Research Article

Burden of Insomnia and Associated Risk Factors in People Living with HIV/AIDS in a Tertiary Hospital in Sub-Saharan Africa

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Abstract

Introduction: Several studies done in developed countries have reported that sleep disturbances occur frequently in people living with HIV/AIDS. However, there are limited data on the burden of insomnia among HIV infected persons in Sub-Saharan Africa.

Aim: The aim of this study was to determine the prevalence and associated factors for Insomnia among HIV patients receiving care at a tertiary institution in south western Nigeria.

Methods: A cross-sectional study was conducted among consecutive adult HIV patients attending an HIV clinic. HIV negative patients attending the general outpatient unit of the hospital were the control group. A semi-structured questionnaire was designed to obtain sociodemographic data and insomnia among the participants was assessed using the insomnia severity index questionnaire. The hospital anxiety and depression scale was used to assess for other psychiatric co-morbidities.

Results: A total of 853 participants were enrolled for the study (424 HIV positive and 429 HIV negative controls). The mean age of HIV positive patients and controls is 42.2±9.5 years and 43.4±12.4 years respectively. There was statistically significant difference in the prevalence of insomnia in the HIV seropositive patients compared to the controls 49.3% and 34.3% respectively (chi^2 = 19.801, p value < 0.0001). Factors associated with insomnia on multivariate analysis were depression (AOR 2.557, 95% CI = 1.556-4.200, p value < 0.0001) and low CD4 count (AOR 2.001, 95% CI = 2.000-2.002, p value < 0.028).

Conclusion: The prevalence of insomnia is high among HIV positive patients and the associated factors were depression and low CD4 count. It is imperative to address this prevailing challenge in this group of patients for improved treatment outcome.

Keywords: Antiretroviral treatment; HIV/AIDS; Insomnia; PLHIV; Sleep disturbance

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Introduction

HIV/AIDS is a pandemic disease with a huge burden in Sub-Saharan Africa. The global estimate is that 36.7 million people were living with HIV (PLHIV) in 2016 with more than two-thirds in Sub-Saharan Africa [1]. PLHIV often suffer from sleep disturbance with a prevalence ranging from 29 to 97 % among HIV seropositive patients. Sleep disturbance is a major HIV-related health issue which is often under-reported by the patients to their attending physicians [2]. Insomnia is defined as difficulty with initiating and maintaining sleep that is associated with daytime distress. It is a well-recognized finding in PLHIV, often associated with fatigue, adherence, poor disease outcomes, quality of life and comorbid psychiatric disorder like depression/anxiety in PLHIV [3,4]. Insomnia in HIV seropositive patients has been linked to the neuronal damage by viral neurotoxic and inflammatory mechanism, adverse effect of antiretroviral drugs, substance abuse and psychiatric disorders in PLHIV [2,3].

Several studies have shown the vital role of sleep in health, absence of which could significantly impact on the immune function and disease progression [5,6]. This is particularly critical in HIV infected individuals whose disease is characterised by immune dysfunction and occurrence of opportunistic infections as it progresses which could be worsened by insomnia. There is however a paucity of data on insomnia in the HIV-seropositive population in Sub-Saharan Africa. Previous studies on insomnia in PLHIV have been limited by lack of power, inadequate control groups and use of Pittsburgh Sleep Quality Index which is not a diagnostic tool to identify sleep disorder [4]. Hence, this study aimed at determining the prevalence of insomnia in PLHIV, comparing the findings with age and sex matched controls who are HIV sero-negative patients and determining the associated risk factors for insomnia.

Materials And Methods

Study design

A cross-sectional study was conducted among patients accessing care for HIV infection at Ekiti State University Teaching Hospital (EKSUTH), Nigeria. The hospital is the major tertiary hospital located in Ekiti state situated in the south-western region of Nigeria with an estimated population of 2,384,212 as at 2006 population census [7].

