ORIGINAL ARTICLE / *ARTIGO ORIGINAL*

Sleep disturbances in older adults are associated to female sex, pain and urinary incontinence

Problemas de sono em idosos estão associados a sexo feminino, dor e incontinência urinária

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ABSTRACT: *Objectives:* The prevalence of sleep problems in elderly, such as insomnia, is a relevant issue in our society. Poor sleep quality is viewed by many as an inevitable result of aging. In this context, this study aimed to estimate the prevalence and associated factors of sleeping disturbances in elderly men and women (60 years and older). *Methods:* The present study is part of SABE Study (Health, Well-being and Aging), a cohort conducted in São Paulo, Brazil. The sample included in the present cross-sectional study comprised 1,334 elderly people aged 60 years or older. Sleep disturbances were assessed based on responses of study participants on whether they had experienced any sleep disturbance in the past month. *Results:* Among the elderly assessed, 44.9% had overall sleep disturbances, which were more frequent in women (51.5%) and in 75 to 79 years old (48.2%). According to the regression analysis, the variables gender, joint diseases, as well as nocturia and urinary incontinence, were associated with sleep disorders. Increase in sleep disturbances was found not to be linearly age-dependent. *Conclusions:* Gender, pain, urinary and nocturia incontinence were factors associated with sleep disorders. Thus, we might conclude that the absence of sleep disturbances in older adults depends on gender and health status.

Keywords: Sleep. Elderly. Pain. Urinary incontinence.

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RESUMO: *Objetivos:* A prevalência de problemas de sono em idosos, como insônia, é uma questão relevante em nossa sociedade. A má qualidade do sono, por exemplo, é vista por muitos como um resultado inevitável do envelhecimento. Neste contexto, este estudo teve como objetivo estimar a prevalência e os fatores associados a distúrbios do sono em homens e mulheres idosos (60 anos ou mais). *Métodos:* O presente trabalho é parte do estudo de coorte Saúde, Bem-Estar e Envelhecimento (SABE), realizado em São Paulo, Brasil. A amostra deste estudo transversal constituiu-se de 1.334 idosos com 60 anos ou mais. Os distúrbios foram avaliados com base nas respostas dos participantes, levando em conta se eles tinham experimentado qualquer perturbação do sono no mês anterior. *Resultados:* Dentre os avaliados, 44,9% indicaram distúrbios do sono em geral, sendo esses mais frequentes em mulheres (51,5%) e na faixa etária de 75 a 79 anos (48,2%). De acordo com a análise de regressão, gênero, doenças articulares, noctúria e incontinência urinária foram associados aos distúrbios, sobre os quais também foi verificado que seu aumento não é linearmente dependente da idade. *Conclusões:* Sexo, dor, incontinência urinária e noctúria são fatores associados a distúrbios do sono em idosos. Assim, concluímos que a sua ausência está associada ao gênero e ao estado de saúde.

Palavras-chave: Sono. Envelhecimento. Dor. Incontinência urinária.

INTRODUCTION

There is consensus about the changes that occur in the characteristics of sleep throughout life[1]. Its poor quality, experienced by elderly people, is seen by many as an inevitable result of aging. However, although there is a reduction in sleep-wake consolidation among the elderly[2], the sleep quality in this population should not necessarily be poor. A systematic review by Smagula et al.[3] suggests that chronological age is not an independent predictor of future sleep disorders.

The prevalence of such problems in the elderly, such as insomnia, for example, may lead to impairment of cognition and development of dementia, evidencing the important role of sleep in the decline of cognitive functions in this group[4]. On the other hand, the elderly tend to suffer less from acute sleep deprivation than younger adults. A recent study shows that total sleep duration was more important for cognition in a group of young adults (mean age = 23.1 years) than in older adults (62.7 years). Sleep disruptions, however, were shown to be detrimental to cognitive aspects in both groups[5].

Changes involving the onset and end times of sleep are expected during aging and do not necessarily indicate problems[2]. Thus, older people who sleep earlier than other adults may have 7.5 consecutive hours of good quality sleep, and not report poor quality upon awakening[6]. In addition, sleep episodes of nine hours or more were associated with decreased cognitive performance in the elderly[7].

Although there is consensus about changes in sleep during aging with an impact on quality, especially by increasing the duration of more superficial stages[1], much remains to

be clarified on the subject. In this context, the present study aimed to estimate the prevalence and factors associated with sleep disorders in the elderly of both genders living in the city of São Paulo.

METHODS

The present work is part of the Health, Well-being and Aging Study (SABE).

To assess the sleep quality, participants answered whether or not they had any difficulty in the month prior to the survey. The sample considered for this cross-sectional study consisted of 1,334 elderly individuals aged 60 years and over, living in the city of São Paulo and interviewed in 2010.

