Quality of Sleep in People Living with HIV

Rafaela Catherine da Silva Cunha de Medeiros
Universidade Federal do Rio Grande do Norte Centro de Ensino Superior do Serido

Tatiane Andreza Lima da Silva
Universidade Federal do Rio Grande do Norte

Isis Kelly dos Santos
Universidade Federal do Rio Grande do Norte Centro de Ensino Superior do Serido

Ricardo Dias de Andrade
Universidade Federal do Rio Grande do Norte Centro de Ensino Superior do Serido

Renata Rangel Barboza
Universidade Federal do Rio Grande do Norte Instituto do Cerebro

Jason Azevedo de Medeiros
Universidade Federal do Rio Grande do Norte

Juliany de Souza Araújo
Universidade Federal do Rio Grande do Norte

Phelipe Wilde de Alcântara Varela (phelipewilde97@hotmail.com)
Universidade Federal do Rio Grande do Norte Centro de Ensino Superior do Serido
https://orcid.org/0000-0001-5833-428X

Maria Irany Knackfuss
Universidade Federal do Rio Grande do Norte

Breno Guilherme de Araújo Tinoco Cabral
Universidade Federal do Rio Grande do Norte

Paulo Moreira Silva Dantas
Universidade Federal do Rio Grande do Norte

Research article

Keywords: Sleep Disorders, HIV, Antiretroviral Therapy, Socioeconomic Factors

Posted Date: February 18th, 2020

DOI: https://doi.org/10.21203/rs.2.23849/v1

Abstract

The aim of this study is to analyze the factors associated with sleep quality in people living with HIV/AIDS (PLHA). It is a cross-sectional study with 314 PLHA. The Pittsburgh Sleep Quality Index was used to assess sleep quality. Socioeconomic, clinical and lifestyle habits were investigated through a structured anamnesis. Using the bivariate analysis, the differences between the sleep quality components in relation to the independent study variables were verified ($p < 0.10$). Linear regression was performed following a multilevel hierarchical model for each sleep quality component ($p \leq 0.5$). Regarding the sleep quality domains, there was an association with socioeconomic and clinical factors. Sleep latency with marital status; usual efficiency with marital status and use of HAART and sleep disorders with schooling. The study concludes that sleep latency and usual efficiency in PLHA are associated with marital status, while sleep quality with gender and sleep disturbance with schooling.

Introduction

Treatment of acquired immunodeficiency syndrome (AIDS) requires treatment with antiretroviral therapy. Treatment, although necessary, is responsible for adverse effects on social context and psychophysiological aspects [1-3]. Throughout the history of AIDS, changes in behavior patterns, sleep quality, development of depressive symptoms, low self-esteem, low levels of self-care, fear and anxiety were observed [4]. In addition, the presence of comorbidities, gender, age and lifestyle aspects such as physical exercise, alcohol consumption and diet may interfere with these changes [5].

Sleep disorders of people living with HIV/AIDS (PLHA) have been described in the literature, especially after the use of Highly Active Antiretroviral Therapy (HAART). These changes promote sleep quality disorders, such as decreased sleep time, daytime sleepiness, frequent accidents, insomnia, and nighttime awakening. Accumulation of sleep bias can impact the social context, such as activities of daily living, performance and physiological changes [6, 7]. Sleep disorders can be identified in behaviors such as, insomnia, respiratory disorders and nocturnal movements, in which, entails "a sleepless night" and, if it occurs periodically, can cause short, medium and long-term damage, affecting daily activities, performance, as well as physiological changes [8].

It is important to mention that the quality of sleep presents as an important factor to be evaluated in PLHA, due to recurrent complaints about the quality of sleep in this population, such as difficulty in falling asleep or remaining a sleep [9] and secondly, poor quality of sleep is an indicator of many other diseases that can negatively affect feelings, ideas, and motivations [10]. Another issue that may be pointed out is the possible relation of socioeconomic and clinical factors to the domains of sleep quality, because if identified in advance by health professionals, there may be immediate interventions. In this context and in an attempt to fill a gap in the literature, the objective of the current study was to analyze the association between the domains of sleep quality with socioeconomic and clinical indicators in people living with HIV/AIDS.

