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Angelini dos Santos, Ariene; Filomena Ceolim, Maria; Iost Pavarini, Sofia Cristina; Liberalesso Neri, Anita; Rampazo, Mariana Kátia
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Association between sleep disorders and frailty status among elderly

Associação entre transtornos do sono e níveis de fragilidade entre idosos

Ariene Angelini dos Santos[1]
Maria Filomena Ceolim[1]
Sofia Cristina Iost Pavarini[2]
Anita Liberalesso Neri[1]
Mariana Kátia Rampazo[1]

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Abstract

Objective: To analyze the association between nap frequency with frailty status, gender, age, education, family income and the five criteria of frailty.

Methods: This is a cross-sectional study assessing 3,075 elderly who met the inclusion criteria. The sociodemographic characterization, cognitive status measures, frailty and nap status were performed. Data were analyzed using descriptive statistics and non-parametric tests for statistical inference.

Results: Most elderly napped during the day (61.7%), with an average frequency of 5.9 days per week (SD=1.9). A significant association was found between nap frequency and the frailty dimension of "energy expenditure in physical activity".

Conclusion: No significant association was found between nap frequency and selected sociodemographic variables and frailty status among the elderly, except for the criterion of frailty "energy expenditure in physical activity".

Resumo

Objetivo: Analisar a associação entre a frequência de cochilo com os níveis de fragilidade, gênero, idade, escolaridade, renda familiar e os cinco critérios de fragilidade.

Métodos: Trata-se de um estudo transversal com avaliação de 3.075 idosos que atenderam aos critérios de inclusão. Foi realizada a caracterização sociodemográfica, as medidas de status cognitivo, de fragilidade e de cochilo. Os dados foram analisados por estatística descritiva, bem como testes não paramétricos para a estatística inferencial.

Resultados: A maioria dos idosos cochilava durante o dia (61,7%), com uma frequência média de 5,9 dias por semana (DP=1,9). Associação significativa foi verificada entre a frequência de cochilo e o critério de fragilidade "gasto calórico em atividade física".

Conclusão: Nenhuma associação significativa foi verificada entre a frequência de cochilo e as variáveis sociodemográficas selecionadas e os níveis de fragilidade entre idosos, com exceção para o critério de fragilidade "gasto calórico em atividade física".

Corresponding author
Ariene Angelini dos Santos
Tessália Vieira de Camargo street, 126,
Campinas, SP, Brazil.
Zip Code: 13084-971
arieneangelini@yahoo.com.br

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[1]Universidade Estadual de Campinas, Campinas, SP, Brazil.
[2]Universidade Federal de São Carlos, São Carlos, SP, Brazil.

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Introduction

Nap among elderly is common, i.e. it is a habit of daily routine.[1,2] In places of warm climates, such as China, Latin America and the Mediterranean, napping is a habit considered a healthy lifestyle for the elderly.[3] The increased trend to sleep in the afternoon makes naps to be more likely to happen at this time of the day.

A nap can be planned or unplanned. Intentional naps can be caused by any drowsiness or by changes in lifestyle that allow sleep during the day, such as, for example, the post-retirement period. Unintentional naps during the day are more related to pathological conditions.[4] Recent findings indicate that the presence of comorbidities is highly associated with the likelihood of regular naps reports by the elderly.[5]

Comorbidities are also common among frail elderly.[6] Sleep disorders and the frailty syndrome are increasingly common in aging.[7] Sleep disorders are characterized by biological processes similar to those observed in the frailty.[8] Problems related to sleep can exacerbate the course of a comorbidity or psychiatric disease, thereby, increasing vulnerability to the development of frailty.[9]

The association between sleep disorders and frailty can be seen as bidirectional, in which fragility can lead to disorders in the pace of activity/rest with irregular cycles, which are commonly observed in the elderly with chronic diseases.[10]

Several studies have found that daytime sleepiness and napping are associated with increased risk of mortality, with cardiovascular diseases, falls, cognitive impairment and decreased quality of nocturnal sleep in elderly.[11-16] However, the literature are scarce in relation to studies on nap and frailty.

Given the above, the present study aimed to analyze the association between nap frequency with frailty status, gender, age, education, family income and the five criteria of frailty.