The multivariate analysis consisted of the use of Poisson regression with robust estimation, which allows the direct estimation of prevalence ratios (PR)[8] by approximation to cumulative incidence ratios. The outcome variable was "sleep difficulty"; the "age" variable was used as an independent variable, in the form of five-year age groups and as the exposure variable, in a continuous form. The number of people per room represents the average number of dwellers divided by the number of rooms. The International Consultation on Incontinence Questionnaire-Short Form (ICIQ-SF), validated in Portuguese[9], was used to evaluate urinary incontinence (UI).

The original SABE study is in conformity with the principles set out in the Declaration of Helsinki and has received the approval of the respective ethics committees of the countries involved. In Brazil, it was approved by the Research Ethics Committee of the School of Public Health of Universidade de São Paulo and by the National Research Ethics Committee (COEP 83/06, March 14, 2006).

RESULTS

Among the elderly, 44.9% presented difficulties with sleep, being more frequent in the female sex (51.5% of women have difficulties, as well as 34.5% of men) and among the individuals aged75 to 79 years (48.2%). As with age, the average number of people per room was not a factor with a significant repercussion on the difficulty to sleep (Table 1).

We highlight the health problems as statistically significant factors associated with sleep difficulty. Among those complaining of sleep problems, 52.6% had diabetes mellitus (DM), 59.2% had joint diseases and 53.4% mentioned pain or discomfort (p<0.05).

Table 1 shows the distribution of the elderly according to the variables: (1) difficulty sleeping; (2) sociodemographic; and (3) health.

We evaluated the possible collinearity between nocturia and incontinence, although the mean Variance Inflation Factor (VIF) was 1.90 and no variable had VIF>5.00, satisfying the usual criteria for collinearity[10]. In the sample, both variables were

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Table 1.Distribution of the elderly according to sleep difficulty, sociodemographic and health variables, São Paulo, 2010 (n=981).

Variables	Sleep difficulty		p-value
	No (%)	Yes (%)	
Sex			
Male	65.4	34.6	0.00*
Female	48.2	51.8	
Age (years)			
65 to 69	56.2	43.8	0.72
70 to 74	56.1	43.9	
75 to 79	51.0	49.0	
>80	54.4	45.6	
Average number of people per room			
< 1	52.5	47.5	0.51
1	57.9	42.1	
1.01 to 1.99	54.8	45.2	
≥ 2	50.2	49.8	
Live alone			
No	54.2	45.8	0.44
Yes	57.8	42.2	
Diabetes mellitus			
No	57.3	42.7	0.01*
Yes	47.4	52.6	
Stroke			
No	55.1	44.9	0.68
Yes	52.4	47.6	
Joint pain			
No	62.7	37.3	0.00*
Yes	40.8	59.2	
Pain or discomfort			
No	61.2	38.8	0.01*
Yes	46.6	53.4	
Nocturia			
No	63.9	36.1	0.01
Yes	52.5	47.5	
Urinary incontinence score			
None	58.7	41.3	0.00*
≥ 3	44.2	55.8	

*p<0.05.

independent (Crammer coefficient=0.04 and Fisher exact test with p=0.149). Thus, nocturia and the UI score were not shown to be associated variables, so they were included in the regression analysis.

Body aches and joint disease were associated with each other (p<0.01), but remained together in the regression analysis because they were collinear. According to this analysis, gender, joint diseases, nocturia and UI were variables associated with difficulty sleeping (Table 2).

DISCUSSION

The present study found a higher prevalence of sleep disorders in women. In fact, the literature shows gender differences for various aspects of health. Longevity may also be associated with greater morbidity, which may lead to sleep disorders among the elderly[11,12]. In addition, Oliveira et al.[13] suggest that the causes of the greatest sleep problems among women are related to their association with stress-related factors, such as family conflicts and a higher incidence of depression. These factors, both isolated and combined, can negatively impact sleep.

Table 2. Poisson regression of the difficulty falling asleep among the elderly and sociodemographic and health variables, São Paulo, 2010 (n=981).

Variables	PR	CI95%
Age (years)		
65 to 69	1.02	0.82 – 1.27
70 to 74	0.89	0.74 – 1.08
75 to 79	0.87	0.71 – 1.06
≥ 80	0.81	0.68 – 0.95
Female sex	1.44	1.25 – 1.66
Average number of people per room		
1,00	1.01	0.79 – 1.30
1,01 to 1,99	1.04	0.82 – 1.31
≥ 2,00	1.05	0.86 – 1.29
Live alone	1.00	0.82 – 1.23
Diabetes Mellitus	1.09	0.93 – 1.27
Stroke	0.99	0.75 – 1.31
Joint pain	1.26	1.08 – 1.46
Pain in general	1.43	1.24 – 1.64
Urinary incontinence	1.25	1.08 – 1.43
Nocturia	1.27	1.04 – 1.55

PR = prevalence ratio; CI95% = confidence interval of 95%.