Methods

The research was a cross-sectional study, with PLHA treated at two referral clinics for infectious diseases in the state of Rio Grande do Norte, Brazil. The consecutive non-probabilistic sample was recruited from April 2012 to June 2015. The study was approved by the Ethics Committee under the protocol number 229/11-P CEP/UFRN and all participants gave their informed consent in writing.

Inclusion criteria were: 18 years old or older, both genders, diagnosed with HIV/AIDS and under regular clinical follow-up. Individuals who presented any type of clinical or cognitive condition that impeded participation in the research, such as patients with severe hearing impairment, psychoactive substance or limitations in the ability to respond to the unaccompanied questionnaire were excluded.

The data were collected through individual interviews, using structured questionnaires in which they were applied by two previously trained evaluators. The questionnaires evaluated socioeconomic aspects, gathering information on gender, age, schooling, marital status, income and physical exercise, as well as clinical aspects such as HIV diagnosis time and antiretroviral therapy.

The Pittsburgh Sleep Quality Index validated for the Brazilian population, was used to evaluate the quality of sleep. It consists of 19 items that evaluate seven components: subjective sleep quality, latency, duration, habitual efficiency, sleep disturbances, hypnotic use, and diurnal dysfunction in the last month. Values smaller than five points defined "Good sleep quality"; values between six and eleven, "Poor quality" and values of eleven or above "Sleep disorder". To answer the questions the subjects were told to think about the quality of sleep in the previous four weeks [11].

The frequencies, percentages, averages and standard deviations of the socioeconomic, clinical and components of the Sleep Quality Index were calculated. Subsequently, the selection of the variables to be included in the multiple regression models was carried out in order to eliminate from the models the variables that did not show any association with each component of the quality of sleep Index. In this analysis, Student's t-test was used to compare the average scores of each domain between the levels of each variable, and the variables that presented a value of $p < 0.10$ were selected for inclusion in the regression models.

For the multivariate analysis, several multiple linear regressions were used. In each regression, the dependent variable was one of the components of quality of sleep and the independent variables were all variables selected in the respective bivariate analysis. In each developed model, the independent variables that did not present a significant association ($p < 0.05$) with the dependent variable were eliminated in a systematic process.

The results are presented as adjusted point estimates of the difference in score of each domain between levels of each independent variable and respective 95% confidence intervals, a significance level of 5% was adopted for all analyses. Statistical analysis was performed using Programs IBM SPSS Statistics (v.22, SPSS an IBM Company, Chicago, IL).

Results

A total of 314 adults living with HIV were included in the study. Table 1 presents information on the socioeconomic and clinical profile of PLHA, showing that in the study most of the individuals were male, single with an income of less than a monthly salary of the Brazilian minimum wage, graduated from elementary school, sedentary, diagnosed with HIV approximately 6 years before and were under HAART for 5.5 years, reflecting the local population of adults living with HIV infection.

Insert table I here.

Table 2 presents the seven components of sleep quality and the overall classification, in which the majority of participants were classified as "poor" sleep quality.
Tables 3 and 4 present the results of the linear regression analysis, which showed as main results the association of subjective sleep quality with gender; sleep latency with marital status; the usual efficiency with marital status and the use of HAART; sleep disorder with schooling, and finally, the use of hypnotics with age.

Insert table II here.

Insert table III here.

Insert table IV here.

Discussion

Considering the main objective of the study which was to analyze the quality of sleep and to identify whether socioeconomic and clinical aspects are associated with the domains of sleep quality in people living with HIV/AIDS, there was a predominance of sleep quality rating as "poor". Moreover, some associations were found among the domains with gender, age, schooling, marital status and the use of antiretroviral therapy.