Methods

This is a cross-sectional study with 3,075 elderly residents in seven cities of geographical regions of Brazil, except for the Midwest region. The elderly were recruited at their home, in urban census sectors, randomly assigned. Research personnel were trained and followed a script composed of personal presentation, research presentation and invitation to participate, according to an instruction manual built and pre-tested for the study.

Inclusion criteria were: age to be greater or equal to 65 years old, understand instructions, be a permanent resident in the household and in the census sector. Exclusion criteria were: a) elderly patients with severe cognitive impairment suggestive of dementia, evidenced by problems with their memory, attention, spatial and temporal orientation, and communication or observed by personnel; b) elderly who were using a wheelchair or who found themselves temporarily or permanently bedridden; c) severe sequelae of stroke, with localized loss of strength and/or aphasia; d) patients with Parkinson's disease in severe or unstable stage, with severe impairment of motor skills, speech or affection; e) people with severe deficits in hearing or vision, which strongly hamper communication; and f) elderly who were terminally ill.

The groups underwent sociodemographic characterization and measures of cognitive, frailty and nap status. At the beginning of data collection, the elderly were assessed for cognition through a screening test called the Mini Mental State Examination (MMSE).[17] Elderly who scored above the cutoff score, according to their education, participated in all interviews and assessments. The others were discharged and received orientations on health care and a health booklet.

Sociodemographic characteristics variables used were: gender, age, marital status, skin color/race, education, family income in minimum wages, family living arrangements, current work and retirement.

For the frailty assessment, the definition adopted followed the one proposed by a North American researchers group.[18]There are five elements of the operational definition of the syndrome or frailty phenotype: 1) Unintentional

weight loss greater than or equal to 4.5 kg or 5% of body weight in the previous year; 2) self-report exhaustion considered the manifestation of fatigue in a statement that three or more days of the week the elderly felt that he/she needed to make a lot of effort to manage the duties or has failed to carry out his/her normal duties; 3) low grip strength measured with a portable hydraulic dynamometer in the dominant hand, adjusted for gender and body mass index (BMI). Three measures of grip strength were performed, the arithmetic means were used; 4) low level of energy expenditure measured in kilocalories and adjusted for gender, assessed from self-reported physical activity and domestic work performed in the last seven days; 5) low gait speed indicated by the average time taken to travel the distance of 4.6 m, with adjustments for height and gender. Three measures of gait speed were performed and used the arithmetic mean. The presence of three or more of the five characteristics of the phenotype meant frail, one or two meant intermediate frail and none of the characteristics indicated a not frail elderly.

Naps were assessed by self-reporting answers using a specific question in the Minnesota Leisure Time Activities Questionnaire.[19] It was asked to the elderly if he/she slept or napped during the day (yes or no). If so, they were also asked about how many days a week they napped.

Data analysis was performed with SAS (Statistical Analysis System) version 9.2 for Windows. Descriptive statistics were used, as well as non-parametric tests for statistical inference, due to non-normal distribution of the variables, confirmed by the Kolmogorov-Smirnov test. To compare the variables: frail status, frail criteria, gender, age, education, family income with respect to the variable nap frequency, the nonparametric Mann-Whitney and Kruskal-Wallis tests were applied. The Mann-Whitney test was used for comparisons between two groups (categories) and the Kruskal-Wallis test between three or more groups (categories). In cases where the null hypothesis of the Kruskal-Wallis test was rejected, the post-test was applied. We defined the level of statistical significance of 5% ($p \leq 0.05$).

The study followed the development of national and international standards of ethics in research involving human beings.

Results

The participants were mostly female (67.4%) and from the age group 65-69 years (35.3%). Most elderly were married or lived with a partner (48.1%), followed by widowed (36.1%); white (53.7%), with one to four years of education (50.1%), with a monthly family income from 1.1 to 3.0 minimum wages (48.8%), living alone with their children (27.4%). Most of these elderly did not work at that time (85.0%), were retired (76.2%) and were intermediate frail (51.9%). Most napped during the day (61.7%) with an average frequency of 5.9 days per week (SD=1.9), minimum of a day and maximum of seven days a week.

Table 1 present the results of the comparison between the variables of interest and the weekly nap frequency.

There was a significant association between the nap frequency and education of the elderly residents of the community ($p=0.0323$). However, no difference was found after applying the post-test of Kruskal-Wallis. In this case, we chose to consider that there is no statistically significant difference between education and the weekly nap frequency.

