Original Article

Frequency of Sleep Disorders and Their Association with Neurocognitive, Psychological, or Physical Alterations in Postmenopausal Women

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Abstract

Objective: The objective of the study was to determine the frequency of sleep disorders and their association with neurocognitive, psychological, or physical alterations in postmenopausal Colombian women. **Materials and Methods:** A cross-sectional study carried out on postmenopausal women (50–75 years). Participants were surveyed on a general questionnaire, the Jenkins Sleep Scale, the Mini-Mental State Examination tool, the Menopause Rating Scale (MRS), and the Strength, Assistance with walking, Rising from a chair, Climbing stairs, and Falling scale. Crude and adjusted logistic regression analyses were performed to determine the association between sleep problems (dependent variable) with the neurocognitive, psychological, and physical established impairments (independent variables). The covariates were age, age at menopause, years of being postmenopausal, coffee consumption, smoking habit, and nutritional status. **Results:** Among 601 participants, 53 (8.8%) had sleep problems. Bivariate analysis found that overall impairment of quality of life and its domains (somato-vegetative, psychological, and urogenital), and cognitive impairment and its various aspects (memory, language, fixation, and temporal fixation) were found at a higher rate among women with sleep problems. The risk of sarcopenia was similar among those with and without sleep problems. Adjusted logistic regression determined that sleep problems were associated with somato-vegetative (odds ratio [OR]: 3.44, 95% confidence interval [CI]: 1.56–7.59), urogenital (OR: 2.35, 95% CI: 1.00–5.51) and cognitive impairment (OR: 2.20, 95% CI: 1.02–4.71). **Conclusion:** 8.8% of this sample of postmenopausal women had sleep problems, which were significantly associated with impairment of quality-of-life aspects and cognition.

Keywords: *Climacteric, cognitive impairment, menopause, mental health, quality of life, sleep*

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Introduction

Sleep is an essential physiological state closely related to brain, metabolic, and hormonal processes, which can impact the general perception of well-being.[1-5] Poor sleep quality can have a similar impact as aging and deteriorating mental and physical health conditions.[6-11]

Sleep architecture differs between genders due to neuronal aspects, the synthesis of pituitary and hypothalamic hormones, and the bioavailability of several neurotransmitters. Women tend to report poorer sleep quality, especially during menstruation, pregnancy, and the menopausal transition.[2,3,12,13] In this last stage of life, ovarian follicular exhaustion and the climacteric hypoestrogenism characteristic cause sleep/wake balance impairment.[14-16]

The etiology of sleep disorders in middle-aged women is usually multifactorial, involving stress, increased body composition, different psychobiological entities,

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poor perception of health, environmental or social influences, and even menopausal symptoms such as hot flashes and night sweats.[1,4,6,8,13,14] There is growing interest regarding sleep problems' implications on early mortality, aging, neurological, endocrine, cardiovascular, physical, and cognitive functioning of mid-aged women and the general elder population.[4,5,7,9-11,17,18]

The World Health Organization defines cognitive impairment as the physiological impairment of brain functions (i.e., memory, attention, or learning capacity) associated with normal aging.[19] On the other hand, the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision (DSM-5-TR) defines cognitive impairment as the significant decline, compared to a previous level and according to personal or family perception, in the performance of one or more cognitive domains (attention, language, memory, executive function, learning, or social cognition).[20]

Morphological and functional conditions of the central nervous system, mental health, cognitive abilities, neurodegenerative entities, and sleep problems can be related to each other and be risk factors for the development of Alzheimer's disease.[1,2,6,9-11,21-23] Few studies on postmenopausal Latin American women evaluate sleep problems in cognitive, mental, and physical aspects. Hence, the present study aimed to determine the frequency of sleep problems and to assess their association with neurocognitive, psychological, or physical impairments in postmenopausal Colombian women of community settings.