Study population

Ekiti state has a prevalence of HIV of 2.9% as at the last survey in 2014, one of the lowest prevalence of HIV in Nigeria, below the national average of 3% [8,9]. Adult HIV patients on follow up who were diagnosed as HIV infected and have been on treatment for at least 6 months were recruited for the study. The HIV patients receive treatment at the Medical Outpatient Department (MOPD) where they are seen by specialists in HIV medicine. Critically ill individuals, patients with opportunistic infections and non-consenting individuals were excluded from the study. The control group of HIV negative patients who consented to HIV screening and attended the General Outpatient Department (GOPD) who were age and sex matched.

Sample size calculation

We calculated the sample size using online statistical software from Open Source Epidemiologic Statistics for Public Health [10]. An estimated sample size of 327 was obtained from a population of 2150 HIV patients in our facility, using a hypothesized percentage frequency of outcome factor in the population of 50% and confidence limit of 5%. Twenty percent of the calculated sample size was added to account for incompletely filled questionnaires thereby making a total of 392. We further increased this number to 424 to increase the power of the study.

Survey instrument

A pretested semi-structured questionnaire was administered by two trained research assistants who obtained information on socio-demographic profile, presence of symptoms, CD4 count, viral load, medication use, HIV screening results and clinical stage of HIV. In addition, the Insomnia Severity Index (ISI) was used to assess the prevalence among the PLHIV and the control group. Furthermore, the Hospital Anxiety Depression Scale (HADS) was also used to assess the prevalence of anxiety and depression among the respondents. This consists of seven items relating to depression and anxiety and either condition was defined as HADS score ≥ 8 [11].

Main outcome

Insomnia was the main outcome of interest. Each participant was assisted in filling the Insomnia Severity Index, seven-item questionnaire assessing the nature, severity and impact of insomnia. Each item has a 5-point Likert scale used for rating. Studies have shown a cutoff score of 14 has a sensitivity and specificity of 94% which could distinguish most cases of insomnia from normal controls, hence we adopted this cutoff for our study [9,10,12-14].

Statistical analysis

Obtained data was analysed using SPSS statistical software version 20 (SPSS Inc., Chicago, IL, USA). Descriptive statistics were initially used to explore the data and to present results of prevalence and socio-demographic data. Categorical variables were expressed in proportions while continuous variables in mean (standard deviation). A comparison of categorical variables was done using Pearson's Chi-square test while student's t-test was used for comparing means. Multivariate associations of socio-demographic and clinical factors with insomnia were determined by logistic regression. Factors with a P value <0.05 in univariate models were included in the multivariate model. All p-values of less than 0.05 were considered statistically significant.

Ethical considerations

Ethical approval was obtained from the Ekiti State University Teaching Hospital's ethics and research committee. Informed verbal and written consent was obtained from every participant and they were ensured of anonymity and confidentiality by assigning numerical codes to each questionnaire.

Results

Sociodemographic characteristics of study population

A total of 424 HIV seropositive patients were enrolled for the study as well as corresponding age and sex matched control group of 429 HIV seronegative patients. The mean age of the HIV positive patients was 42.2± 9.5 years while that of the control group was 43.4±12.4 years. There was a female preponderance in both the exposed and control groups as the percentage was 73.8% and 64.1% respectively. A major proportion (76.2%) of HIV positive patients was married and likewise (68.1%) in the control group. Only 16.9% and 14.2% of the HIV positive patients and control group respectively had no formal education. Despite more than half of the respondents in both the HIV positive and control being self-employed (61.1% and 50.1% respectively), two thirds (63.4%) of the HIV positive patients had a monthly income less than 140 dollars while just about half (52.4%) of the control group had a monthly income less than 140 dollars as shown in table 1.

