

Sleep Disturbance, Psychiatric Issues, and Employment Status of Iranian People Living with HIV

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Abstract

Objectives. Psychiatric problems and sleep disturbance among people living with HIV (PLWH) are associated with response to treatment, prognosis, and high-risk behaviors. We aimed to assess sleep disorders, psychiatric characteristics, and employment status among Iranian PLWH.

Results. In total, 304 patients with a mean age of 40.01 (SD=9.60) years participated in the study. About 72% of the participants had a global PSQI score of more than 5, with a mean of 7.71 (SD=3.31). About 55.6%, 50%, and 67.4% of patients had abnormal scores for depression, anxiety, and stress. Unemployed patients had 2.13 times more chance (95% CI: 1.01-4.53) of having poor sleep quality compared to employed patients, and stress increased its likelihood by 3.18 times (95% C: 1.47-5.88).

1. Introduction

HIV/AIDS has been a major health problem in recent decades, with a heavy burden on the countries' health systems. (1). Significant advances in the treatment and management of HIV infection and its aftermath have led to an increase in the survival of people living with HIV (PLWH), making their quality of life more important (2). Mental disorders are common among people living with HIV, with more than half of them suffer from depression, mania, psychosis, anxiety, and committing suicide. Following the disease's progression, sleep quality is affected by physical symptoms such as diarrhea, pain, cough, fever, night sweat, shortness of breath, and antiretroviral medications. Sleep disturbances may worsen depression and anxiety symptoms and worse quality of life (2–4). Poor sleep quality can also lead to attention deficit disorder, mood swings, fatigue, and cardiovascular complications. Furthermore, insomnia can lead to depression, reduce the response to treatment, and increase disease recurrence (5).

Although the available data indicate an association between psychological issues with sleep disorders in the general population, few studies assessed this issue in PLWH. Also, to prevent the potential side effects and progression of sleep disorders in PLWH, it may help screen them as a part of routine care. Therefore, the present study aimed to assess sleep disorders and their associated psychological and socio-economics factors among PLWH.

2. Materials And Methods

This cross-sectional study was conducted between October to November 2019 on 304 PLWH referred to voluntary counseling and testing centers in Tehran. First, Tehran was divided into four geographical areas, and then a list of VCT centers was prepared in all four areas, and two centers were randomly selected from each of them. In each center, patients were randomly selected and invited to participate in the study. The inclusion criteria were being diagnosed with HIV, age 18 and older, and giving consent to participate in the study. Before the interview, participants were provided with explanations about the aim of the study. They were assured that their information would remain confidential and that they could withdraw from the study in all its stages. Written consent was obtained from the participants. The study

protocol was reviewed and approved by the ethics committee of Tehran University of Medical Sciences (ethical code: IR.TUMS.VCR.REC.1398.312).

We used Pittsburgh Sleep Quality Index (PSQI) and the Depression Anxiety Stress Scales (DASS) in this study. Six trained psychologists completed the questionnaires in a face-to-face interview with participants. PSQI is designed to assess sleep quality over the past month, and various studies have confirmed the validity and reliability of the Persian version of PSQI (6–10). The questionnaire has seven subscales, including (1) sleep duration, (2) sleep disturbance, (3) sleep latency, (4) daytime dysfunction due to sleepiness, (5) sleep efficiency, (6) overall sleep quality, and (7) sleep medication use. Each question can be answered on a Likert scale from 0 to 3, and the total score is calculated from 0 to 21. Total scores of higher than five are considered poor sleep quality (11).

DASS has three self-reporting scales to assess negative emotional states, including depression, anxiety, and stress. Its abbreviated version consists of 21 questions, which can be answered on a Likert scale from 0 to 3, and higher scores indicate more severe depression, anxiety, and stress (12). The Persian validated translation of the abbreviated version of the DASS questionnaire was used in this study (13, 14).