In this manner, the high prevalence of sleep quality classified as "poor" in PLHA is related to the confrontation of the disease condition, since the diagnosis of being HIV positive is associated with the need for chronic use of antiretroviral therapy, which promotes several changes that are directly related to psychological, physical and social aspects [1].

The knowledge of the influence of socioeconomic factors on sleep parameters is fundamental and complementary, since it is relevant to consider socioeconomic factors that may also interfere with sleep parameters, for example, the education level of the individuals with HIV may differentiate them in regards to the access of information and has great importance in health conditions; gender is another factor because women often have increased or impaired mental health variables (anxiety and depression); Marital status, because living with HIV means facing discrimination, breaking up relationships and sexual

problems. Under such circumstances, living and coping with the disease becomes increasingly challenging and, as a consequence, the quality of sleep can suffer [12].

Sleep quality impairment and the presence of disorders in PLHA are common since the onset of infection, and that is because the central nervous system (CNS) may be an important target of infection [13-15], in which other factors may also be related such as: cognitive impairment, peripheral painful neuropathy, chronic fatigue, difficulty concentrating, depression, symptoms of inability to be productive during the day and unwillingness to perform healthy habits [15,17].

Detailing the results on the domains of sleep quality analyzed, we found relations between the subjective quality of sleep with gender. In view of this result, there is a greater impairment of the subjective quality of sleep in women that were included in this study; this relation has been pointed out in the literature, affirming that females show sleep interruption, being related to different psychological, cultural, social and environmental influences factors [10,18]. One of the possible explanations for this finding is based on the fact that the higher prevalence of changes such as the Metabolic Syndrome is observed in women and not in men, which is generally associated with greater accumulation of fat in the central region of the body, and this abdominal obesity leads to higher indices of body image dissatisfaction, contributing to a greater risk of developing psychological disorders, such as depression; and sleep disorders [19-20].

As for the domain Sleep latency, we can observe an association with the marital status, this factor can be explained by the fact that the group classified as "single" presents less time to fall asleep (latency), which is a positive characteristic when compared to those who are married.

It is known that sleep latency corresponds to difficulty in initiating or continuing to sleep, and these conditions may be related to the situations in which individuals face due to the state of tension and anxiety in their daily life, therefore, being on condition of chronic disease may increase this behavior [21]. Thus, for these reasons, the literature also points out that PLHA present these disorders significantly, indicating "insufficient sleep" or "sleeping less than they would like to" [10,22]. However, there are unknown reports that point to the relation of poor sleep latency with being single, thus requiring that further studies be performed to clarify this association.

On the other hand, the usual efficiency component was associated with marital status, where the bachelors presented greater sleep efficiency or felt that the sleep period reached was enough; and with the use of HAART, indicating in this group greater sleep efficiency. There are contradictory reports on this aspect in the literature, since it is indicated that sleep problems are common in patients who are using HAART because they promote high prevalence of insomnia, complaints of daytime sleepiness. Furthermore, increased neck circumference and central obesity are potential risk factors for obstructive sleep apnea in patients with HIV undergoing HAART [23-25]. Another factor is the stress associated with HIV infection that can lead to the onset of insomnia. In addition, depression is common in the seropositive population, in which it is directly related to insomnia [13,26].

In particular, it has been elucidated that the use of Efavirenz, present in conventional combinations and in the widely prescribed 3-in-1 version, causes a number of physical and psychological manifestations that are related to sleep impairment of PLHA. As well as symptoms, such as fatigue, pain, nausea, depression associated with the stressful circumstances surrounding the diagnosis can also be adverse effects of HAART [27,28].