Clinical characteristics

The mean score of the respondents on the insomnia severity index scale was 6.87 (SD = 5.37) while the mean scores for depression and anxiety were 7.92 (SD = 4.395) and 7.66 (SD = 3.85) respectively. At diagnosis the median CD4 count of the respondents was 224 cells/ul while their current CD4 count was observed to be much higher than the values reported at diagnosis, with a median of 405 cells/ul. A relatively significant proportion of participants (34.6 %) were not aware of the HIV status of their partners. Seroconcordance of couples was also reported among one fifth of those who knew the HIV status of their partners. About three quarters of the respondents (76%) were diagnosed in the last 10 years. A majority of the respondents (84.5%) was on antiretroviral medications in the last 10 years.

Prevalence of insomnia and associated factors

The prevalence rate of insomnia in HIV seropositive group and control was 49.3% and 34.3% respectively. The observed differences in these two groups were statistically significant with p value < 0.0001. The only sociodemographic characteristic found to be associated with insomnia on bivariate analysis was low income. Details of the statistics of the other sociodemographic factors are in table 2. We found out that insomnia was present in almost all the respondents (93.5%) earning less than $140 per month compared to only 25% of

those earning twice as much (i.e., > $300). These differences were statistically significant with a p value of 0.019. Among the clinical factors, insomnia was reported in all HIV seropositive patients who were on antiretroviral medications for less than five years. On the contrary, less than half of the HIV seropositive patients on medications for more than five years reported insomnia. There was however no statistically significant difference when the different ART regimens were compared.

Variable	HIV n (%)	Control n (%)	Test	p-value
Age (mean ± SD)	42.16+9.537	43.37+12.380	t = -1.598	0.110
Sex				
Male	11 (26.2)	154 (35.9)	chi^2 = 0.347	0.556
Female	313 (73.8)	275 (64.1)		
Marital status				
Single	45 (10.6)	90 (21)	chi^2 = 22.352	< 0.0001
Married	323 (76.2)	292 (68.1)		
Divorce	28 (5.9)	11 (2.6)		
Widow(er)	31 (7.3)	36 (8.4)		
Occupation				
Civil servant	13 (30.9)	129 (30.1)	chi^2 = 30.859	< 0.0001
Retired	7 (1.7)	38 (8.9)		
Unemployed	27 (6.4)	47 (11.0)		
Self employed	259 (61.1)	215 (50.1)		
Education				
Primary	68 (16.0)	60 (14.0)	chi^2 = 15.116	0.002
Secondary	144 (34.0)	105 (24.5)		
Tertiary	197 (46.5)	252 (58.7)		
None	4 (0.9)	1 (0.2)		
Average Monthly Income				
<140 dollars	269 (63.4)	225 (52.4)	chi^2 =8.887	0.012
140 - 280 dollars	86 (20.3)	77 (17.9)		
>280 dollars	12 (2.8)	28 (6.5)		

Table 1: Showing the socio-demographic characteristics of the study and control groups.

Psychiatric morbidity was significantly associated with insomnia as it was observed in more than two thirds (67.5%) of depressed patients compared to only about one third (37.5%) of non-depressed HIV positive patients. Similarly, insomnia was found in about 60% of patients with anxiety disorder compared with only about 43.5% in those without anxiety disorder. These differences were also statistically significant. It was observed that the CD4 count of the HIV positive patients was negatively correlated with the insomnia scores of the patients with a correlation coefficient of -0.138. Hence, lower CD4 counts were associated with higher scores on the insomnia severity scores.

Multivariate analysis

Multivariate analysis was carried out and among all the significant factors on bivariate analysis (low income, depression, anxiety disorders, CD4 count and duration on ART). Only depression (AOR, 2.557, 95% CI = 1.556-4.200, p value <0.0001 and low CD4 count AOR, 2.001, 95% CI=2.000-2.002, p value = 0.028 were found to be statistically significant.