We also collected patients' demographic characteristics and medical history, including gender, age, educational level, marital status, history of heart disease, lung diseases, or diabetes, body mass index (BMI), employment status, CD4 count, and co-infection with hepatitis B, C, and tuberculosis. Participants were divided into three groups based on their BMI (less than 25, 25 to 29, and 30 or higher). Employment status was categorized as employed and unemployed. Patients' last measured CD4 was also recorded.

2.1. Statistical analysis

Participants with incomplete data of PSQI and DASS questionnaires were excluded from the samples (14 people). Approximately 3.11% of cells did not have information for other variables. Therefore the missing values were imputed using a single imputation method in R software. We calculated mean and standard deviation (SD) for quantitative variables and frequency and percentage for qualitative variables. A Chi-square test was used to compare qualitative variables, and a T-test was used to compare continuous variables between groups. The logistic Regression model test was used to determine the factors affecting sleep quality. Communications were examined by using the chance ratio and 95% confidence interval. All analyzes were performed with STATA software, and a p-value of less than 0.05 was considered statistically significant.

3. Results

In total, 304 PLWH, including 209 men (68.8%) and 95 women (31.2%) with a mean age of 40.01 years, participated in the study. Table 1 shows the demographic characteristics of participants. About half of the participants were married and undergraduate, and about 72 percent were employed. Drug injection

(57.2%) sexual transmission (39.1%) were the most common routes of HIV transmission. Furthermore, about 23% of people had co-infection of HIV and hepatitis C.

Table 1
Sleep quality and its associations with other factors in Iranian PLWH

Variables	Total (n = 304)	Poor Sleep Quality (n = 219)	Good Sleep Quality (n = 85)	P- value
	Mean (SD)	Mean (SD)	Mean (SD)	
Age, years (mean \pm SD)	40.01 (9.60)	39.80 (9.56)	40.55 (9.22)	0.537
BMI (kg/m ²)	43.75 (24.73)	24.55 (4.15)	25.19 (3.90)	0.216
	No (Percent)	No (Percent)	No (Percent)	
Sex				
Male	209 (68.8)	151 (68.9)	58 (68.2)	0.904
Female	95 (31.3)	68 (31.1)	27 (31.8)	
Marital status				
Single ¹	149 (49)	106 (48.4)	43 (50.6)	0.732
Married (committed)	155 (51)	113 (51.6)	42 (49.4)	
Education				
Under diploma	146 (48)	41 (48.2)	105 (47.9)	0.975
Diploma	102 (33.6)	29 (34.1)	73 (33.3)	
Upper diploma	56 (18.6)	15 (17.6)	41 (18.7)	
Employment status				
Employed	218 (71.7)	146 (66.7)	72 (84.7)	0.002
Unemployed	86 (28.3)	73 (33.3)	13 (15.3)	
HIV characteristics				
Duration of HIV diagnosed, month (median, IQR)	50 (63.75)	62 (62.5)	49 (64)	0.073
Mean CD4 count (SD)	577.12 (301.21)	580.60 (318.35)	568.15 (253.26)	0.747
Duration of ART, years (Med, IQR)	40.00 (46.75)	47 (47.5)	38.00 (44)	0.241
	No (Percent)	No (Percent)	No (Percent)	
CD4 count				

Variables	Total (n = 304)	Poor Sleep Quality (n = 219)	Good Sleep Quality (n = 85)	P- value
< 500	135 (44.4)	102 (46.6)	33 (38.8)	0.222
≥ 500	169 (55.6)	117 (53.4)	52 (61.2)	
Route of transmission				
Sexual contact	119 (39.1)	86 (39.3)	33 (38.8)	0.611
Injection drug use	174 (57.2)	127 (58)	47 (55.3)	
Blood products	4 (1.3)	2 (0.9)	2 (2.4)	
unknown	7 (2.3)	4 (1.8)	3 (3.5)	
HIV/HBV co-infection	9 (3)	7 (3.2)	2 (2.4)	0.697
HIV/HCV co-infection	69 (22.7)	51 (23.3)	18 (21.2)	0.693
HIV/TB co-infection	28 (9.2)	23 (10.5)	5 (5.9)	0.211
Separated and divorced /widowed are in this category				