In this study, advanced age was not associated with sleep disorders. The group of 80 years or more was a protective factor for these disorders, which may suggest good sleep quality, although it has not been directly evaluated. On the other hand, some studies have mentioned the exact opposite: constant decline in sleep quality with age[14], which does not appear to be linear.

Araújo and Ceolim[15] observed worse sleep quality in individuals aged 70 to 79 years. These authors indicate that quality is more affected by health problems than by chronological age[15]. Corroborating this finding, data from the Health, Aging and Retirement Survey in Europe (2011/2012) show that people aged between 60 and 69 years reported fewer sleep problems than those aged 50 to 59 years.

In addition, in a study conducted by Marquié et al.[16], an increase in difficulty was observed both in maintaining sleep and in falling asleep again, as well as increasing the occurrence of early arousal in individuals around 50 years of age. This tendency remained constant, reducing at least in the case of early awakening, around 70 years of age. One of the authors' explanations is that retirement would have altered the daily routine of individuals to the point of improving sleep quality. Retirement and social isolation seem to be psychosocial characteristics that interfere[2,17]. This idea corroborates the hypothesis that social support represents an important strategy to improve the quality in question[18].

The association between the health of the elderly and the quality of their sleep has been established in several studies[11]. Health problems lead to its reduction and, paradoxically, the use of benzodiazepines as a solution to the difficulty of falling asleep can lead to side and harmful effects[12]. These substances are also an example of inappropriate drugs for the elderly, according to Beers-Fick[19] criteria, given the high risk of side effects. Thus, the adoption of medications to improve the quality of sleep in a population that generally uses several others for different problems can generate situations that are more harmful than beneficial.

In a study of healthy older adults who were physically active and exposed to light in the morning, no sleep fragmentation was observed[20]. The results suggest that fragmentation and other changes are consequences of habits and living conditions, and not a biological factor inherent to aging itself.

In the present study, pain in general and joint pain were associated with difficulty falling asleep, corroborating the literature. It is important to emphasize, however, that due to the transversal character of this work, it is not possible to establish the direction of this association. The reduction of sleep quality has been related to musculoskeletal pain both in adults[21,22] and in children and adolescents[23]. Some authors suggest that pain can lead to poor sleep quality in the same way that it leads to an increase in the perception of other daily stressors, due to the greater sensitivity caused by the painful state[23,24].

In summary, in view of the results obtained in this study, it is observed that there is also an association between pain and sleep difficulties in this age, as in children, adolescents and young adults. On the other hand, a characteristic of the elderly is the occurrence of

UI, which presents itself as involuntary urine loss and, when present in women, has a negative effect on the quality of sleep[25], which may contribute to a higher prevalence of sleep difficulty in the female sex. It is worth noting, however, that, although less prevalent, UI also occurs in men[26]. Regardless of gender, it was associated with difficulty falling asleep in the elderly participants of this study. Other studies have shown that behavioral changes such as avoiding excessive fluid before bedtime and minimizing caffeine and citrus fruits due to the bladder irritant effect reduce UI[27] and consequently improve sleep quality.

CONCLUSION

The difficulty in falling asleep in elderly residents of the city of São Paulo, participants of this study, is related to female sex, joint diseases, UI and nocturia. Thus, promoting the health of the elderly is the first step towards improving their quality of sleep.

REFERENCES

1. Danker-Hopfe H. Growth and development of children with a special focus on sleep. Prog Biophys Mol Biol. 2011 Dec; 107(3): 333-8.

2. Geib LTC, Cataldo-Neto A, Wainberg R, Nunes ML. Sono e Envelhecimento. R Psiquiatr. 2003; 25(3): 453-65.

3. Smagula SF, Stone KL, Fabio A, Cauley JA. Risk factors for sleep disturbances in older adults: Evidence from prospective studies. Sleep Med Rev. 2015 Jan 15.

4. Yaffe K, Falvey CM, Hoang T. Connections between sleep and cognition in older adults. Lancet Neurol. 2014 Oct; 13(10): 1017-28.

5. Wilckens KA, Woo SG, Kirk AR, Erickson KI, Wheeler ME. Role of sleep continuity and total sleep time in executive function across the adult lifespan. Psychol Aging. 2014; 29(3): 658-65.