Another association found in the present study was between the sleep disorder domain and schooling, thus this association needs to be investigated later, since there is insufficient information in the literature that justifies if the low level of schooling in PLHA makes this population more predisposed to sleep disorders. However, the indicative of the present study for such result is that low educational level or low clarification on their health (disease) causes PLHA not to present characteristics that aid in the hygiene of sleep. Thus, the literature indicates that sleep hygiene refers to a set of measures and attitudes that point to a certain level of clarification, for example, it is necessary to know the different biological mechanisms regulating sleep; stimulate the regularity of sleeping and waking hours; know about the adverse effects of alcohol and stimulants like coffee and cigarette. It is necessary to take some care in regards to the place of sleep, such as adequate temperature and light, comfortable bed and nightwear, avoid watching television, reading or studying in bed. In addition to being extremely necessary the modification of lifestyle with the inclusion of healthy eating habits and practice of physical activity as a co-adjuvant in sleep stimulation, that is, clarification is needed to promote attitudes that favor good sleep quality [12].

Finally, the use of hypnotics or medications indicated to assist the individual in maintaining sleep was related to age, indicating that older individuals with HIV/AIDS included in this study used medications as a way to decrease sleep disorder and consequently symptoms of insomnia. In this sense, studies have elucidated that during adulthood there are reports of nights of disturbed sleep, linking this factor with modifications such as: age, stress and health problems. Therefore, pharmacotherapy, through prescription and over-the-counter (OTC) drugs, has been a common way of managing insomnia symptoms and this use is particularly high among older adults [29].

Poor quality of life related to sleep is associated with the risk of cardiovascular disease [30], β-amyloid accumulation in the brain suggests an increased risk of developing Alzheimer's [31] and makes the behavior more prone to developing obesity [32]. Therefore, it is necessary to understand and address the mechanisms that promote the reduction of sleep quality.

When analyzing the existing limitations in this study we can point out the lack of information about specific types of drugs and antiretroviral therapy that PLHA used, since treatment with antiretroviral therapy is divided into four classes of inhibitors. The evaluation of the use of medication for psychiatric disorders for reasons other than depression and anxiety factor common in the population studied needs to be investigated so that there is a control of all medications used. Non-use of objective instruments to assess sleep quality such as polysomnography, which is a non-invasive test that measures the breathing, muscular and cerebral activity of the individuals during sleep, and the apparatus *actimetro* that records levels of activity and rest. Another limitation was the sample size and the regional character of the study,

which limits extrapolating the results to other populations. In addition, there is a need for longitudinal studies that assess the quality of sleep of people living with HIV/AIDS.

In the present study most of the population had poor sleep quality. However, women living with HIV, single and with a low level of education, had the highest scores in the assessed sleep quality domains. In view of these findings, it is important to mention that the observation of sleep quality and all its components is a useful tool in the comprehensive evaluation of patients living with HIV, since sleep is such an important element for the general health of these subjects.

Declarations

Conflict of interest

The authors have no conflicts of interest to disclose.

Funding

This research did not receive any specific grant from funding agencies.

Acknowledgments

We thank the specialized assistance service of the Giselda Trigueiro and Rafael Fernandes hospital for assistance in collecting data. Matheus Dantas for structuring the paper to the journal norms.

Data Statement

The data is available to access or suitable to post.

References

1. Birbal, S., Dheda, M., Ojewole, E., & Oosthuizen, F. (2016). Adverse drug reactions associated with antiretroviral therapy in South Africa. *African Journal of AIDS Research, 15*(3), 243-248.
2. Juchem, G. M. V., & Lazzarotto, A. R. (2010). Physical training in the lipodistrophy syndrome: a systematic review. *Revista Brasileira de Medicina do Esporte, 16*(4), 310-313.
3. Tsuda, L. C., da Silva, M. M., Machado, A. A., & Fernandes, A. P. M. (2012). Alterações corporais: terapia antirretroviral e síndrome da lipodistrofia em pessoas vivendo com HIV/AIDS. *Revista Latino-Americana de Enfermagem, 20*(5), 847-853.
4. Ferreira, L. T. K., & Ceolim, M. F. (2012). Sleep quality in HIV-positive outpatients. *Revista da Escola de Enfermagem da USP, 46*(4), 892-899.
5. McDermott, A., Zaporojan, L., McNamara, P., Doherty, C. P., Redmond, J., Forde, C., et al. (2017). The effects of a 16-week aerobic exercise programme on cognitive function in people living with HIV.