Based on the results of PSQI, 72% of patients had poor sleep quality. The association between the sleep quality of participants and their demographic characteristics is shown in Table 1. 70% of people with poor sleep quality were men, but this difference was not statistically significant. A comparison of other demographic characteristics between the two groups of patients with poor sleep quality and good sleep quality showed that the only significant difference was in their job status, as about 85% of the participants with good sleep quality were employed.

Table 2 shows the association between sleep quality and psychological issues, including stress, anxiety, and depression. The mean PSQI index in participants was 7.71. 44% of participants did not have depression at all, while 56% suffered from varying degrees of depression, of which 18% had severe depression. Furthermore, the mean depression index score was significantly higher in people with sleep disorders (16.06) than in participants with appropriate sleep quality (9.52). Half of the participants did not suffer from anxiety, and about 20% suffered from very severe anxiety. Mean anxiety index scores were significantly higher in people with poor sleep quality (11.53) than participants with good sleep quality (9.11). Also, about 72% of participants with good sleep quality did not have anxiety. About 33% of participants did not have stress, and 11.2% had very severe stress. About 31% of participants with poor sleep quality suffered from mild levels of stress.

Table 2
Psychiatric and sleep characteristic of Iranian PLWH

Variables	Total (n = 304)	Poor quality sleep (n = 219)	Good quality sleep (n = 85)	P-value
	Mean (SD)	Mean (SD)	Mean (SD)	
Sleep duration				
PSQI score total score (SD)	7.71 (3.03)	9.03 (2.57)	4.41 (0.67)	< 0.0001
c-1 quality of sleep	1.17 (1.09)	1.55 (1.03)	0.17 (0.38)	< 0.0001
C-2 Sleep latency	0.97 (1.07)	1.21 (1.13)	0.34 (0.54)	< 0.0001
C -3 sleep duration	0.76 (1.00)	0.94 (1.07)	0.30 (0.59)	< 0.0001
C-4 sleep efficiency	2.96 (0.31)	2.96 (0.31)	2.96 (0.32)	0.976
C-5 sleep disturbances	0.86 (0.46)	0.97 (0.41)	0.60 (0.49)	< 0.0001
C-6 sleep medication	0.36 (0.88)	0.50 (0.72)	0.05 (0.00)	< 0.0001
C-7 Daytime sleepiness	0.63 (0.82)	0.87 (0.85)	0.2 (0.15)	< 0.0001
Depression score	14.23 (12.65)	16.06 (12.60)	9.52 (11.57)	< 0.0001
Anxiety score	10.94 (11.28)	12.75 (11.53)	6.25 (9.11)	< 0.0001
Stress score	16.48 (12.57)	18.99 (12.17)	10.04 (11.27)	< 0.0001
	No (percent)	No (percent)	No (percent)	
Depression category				
Normal (0–9)	135 (44.4)	81 (37)	54 (63.5)	< 0.0001
Mild (10–12)	25 (8.2)	17 (7.8)	8 (9.4)	
Moderate (13–20)	63 (20.7)	53 (24.2)	10 (11.8)	
Sever (21–27)	27 (8.9)	22 (10)	5 (5.9)	
Extremely severe (28–42)	54 (17.8)	46 (21)	8 (9.4)	
Anxiety category				
Normal (0–6)	152 (50)	91 (41.6)	61 (71.8)	< 0.0001
Mild (7–9)	19 (6.3)	14 (6.4)	5 (5.9)	
Moderate (10–14)	40 (13.2)	34 (15.5)	6 (7.1)	
Sever (15–19)	31 (10.2)	27 (12.3)	4 (4.7)	
Extremely severe (20–42)	62 (20.4)	53 (24.2)	9 (10.6)	