Character-istics	Subjects with Insomnia	Bivariate Analysis		Multivariate Model	
		Test	P value	AOR (95% CI)	P value
Socio Demographic Factors					
Age					
Mean (SD)	42.57 yrs (9.67)	T test = -0.881	0.378		
Sex					
Male	50.5%	Chi^2 = 0.081	0.776		
Female	48.9%				
Marital Status					
Single	53.3%	Chi^2 = 0.909	0.809		
Married	48.0%				
Divorced	52.0%				
Widow/er	54.8%				
Occupation					
Civil servant	46.6%	Chi^2 = 0.186	0.602		
Unemployed	51.9%				
Retired	71.4%				
Self employed	49.8%				
Education					
Primary	52.9%	Chi^2 = 4.843	0.184		
Secondary	48.6%				
Tertiary	47.2%				
None	100.0%				
Income (per month)					
< $140	93.5%	Chi^2 = 7.889	0.019	0.0798 (0.185-4.116)	0.755
$ 140-$300	58.1%				
> $300	25.0%				
Clinical Factors					
HIV Status of Partner					
Known	42.2%	Chi^2 = 21.113	0.146		
Unknown	50.4%				
HIV Status of Partner					
Positive	21.2%	Chi^2 = 31.70	0.075		
Negative	37.9%				
Depression					
Depressed	67.3%	Chi^2 = 35.966	0	2.557 (1.556-4.200)	<0.001*
Not depressed	37.5%				
Anxiety Disorder					
Present	60.9%	Chi^2 = 11.212	0.001	0.435 (0.180-1.051)	0.064
Absent	43.5%				
Duration on ART					
>5yrs	48.8%	T = 7.322	0.007	0.011(0.010-0.05)	0.900
<5yrs	100.0%				
CD4 Count at Diagnosis					
Mean (SD)	221.0 (257.0)	Corr Coef= -0.76	0.128		
Current CD4 count					
Mean (SD)	294.0 (264.93)	Corr Coef= -0.138	0.03	2.001(2.000-2.002)	0.028*
Viral Load					
Mean (SD)	11372.0 (6627.0)	Corr Coef= -0.019	0.789		

Table 2: Sociodemographic and clinical factors associated with insomnia.

* significant p-value of less than 0.05

Discussion

This study showed a higher prevalence of insomnia and its associated factors among HIV infected patients compared to uninfected patients. The high rate of insomnia (43.5%) reported in this study is similar to that reported in some other studies ranging from 29% to 73% [2,4,15,16]. The differences in the prevalence rates may be due to the different case-defining instruments, population setting and baseline prevalence of HIV in the population. In our study, the main factors found to be associated with insomnia were depression and low CD4 count. Depression as a factor in insomnia has also been reported by other authors [2,4,15,17]. This relationship between insomnia and depression may not be unconnected to the fact that sleep disturbances are a major symptom of depression and other major psychiatric illnesses. Hence, addressing these comorbidities in HIV patients will further improve the treatment outcome [18]. The higher current CD4 count of the respondents compared to their CD4 count at diagnosis may be due to the improvement in the patients following their commencement of antiretroviral drugs. Similarly, we observed that low CD4 count as a factor for insomnia has also been observed by other authors. This has been attributed to specific polysomnographic sleep changes in the late stage of HIV infection [19,20]. On the contrary, certain studies have reported no association between the CD4 count and insomnia [2,4].

Although, we found out that factors such as low income, anxiety disorder and short duration of treatment were associated with insomnia on initial analysis, these factors however had no strong association on multivariate analysis (p value > 0.05). Earlier authors have also reported that duration of HIV and ART, viral load and HIV therapy type were not important factors in insomnia among HIV patients [4,15,20,21]. This is however contrary to the findings of other researchers who reported strong association between insomnia and short duration of diagnosis and anxiety disorder [2]. A major limitation of this study is the cross-sectional nature which did not allow for proper evaluation of whether the sleep disturbances were transient or chronic. Another limitation is the questionnaire based data collection rather than use of polysomnograms, however, the major strength of the study lies in the use of matched controls group.

In conclusion, our study found a high prevalence of insomnia among PLHIV and main factors associated with it were depression and low CD4 count. It is imperative to address this prevail challenge in this group of patients for improved treatment outcome.

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