AIDS care, 29(6), 667-674.

6. Chokroverty, S. (2010). Overview of sleep & sleep disorders. *Indian J Med Res, 131*(2), 126-140.
7. Dabaghzadeh, F., Khalili, H., Ghaeli, P., & Alimadadi, A. (2013). Sleep quality and its correlates in HIV positive patients who are candidates for initiation of antiretroviral therapy. *Iranian journal of psychiatry, 8*(4), 160.
8. Müller, M. R., & Guimarães, S. S. (2007). Sleep disorders impact on daily functioning and life quality. *Estudos de Psicologia (Campinas), 24*(4), 519-528.
9. Taibi, D. M., Price, C., & Voss, J. (2013). A pilot study of sleep quality and Rest–Activity patterns in persons living with HIV. *Journal of the Association of Nurses in AIDS Care, 24*(5), 411-421.
10. Costa, S. V. d., & Ceolim, M. F. (2013). Factors that affect inpatients' quality of sleep. *Revista da Escola de Enfermagem da USP, 47*(1), 46-52.
11. Soárez, D., Coelho, P., Castelo, A., Abrão, P., Holmes, W. C., & Ciconelli, R. M. (2009). Tradução e validação de um questionário de avaliação de qualidade de vida em AIDS no Brasil. *Revista Panamericana de Salud Pública, 25*, 69-76.
12. Junqueira, P., Bellucci, S., Rossini, S., & Reimão, R. (2008). Women living with HIV/AIDS: sleep impairment, anxiety and depression symptoms. *Arquivos de neuro-psiquiatria, 66*(4), 817-820.
13. Chaponda, M., Aldhouse, N., Kroes, M., Wild, L., Robinson, C., & Smith, A. (2018). Systematic review of the prevalence of psychiatric illness and sleep disturbance as co-morbidities of HIV infection in the UK. *International journal of STD & AIDS, 29*(7), 704-713.
14. Crum-Cianflone, N. F., Roediger, M. P., Moore, D. J., Hale, B., Weintrob, A., Ganesan, A., et al. (2012). Prevalence and factors associated with sleep disturbances among early-treated HIV-infected persons. *Clinical infectious diseases, 54*(10), 1485-1494.
15. Wu, H.-C., Lu, P.-L., Lin, W.-C., Yu, C.-T., & Feng, M.-C. (2017). Sleep quality, depression, anxiety, and self-esteem in people living with HIV/AIDS (PLWHA). *Hu Li Za Zhi, 64*(6), 34-44.
16. Gamaldo, A. A., Gamaldo, C. E., Allaire, J. C., Aiken-Morgan, A. T., Salas, R. E., Szanton, S., et al. (2014). Sleep complaints in older blacks: do demographic and health indices explain poor sleep quality and duration? *Journal of Clinical Sleep Medicine, 10*(07), 725-731.
17. Saberi, P., Neilands, T. B., & Johnson, M. O. (2011). Quality of sleep: associations with antiretroviral nonadherence. *AIDS Patient Care and STDs, 25*(9), 517-524.
18. Tu, X., Cai, H., Gao, Y.-T., Wu, X., Ji, B.-T., Yang, G., et al. (2012). Sleep duration and its correlates in middle-aged and elderly Chinese women: the Shanghai Women's Health Study. *Sleep medicine, 13*(9), 1138-1145.
19. Andrade, R. G., & Iriart, J. A. B. (2015). Stigma and discrimination: the experiences of HIV-positive women in poor neighborhoods of Maputo, Mozambique. *Cadernos de saude publica, 31*(3), 565-574.
20. Medeiros, D. C. d., Galvão, H. A., Melo, J. P. d., Medeiros, R. C. d. S. C., Silva, T. A. L. d., Medeiros, J. A. d., et al. (2016). Somatótipo e imagem corporal em pessoas vivendo com Hiv/Aids. *Revista Brasileira de Medicina do Esporte, 22*(1), 54-58.