Variables	Total (n = 304)	Poor quality sleep (n = 219)	Good quality sleep (n = 85)	P-value
Stress category				
Normal (0–10)	99 (32.6)	49 (22.4)	50 (58.8)	< 0.0001
Mild (11–18)	89 (29.3)	68 (31.1)	21 (24.7)	
Moderate (19–26)	45 (14.8)	40 (18.3)	5 (5.9)	
Sever (27–34)	37 (12.2)	33 (15.1)	4 (4.7)	
Extremely severe (35–42)	34 (11.2)	29 (13.2)	5 (5.9)	

Table 3 shows the factors affecting sleep quality in our participants, with only stress and employment status affected the quality of sleep independently. Unemployed patients had a 2.13 times more chance (95% CI: 1.01–4.53) of having poor sleep quality than employed patients. Patients' stress scale score was also associated with their sleep quality (OR = 3.18, 95% C: 1.47–5.88).

Table 3

Results of the logistic regression model on the factors affecting the sleep quality in Iranian PLWH

Variables	Crude OR	CI 95% (P-value)	Multivariate adjusted OR	CI 95% (P-value)
Age, years (mean \pm SD)	0.99 (0.96–1.02)	0.536	0.99 (0.96–1.02)	0.773
BMI	0.96 (0.90–1.02)	0.216	1.01 (0.93–1.07)	0.973
Sex (female is reference)	1.03 (0.60–1.77)	0.904	1.34 (0.73–2.44)	0.786
Marital status (single is reference)	1.09 (0.66–1.80)	0.732	1.34 (0.73–2.44)	0.335
Education				
Under diploma	1		1	
Diploma	0.98 (0.561–1.73)	0.952	1.12 (0.57–2.17)	0.736
Upper diploma	1.06 (0.53–2.13)	0.854	1.52 (0.62–3.68)	0.354
Employment status (Employed is reference)	2.76 (1.44–5.32)	0.002	2.13 (1.01–4.53)	0.048
Duration of HIV diagnosed, month (median, IQR)	0.99 (0.99–1.00)	0.121	1.00 (0.99–1.01)	0.747
Duration of ART, years (Med, IQR)	0.99 (0.98–1.003)	0.241	0.995 (0.98–1.01)	0.441
CD4 count \geq 500	0.73(0.43–1.21)	0.223	0.868 (0.46–1.61)	0.868
Route of transmission				
Sexual contact	1		1	
Injection drug use	1.25 (0.65–2.27)	0.197	1.19 (0.50–2.17)	0.295
Unknown or Blood products	1.17 (0.62–1.60)	0.225	1.72 (0.40–3.21)	0.935
HIV/HBV coinfection ¹	1.15 (0.65–2.03)	0.615	0.970 (0.46–2.01)	0.970
Depression ²	2.96 (1.76–4.99)	< 0.0001	1.26 (0.61–2.67)	0.537
Anxiety ²	3.57 (2.07–6.15)	< 0.0001	1.52 (0.68–3.43)	0.314

Variables	Crude OR	CI 95% (P-value)	Multivariate adjusted OR	CI 95% (P-value)
Stress ²	4.95 (2.89–8.47)	< 0.0001	3.18 (1.47–5.88)	0.003
¹ HIV/HBV or HIV/HCV or HIV/TB co-infection				
² mild, moderate, severe, extremely severe patient as defined as abnormal				

4. Discussion

While many studies have shown the effects of drug and alcohol use on sleep quality and sleep disorders, few studies have examined the effects of psychological issues on sleep quality, especially in PLWH. Therefore, the present study has examined sleep quality and related factors among Iranian PLWH.