Table 2 shows the results from the comparison of the five criteria of frail and weekly frequency of naps.

There was a significant association between the criterion "energy expenditure in physical activity" and the weekly nap frequency of the elderly community. The elderly considered frail in this criterion, i.e., those with low rates of energy expenditure in physical activity showed an average of 6.1 naps during the week, slightly higher than not frail elderly to this aspect.

Table 1. Study variables and nap frequency on weekdays

Variable	n*	Mean	SD	Nap frequency on week days					p-value
				Minimum	Q1	Median	Q3	Maximum	
Frail									0.4274†
Not frail	692	5.9	1.9	1.0	5.0	7.0	7.0	7.0	
Intermediate frail	920	5.9	1.9	1.0	5.0	7.0	7.0	7.0	
Frail	173	6.0	1.9	1.0	7.0	7.0	7.0	7.0	
Gender									0.4705‡
Male	658	6.0	1.8	1.0	5.0	7.0	7.0	7.0	
Female	1.155	5.9	1.9	1.0	5.0	7.0	7.0	7.0	
Age group (years)									0.1321†
65 to 69	618	5.8	1.9	1.0	5.0	7.0	7.0	7.0	
70 to 74	538	5.9	1.9	1.0	5.0	7.0	7.0	7.0	
75 to 79	376	5.8	2.0	1.0	5.0	7.0	7.0	7.0	
80 +	281	6.1	1.7	1.0	7.0	7.0	7.0	7.0	
Education (in years)									0.0323†
0	346	6.0	1.8	1.0	5.0	7.0	7.0	7.0	
1 to 4	904	5.8	2.0	1.0	5.0	7.0	7.0	7.0	
5 to 8	329	5.9	1.9	1.0	5.0	7.0	7.0	7.0	
9 +	232	6.2	1.7	1.0	7.0	7.0	7.0	7.0	
Family income (MW)									0.8837†
0 to 1,0	169	6.0	1.8	1.0	6.0	7.0	7.0	7.0	
1,1 to 3,0	727	5.8	1.9	1.0	5.0	7.0	7.0	7.0	
3,1 to 5,0	346	5.9	1.9	1.0	5.0	7.0	7.0	7.0	
5,1 to 10,0	180	5.9	1.9	1.0	5.0	7.0	7.0	7.0	
>10,0	102	5.9	1.8	1.0	5.0	7.0	7.0	7.0	

* The different sample numbers for each variable refers to the lack of answers in the study protocol; SD – standard deviation; † p-value obtained through Kruskal-Wallis test; ‡ p-value obtained through Mann-Whitney test; MW – Minimum wage

Table 2. Five criteria for frailty and nap frequency

Variable	n	Mean	SD	Nap frequency on week days					p-value*
				Minimum	Q1	Median	Q3	Maximum	
Weight loss									0.4754
Not frail	1.394	5.9	1.9	1.0	5.0	7.0	7.0	7.0	
Frail	312	6.0	1.8	1.0	5.50	7.0	7.0	7.0	
Exhaustion									0.1241
Not frail	1.349	5.9	1.9	1.0	5.0	7.0	7.0	7.0	
Frail	407	5.8	2.0	1.0	4.0	7.0	7.0	7.0	
Grip strength									0.4077
Not frail	1.400	5.9	1.9	1.0	5.0	7.0	7.0	7.0	
Frail	370	5.9	1.9	1.0	5.0	7.0	7.0	7.0	
Physical activity									0.0324
Not frail	1.448	5.8	1.9	1.0	5.0	7.0	7.0	7.0	
Frail	351	6.1	1.8	1.0	7.0	7.0	7.0	7.0	
Gait speed									0.3519
Not frail	1.400	5.9	1.9	1.0	5.0	7.0	7.0	7.0	
Frail	375	5.9	1.9	1.0	6.0	7.0	7.0	7.0	

SD – standard deviation; * p-value obtained by Mann-Whitney test

Discussion

This study had some limitations, such as: the results may not apply to other groups of elderly inserted in different contexts; analysis were adjusted for various factors, but the possibility of residual confounding cannot be eliminated; we used only subjective measures of sleep, which would result in lower stability of the measures; the study design was cross-sectional and causality cannot be asserted between the variables; furthermore, the presence of comorbidities was not assessed in this study, which may influence the nap and/or frailty.