6. Lockey S, Foster R. Sleep: a Very Short Introduction. Nova York: Oxford University Press; 2012.

7. Malek-Ahmadi M, Kora K, O'Connor K, Schofield S, Coon D, Nieri W. Longer self-reported sleep duration is associated with decreased performance on the montreal cognitive assessment in older adults. Aging Clin Exp Res. 2016.

8. Barros AJ, Hirakata VN. Alternatives for logistic regression in cross-sectional studies: an empirical comparison of models that directly estimate the prevalence ratio. BMC Med Res Methodol. 2003; 20: 3-21.

9. Tamanini JTN, Dambros M, D'Ancona CAL, Palma PCR, Netto Jr. NR. Validação para o português do "International Consultation on Incontinence Questionnaire-Short Form" (ICIQ-SF). Rev Saúde Pública. 2004; 38(3): 438-44.

10. Hair Jr. JF, Anderson RE, Tatham RL, Black WC. Multivariate Data Analysis. 3ª ed. Nova York: Macmillan Publishing Company; 1995.

11. Oliveira BHD, Yassuda MS, Cupertino APFB, Neri AL. Relações entre padrão do sono, saúde percebida e variáveis socioeconômicas em uma amostra de idosos residentes na comunidade - Estudo PENSA. Ciênc Saúde Coletiva. 2010; 15(3): 851-60.

12. Noia AS, Secoli SR, Duarte YAO, Lebrao ML, Lieber NSR. Fatores associados ao uso de psicotrópicos por idosos residentes no Município de São Paulo. Rev Esc Enferm. 2012; 46: 38-43.

13. Oliveira MF, Bezerra VP, Silva AO, Alves MSCF, Moreira MASP, Caldas CP. Sintomatologia de depressão autorreferida por idosos que vivem em comunidade. Ciênc Saúde Coletiva. 2012; 17(8): 2191-98.

14. Bliwise DL. Normal aging. In: Kryger MH, Roth T, Dement WH, editors. Principles and practice of sleep medicine. Philadelphia: Saunders; 2000. p. 26-42.

15. Araújo CLO, Ceolim MF. Sleep quality of elders living in long-term care institutions. Rev Esc Enferm USP. 2010; 44(3): 619-26.

16. Marquié JC, Folkard S, Ansiau D, Tucker P. Effects of age, gender, and retirement on perceived sleep problems: results from the VISAT combined longitudinal and cross-sectional study. Sleep. 2012; 35: 1115-21.

17. Menna Barreto L, Wey D. Ontogênese do sistema de temporização – a construção e as reformas dos ritmos biológicos ao longo da vida humana. Psicologia USP. 2007; 18(2): 133-53.

18. Costa SV, Ceolim MF, Neri AL. Problemas de sono e suporte social: estudo multicêntrico Fragilidade em Idosos Brasileiros. Rev Latino-Am Enferm. 2011; 19(4): 9-17.

19. Gorzoni ML, Fabbri RMA, Pires SL. Medicamentos potencialmente inapropriados para idosos. Rev Assoc Med Bras. 2012; 58(4): 442-6.

20. Ceolim MF. Sleep/wake cycle and physical activity in healthy elderly people. Sleep Research Online. 2000; 3(3): 87-95.

21. Kundermann B, Krieg JC, Schreiber W, Lautenbacher S. The effect of sleep deprivation on pain. Pain Res Manag. 2004; 9(1): 25-32.

22. Smith MT, Haythornthwaite JA. How do sleep disturbance and chronic pain inter-relate? Insights from the longitudinal and cognitive-behavioral clinical trials literature. Sleep Med Rev. 2004; 8: 119-32.

23. Molina J, Dos Santos FH, Terreri MT, Fraga MM, Silva SG, Hilário MO, et al. Sleep, stress, neurocognitive profile and health-related quality of life in adolescents with idiopathic musculoskeletal pain. Clinics. 2012 Oct; 67(10): 1139-44.

24. Graham JE, Streitel KL. Sleep quality and acute pain severity among young adults with and without chronic pain: the role of biobehavioral factors. J. Behav Med. 2010; 33(5): 335-45.

25. Fonseca DC, Galdino DAA, Guimarães LHCT, Alves DAG. Avaliação de qualidade do sono e sonolência excessiva diurna em mulheres idosas com incontinência urinária. Rev Neurocienc. 2010; 18(3): 294-9.

26. Blanes L, Pinto RTC, Santos VLCG. Urinary incontinence: Knowledge and attitudes in São Paulo. Braz J Urol. 2001; 27(3): 281-8.

27. Honório MO, Santos SMA. Incontinência Urinária: impacto no cotidiano e na qualidade de vida. Rev Bras Enferm. 2009; 62(1): 51-6.