21. da Cunha, M. C. B., Zanetti, M. L., & Hass, V. J. (2008). Qualidade do sono em diabéticos do tipo 2. *Revista Latino-Americana de Enfermagem, 16*(5).
22. Sandoval, R., & Gilkerson, R. (2015). Management of sleep quality and pain in an individual living with HIV and hepatitis C coinfection using an activity monitor. *Journal of the International Association of Providers of AIDS Care (JIAPAC), 14*(6), 476-481.
23. Lo Re III, V., Schutte-Rodin, S., & Kostman, J. (2006). Obstructive sleep apnoea among HIV patients. *International journal of STD & AIDS, 17*(9), 614-620.
24. Manzar, M. D., Sony, P., Salahuddin, M., Kumalo, A., Geneto, M., Pandi-Perumal, S. R., et al. (2017). Electrolyte imbalance and sleep problems during anti-retroviral therapy: an under-recognized problem. *Sleep Science, 10*(2), 64.
25. Patil, S. P., Brown, T. T., Jacobson, L. P., Margolick, J. B., Laffan, A., Johnson-Hill, L., et al. (2014). Sleep disordered breathing, fatigue, and sleepiness in HIV-infected and-uninfected men. *PLoS One, 9*(7), e99258.
26. Cruess, D. G., Antoni, M. H., Gonzalez, J., Fletcher, M. A., Klimas, N., Duran, R., et al. (2003). Sleep disturbance mediates the association between psychological distress and immune status among HIV-positive men and women on combination antiretroviral therapy. *Journal of Psychosomatic Research, 54*(3), 185-189.
27. Rafihi-Ferreira, R. E., Pires, M. L. N., & Soares, M. R. Z. (2012). Sleep, quality of life and depression in women in breast cancer post-treatment. *Psicologia: Reflexão e Crítica, 25*(3), 506-513.
28. Wibbeler, T., Reichelt, D., Husstedt, I.-W., & Evers, S. (2012). Sleepiness and sleep quality in patients with HIV infection. *Journal of Psychosomatic Research, 72*(6), 439-442.
29. Leggett, A., Pepin, R., Sonnega, A., & Assari, S. (2016). Predictors of new onset sleep medication and treatment utilization among older adults in the United States. *Journals of Gerontology Series A: Biomedical Sciences and Medical Sciences, 71*(7), 954-960.
30. Mullington, J. M., Haack, M., Toth, M., Serrador, J. M., & Meier-Ewert, H. K. (2009). Cardiovascular, inflammatory, and metabolic consequences of sleep deprivation. *Progress in cardiovascular diseases, 51*(4), 294-302.
31. Shokri-Kojori, E., Wang, G.-J., Wiers, C. E., Demiral, S. B., Guo, M., Kim, S. W., et al. (2018). β-Amyloid accumulation in the human brain after one night of sleep deprivation. *Proceedings of the National Academy of Sciences, 115*(17), 4483-4488.
32. Mavanji, V., Teske, J. A., Billington, C. J., & Kotz, C. M. (2013). Partial sleep deprivation by environmental noise increases food intake and body weight in obesity-resistant rats. *Obesity, 21*(7), 1396-14

Tables

Table I - Socioeconomic and clinical data of people living with HIV (n = 314)