Nurses must take into account the in-depth assessment with elderly who have joined health services, seeking to study sleep issues in order to achieve early detection of problems and the development of actions to minimize these complaints and, thus, avoid late action.

Significant association was found between the criterion "energy expenditure in physical activity" and the weekly nap frequency for the elderly. The elderly that had low rates of energy expenditure in physical activity napped more frequently than not frail elderly.

Studies conducted in the U.S.A have corroborated the findings of our study, which showed an existing significant association between daily nap and physical activity: women who napped daily were less likely to go walking, i.e. 10.8% of them.[11,14]

Two other studies from the U.S.A addressed exhaustion and have also corroborated our findings. One revealed that the more a person present fatigue, the more frequent naps will be.[16] The other found that 37.5% of men and 28.9% of women were napping at least seven times a week and the short duration of sleep and early awakening were associated with symptoms of exhaustion.[20]

The time devoted to physical activities decreases over the years, due to physiological changes of aging, the presence of comorbidities and functional disability. Some elderly choose activities that require less physical effort and frequent naps possibly by having some limitation in functional capacity.[21]

Physical inactivity or fatigue may indicate a symptom of depression or physical illness,[22] which can cause social isolation. Some studies have indicated the association between depressive symptoms and naps.[11,16] Thus, it can be inferred that if an elderly is having depressive symptoms, probably he/she will not have desirability to perform physical activities and, thus, are more prone to nap. For some authors, physical inactivity favors naps.[23]

Another aspect worth mentioning is medication use by the elderly. There are medications that can induce the elderly to sleep, such as antihistamines, antidepressants, benzodiazepines,[24] making the elderly to feel unwell for practicing physical activities as a result of excessive daytime sleepiness.[21]

The prescription of medicines to the elderly must be accurate and monitored, as some drugs can impair gait and cognition of these subjects, and it may cause drowsiness and indisposition, leading them to physical inactivity.[24]

Deleterious effects of frailty, such as loss of physical function and reduced socialization, can negatively affect social activities, physical exercise and exposure to sunlight outdoors. This could alter the circadian rhythm, leading to highly irregular hours for wakefulness and sleep. These disorders in the circadian rhythm are prevalent in chronic patients.[25]

This study presented several positive aspects, including: unprecedented nature of the subject, significant sample size, national scope, the fact that the elderly are living in the community and they were not selected on the basis of sleep disorders or frail status, validated measures of frailty and identical to those used in the definition proposed by Linda Fried. To avoid the influence or even change the findings, the elderly with cognitive impairment were excluded at the baseline of this research.

The results pointed to the need for inclusion of the elderly in groups of physical activities that can be developed in Basic Health Units, which aims at health promotion and disease prevention, thus improving the quality of life of these people and the use of time by part of them.

Conclusion

No significant association was found between the nap frequency and the variables of interest for this study, with only one exception for the criterion of frailty "energy expenditure in physical activity".

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Collaborations

Santos AA contributed to the research design, conception, analysis and interpretation of data, drafting the article, critical revision of the manuscript and approved the final content. Neri AL collaborated with the research design. Ceolim MF and Pavarini SCI contributed to the research design, conception, analysis and interpretation of data, critical revision of the manuscript and approved the final content. Rampazo MK collaborated with the critical review of the manuscript and approved the final content.