About 72% of our participants had poor sleep quality, according to PSQI results. In a study conducted by Oshinaike et al., about 60% of patients with HIV had poor sleep quality (15). A study conducted in Brazil reported that 47% of PLWH had poor sleep quality (16). A study conducted among PLWH in Tehran showed that 47.5% of them suffered from sleep disorders (4). The differences observed in the reported prevalence of sleep disturbance among PLWH in different studies can be attributed to differences in geographical areas of study, participants' demographic characteristics, inclusion and exclusion criteria, or different tools in data collection, but it seems that poor sleep quality is a significant problem for a significant proportion of PLWH, affecting the patients' quality of life and impairing their social and physical functioning.

In our study, no relationship was found between participants' gender, age, educational status, marital status, and BMI and their sleep quality, which contrasts with the results of other studies (4, 17, 18). Some similar studies showed an association between an increase in BMI and sleep disorders. There are hypotheses that abdominal fat and difficulty in achieving a comfortable sleeping position in people with higher BMI may lead to poor sleep quality, but the reason for this association remains unclear (19, 20). A study in China showed that age affects sleep quality among the general population, as younger people had more sleep disorders reflecting the significance of psychological issues among them (21).

Almost all components related to sleep quality were significantly different in people with good, and poor sleep quality, similar to previous studies as PLWH typically have sleep disturbances such as reduced sleep hours, waking up at night, and waking up early, overturning short brain waves, and rapid eye movements (22).

The results clearly show the effect of stress on sleep quality. People with stress are more likely to have trouble sleeping, and psychological disorders such as stress are among the leading causes of sleep disorders in PLWH (23). Studies on the effects of stress on PLWH show associations between stress and anxiety, depression, sleep quality, and fatigue during the day (24, 25). HIV is a significant source of stress

in patients due to several reasons, including fear of infecting others, exposing the HIV status, job changes, interpersonal relationships, and changes in personal life. Stress can reduce their immunity in the long term and accelerate the progression of the disease. One of the effective ways to reduce stress and increase patients' health is social support, which ultimately improves the quality of life (26).

In our study, employment status was a variable, which independently affected sleep quality, and unemployed people were more likely to have poor sleep quality. Unemployment in PLWH and health-related characteristics were also associated with demographic and social factors, including younger age, lower levels of education, and the presence of stigma in the community (27, 28). In a study conducted by Jabbari et al., occupational status and educational levels were associated with sleep quality among PLWH (29). Poverty is also a chronic stressor that can cause irreparable damage to a person's physical and mental health (30). Poverty and unemployment affect individuals' quality of life and, consequently, sleep quality (31).

5. Conclusion

Poor sleep quality seems to be a common issue caused by a variety of factors among PLWH. There is a need for intervention to improve the quality of sleep among this group of people. Social support, such as helping them find a job and non-pharmacological techniques, including sleep hygiene training, behavioral changes, and stress reduction activities, may also positively affect sleep disorders.

Limitations

The present study has limitations that need to be given more attention in future researches. Our first limitation is that the participants were the patients of VCT centers of Tehran and may not represent the whole population of people living with HIV in Iran. Furthermore, as we conducted a cross-sectional study, we could not evaluate the causal relationships between variables. Also, measuring the quality of life of patients could provide more information about the effect of sleep quality on people's lives, which was not measured in this study.

Abbreviations

PLWH: People Living With HIV

PSQI: Pittsburgh Sleep Quality Index

DASS: Depression Anxiety Stress Scales

BMI: Body Mass Index

Declarations

Ethics approval and consent to participate

We obtained written consent from participants prior to their participation in the study. The ethics committee of Tehran University of Medical Sciences approved the study protocol (ethical code: IR.TUMS.VCR.REC.1398.312).

Availability of data and materials

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no known competing financial interests or personal relationships that could have influenced the work reported in this paper.

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Authors' contributions

Samaneh Akbarpour and Arezu Najafi had the idea for this study.

Khosro Sadeghniaat Haghighi, Faezeh Aghajani, Amin Nakhostin-Ansari, collected the data. Parvin Afsar Kazerooni, Matin Bazargani, Somayeh Ghodrati wrote the article. Saber Soltani and Ali Jafarpour edited the final proof.

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