Age (m; sd)	41,5	11,8
Sex		
Male (n; %)	181	57,5
Female (n; %)	134	42,5
Education		
Analfabeto (n; %)	46	14,6
Elementary School (n; %)	147	46,7
High School (n; %)	91	28,8
Higher Education (n; %)	31	9,9
Marital status		
Single (n; %)	209	66,3
Married (n; %)	106	33,7
Income		
Less than 1 salary (n; %)	42	13,3
1/2salaries (n; %)	222	70,5
3 salaries above (n; %)	51	16,2%
Exercise		
Yes (n; %)	83	26,3%
No (n; %)	232	73,7%
Time VIH (m; sd)	6,6	
HAART		
Yes (n; %)	281	89,2%
No (n; %)	34	10,8%
Time HAART		
Short (n; %)	100	31,7%
Medium (n; %)	177	56,2%
Long (n; %)	38	12,1%

m: mean; sd: standard deviation; n: number; %: percentage; HAART: antiretroviral therapy.

Table II - Components of the Sleep Quality Index and Overall Rating

Component 1 - Subjective sleep quality		
Good (n;%)	193	61,3
Bad (n;%)	64	20,3
Very good (n;%)	34	10,8
Very bad (n;%)	24	7,6
Component 2 - Sleep latency (min) (m; sd)	0,60	0,90
Component 3 - Duration of sleep (m; sd)	7,9	2,5
Component 4 - Normal sleep efficiency (m; sd)	91	49
Component 5 - Sleep disorder (m; sd)	7,7	4,7
Component 6 - Use of Hypnotics		
Not once (n;%)	263	83,5
1 to 2 times/ week (n;%)	29	9,2
3 times/ wk or more (n;%)	23	7,3
Component 7 - Dysfunction_during_day (m;sd)	1,3	1,6
QdS_Global (m;sd)	6,2	3,4
Global _ classification		
Very good	34	22,4
Good (n;%)	193	36,8%
Bad (n;%)	164	52,1%
Disturb (n;%)	35	11,1%

m: mean; sd: standard deviation; n: number; %: percentage; QdS: quality of sleep.

Table III - Multivariate analysis of sleep quality components of people living with HIV (N = 314), attended at the SAE of Natal and Mossoró, RN, Brazil

	Subjective sleep quality				Sleep latency				Normal sleep efficiency			
	Difference	IC 95%		p-value	Difference	IC 95%		p-value	Difference	IC 95%		p-value
Sex	1,33	1,22	1,44	0,049*	1,41	1,35	1,46	0,087	1,50	1,38	1,62	0,151
Age	40,33	37,76	42,89	0,292	41,48	40,11	42,85	0,887	41,24	38,36	44,11	0,833
Education	3,42	3,10	3,74	0,283	3,27	3,10	3,44	0,882	3,25	2,89	3,61	0,922
Marital status	1,36	1,26	1,46	0,498	1,32	1,26	1,37	0,041*	1,44	1,32	1,55	0,043*
Use HAART	1,12	1,05	1,19	0,557	1,10	1,06	1,13	0,117	1,19	1,11	1,26	0,013*

HAART: antiretroviral therapy; Linear regression; CI: Confidence interval; * p-value <0.05.

Table IV - Multivariate analysis of sleep quality components of people living with HIV (N = 314), attended at the SAE of Natal and Mossoró, RN, Brazil.

	Sleep disorder				Use of Hypnotics			
	Difference	IC 95%		p-value	Difference	IC 95%		p-value
Sex	1,38	1,27	1,48	0,344	1,41	1,35	1,47	0,230
Age	41,38	38,87	43,90	0,908	40,63	39,24	42,02	0,001*
Education	3,59	3,28	3,90	0,016*	3,33	3,15	3,50	0,058
Marital Status	1,34	1,24	1,44	0,801	1,35	1,29	1,40	0,206
Use HAART	1,09	1,02	1,15	0,534	2,77	2,61	2,93	0,164

HAART: antiretroviral therapy; Linear regression; IC: Confidence interval; * p-value <0.05.