of the disease may also be a contributory factor to depression in the study participants. It is worth noting that the high prevalence of depression is not peculiar to PLHIV as those suffering from other chronic diseases such as diabetes and coronary heart disease have been found to have a higher prevalence of depression than the general public. The respondents' perception of depression in PLHIV was assessed to determine their outlook on the illness. Understanding of depression may help PLHIV identify the signs early and seek help promptly. The participants in the FGDs had a general fair understanding of what depression is and many in both locations linked it to feelings of hopelessness, loneliness, moodiness, and suicidal ideations. Respondents from urban facilities demonstrated a better understanding of what depression is and were better able to share their experiences of depression. The higher level of awareness of depression and other mental health issues in urban areas may be responsible for the differences in understanding of the subject matter and may also account for the lower prevalence of depression in the urban population compared to the rural. A good understanding of depression and its perceived consequences is important for PLHIV to enable them to identify the signs and seek help promptly. This study went ahead to determine the perception of PLHIV on the determinants of depression in PLHIV. Respondents who received treatment in rural facilities mostly agreed that sudden awareness of HIV status, stigma, and lifelong medication, were the factors promoting depression in their population. Among urban respondents, stigma was the commonest perceived promoter of depression.

Limitations

Firstly, it is a cross-sectional study, hence, conclusions could not be made on the causal relationships between variables. As such, it could only determine whether there is an association between depression and the studied factors, and not whether this association is a cause-effect relationship. Prospective studies will be helpful to better understand the relationships observed in this study. In addition, this study was limited by the use of self-reported depression symptoms and adherence level to treatments. Therefore, participants could have over or under-reported level

of depression symptoms and ART adherence, thus a combination of self-reported and clinical assessment of depression would give a better estimate of the prevalence of depression in PLHIV.

Conclusion

This comparative study provides information on the prevalence of depression and its associated factors among urban and rural PLHIV in northwest senatorial district of Akwa Ibom state.

There was a high prevalence of depression among the respondents; with rural respondents having a significantly higher proportion of depression compared to the urban respondents.

Recommendations

To the Policymakers:

Due to the high prevalence of depression in this study, The WHO recommendation of the integration of mental health services in all health facilities offering HIV services should be implemented by the Akwa Ibom state ministry of health in all health facilities offering HIV services particularly in the rural areas. This will improve the access of rural dwellers living with HIV to the holistic health care services.

To the health care system/health workers:

Every patient living with HIV/AIDS should be screened for signs and symptoms of depression. This will further help to improve the prompt diagnosis of depression in PLHIV and ensure that

They receive the needed mental health support they require as this will ultimately improve treatment outcomes in PLHIV.

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