References

1. Xu Q, Song Y, Hollenbeck A, Blair A, Schatzkin A, Chen H. Day napping and short night sleeping are associated with higher risk of diabetes in older adults. Diabetes Care. 2010;33(1):78–83.
2. Milner CE, Cote KA. Benefits of napping in healthy adults: impact of nap length, time of day, age, and experience with napping. J Sleep Res. 2009;18(2):272–81.
3. Lan TY, Lan TH, Wen CP, Lin YH, Chuang YL. Nighttime sleep, chinese afternoon nap, and mortality in the elderly. Sleep. 2007;30(9):1105-10.
4. Martin JL, Ancoli-Israel S. Napping in older adults. Sleep Med Clin. 2006;1(2):177-86.
5. Vitiello MV. Sleep in normal aging. Sleep Med Clin. 2006;1(2):171-6.
6. Ottenbacher KJ, Ostir GV, Peek MK, Al SS, Raji MA, Markides KS. Frailty in older Mexican Americans. J Am Geriatr Soc. 2005;53(9):1524-31.
7. Ensrud KE, Blackwell TL, Redline S, Ancoli-Israel S, Paudel ML, Cawthon PM, et al. Sleep disturbances and frailty status in older community-dwelling men. J Am Geriatr Soc. 2009;57(11):2085-93.
8. Fragoso CA, Gill TM. Sleep complaints in community-living older persons: a multifactiorial geriatric syndrome. J Am Geriatr Soc. 2007;55(11):1853-66.
9. Roth T, Roehrs T, Pies R. Insomnia: pathophysiology and implications for treatment. Sleep Med Rev. 2007;11(1):71-9.
10. Ensrud KE, Blackwell TL, Ancoli-Israel S, Redline S, Cawthon PM, Paudel ML, et al. Sleep disturbances and risk of frailty and mortality in older men. Sleep Med. 2012;13(10):1217-25.
11. Stone KL, Ewing SK, Ancoli-Israel S, Enrusd KE, Redline S, Bauer DC, et al. Self-reported sleep and nap habits and risk of mortality in large cohort of older women. J Am Geriatr Soc. 2009;57(4):604-11
12. Tanabe N, Iso H, Seki N, Suzuki H, Yatsuya H, Toyoshima H, Tamakoshi A. Daytime napping and mortality, with a special reference to cardiovascular disease: the JACC study. Int J Epidemiol. 2010;39(1):233–43.
13. Campbell SS, Murphy PJ, Stauble TN. Effects of a nap on nighttime sleep and waking function in older subjects. J Am Geriatr Soc. 2005;53(1):48-53.
14. Stone KL, Ewing SK, Lui LY, Ensrud KE, Ancoli-Israel S, Bauer DC et al. Self-reported sleep and nap habits and risk of falls and fractures in older women: the study of osteoporotic fractures. J Am Geriatr Soc. 2006; 54(8):1177–83.
15. Ficca G, Axelsson J, Mollicone DJ, Muto V, Vitiello MV. Naps, cognition and performance. Sleep Med Rev. 2010;14(4):249-58.
16. Owens JF, Buysee DJ, Hall M, Kamarck TW, Lee L, Strollo PJ, et al. Napping, nighttime sleep, and cardiovascular risk factors in mid-life adults. J Clin Sleep Med. 2010;6(4):330-5.
17. Folstein MF, Folstein SE, McHugh PR. "Mini-Mental State". A practical method for grading the cognitive status of patients for the clicician. J Psychiatr Res. 1975;12(3):189-98.
18. Fried LP, Tangen CM, Walston J, Newman AB, Hirsch C, Gottdiener J, et al. Frailty in older adults: evidence for a phenotype. J Gerontol Biol Sci Med Sci. 2001;56(3):M146-56.
19. Taylor HL, Jacobs DR, Schucker B, Knudsen J, Leon AS, Debacker G. A questionnaire for the assessment of leisure time physical activities. J Chron Dis. 1978;31(12):741-55.
20. Goldman SE, Ancoli-Israel S, Boudreau R, et al. Sleep problems and associated daytime fatigue in community-dwelling older individuals. J Gerontol A Biol Sci Med Sci. 2008; 63:1069–75.
21. Back FA, Fortes FS, Santos EH, Tambelli R, Menna-Barreto LS, Louzada FM. Sincronização não fótica: o efeito do exercício físico aeróbio. Rev Bras Med Esporte. 2007;13(2):138-42.
22. Araújo LA, Bachion MM. Diagnósticos de enfermagem do padrão mover em idosos de uma comunidade atendida pelo Programa Saúde da Família. Rev Esc Enferm USP. 2005; 39(1):53-61.
23. Geib LT, Cataldo Neto A, Wainberg R, Nunes ML. Sono e envelhecimento. Rev Psiquiatr. 2003;25(3):453-65.
24. Araújo CL, Ceolim MF. [Sleep quality of elders living in long-term care institutions]. Rev Esc Enferm USP. 2010; 44(3):619-26. Portuguese.
25. Fragoso CA, Gahbauer EA, Ness PH, Gill TM. Sleep–wake disturbances and frailty in community-living older persons. J Am Geriatr Soc. 2009;57(11):2094–100.