Materials and Methods

Study design and participants

This document is a sub-analysis of a primary cross-sectional research study entitled *"Sarcopenia en Mujeres Colombianas"* (SARCOL), approved by the Universidad de Cartagena, Cartagena, Colombia. In the SARCOL project, postmenopausal women 50–75 years old were invited to participate. They were included if they had one or more years of amenorrhea, performed daily activities and moved around without a caregiver, had not attended a medical consultation in the previous week, and were at home, located in urban or rural Colombian municipalities chosen at convenience. Women who were not interested, who did not understand the instructions, who had problems with reading and writing, who had severe visual impairment, who were diagnosed with a primary sleep disease, musculoskeletal disease, mental disability, or neuropsychiatric disease, and those who reported the use of medications or home sleep measures were excluded. The STROBE initiative's suggestions, recommendations, and checklist were considered when structuring the research report.[24]

Studied variables

The data for the study were collected using a form with three sections. The first section recorded sociodemographic data (age, ethnicity, daily coffee intake, current smoking habit, and age at menopause), and the second section recorded body weight (kg) and height (m), measured with a scale and a measuring rod, respectively. These data calculated body mass index (kg/m^2). The third section of the form contained four validated scales. The Jenkins Sleep Scale (JSS) was used to assess the prevalence of sleep problems and the most frequent issues in the past months. The items of the JSS explore the difficulty of falling asleep, waking up several times a night, difficulty staying asleep or waking up too early, and waking up exhausted the next morning after usual sleep. Points are assigned to each item as follows: zero (never), one (1–3 days), two (4–7 days), three (8–14 days), four (15–21 days), and five (22–31 days). The total JSS score may range from 0 to 20. Scores from 0 to 11 indicate no sleep problems, and scores ≥12 indicate the presence of sleep problems.[25-29] For the JSS, a Cronbach's alpha of 0.83 has been reported in the Turkish population and a value of 0.82 in Colombian climacteric women.[26,29]

The other scales allowed the identification of neurocognitive, psychological, and physical impairments. The Mini Mental State Examination (MMSE) tool has 30 questions that can each be graded as: zero (incorrect) or one (correct). Items are grouped to explore six aspects: temporal orientation, spatial orientation, attention and calculation capacity, memory, language, and fixation. A cutoff value is not described for each of these situations; hence, for this study, a value below-average score for each aspect in the participating population indicated impairment. The total MMSE score (sum of the values obtained for the answers to each question) can range from 0 to 30 points. A total score of <24 suggests cognitive impairment, and according to previous studies, this cut-off has shown a sensitivity of 88.3% and a specificity of 86.2%.[30,31] The MMSE is available and validated in several languages. For the present study, we used the Spanish language version proposed by López and Martí, which has been based on the original tool.[32]

The Menopause Rating Scale (MRS) is a validated tool to assess the quality of life in middle-aged women, used to evaluate psychological and physical impairments related to eleven menopausal symptoms that compose the instrument. The items are grouped into subscales: somato-vegetative, psychological, and urogenital. Each item can be graded as 0 (absent) to 4 (1 = mild; 2 = moderate; 3 = severe; and 4 = very severe). The total score of each subscale is the sum of the scores rated for

each item composing that subscale. The total MRS score is the sum of the scores achieved by each subscale, with higher total scores indicating worse impairment of quality of life. A score above 8, 6, 3, and 16, for the somato-vegetative, psychological, and urogenital subscales and the total MRS indicate impaired quality of life.[3,33,34] A Cronbach's alpha of 0.87 has been reported for the MRS among Colombian climacteric women.[34]

The Strength, Assistance with walking, Rising from a chair, Climbing stairs, and Falling (SARC-F) scale was used to determine the difficulty in carrying a bag, walking, getting up from a chair, climbing stairs, and the number of falls in the last year. The first four are rated: "no difficulty" (0 points), "some difficulty" (1 point), and "much difficulty or total disability" (2 points). For the number of falls, the rating was "no falls" (0 points), "one to three" (1 point), and "four or more" (2 points). A score >1 indicates difficulty in each situation or a history of any fall, and a total SARC-F score of 4–10 suggests a possible risk of sarcopenia.[35-37] The validated version translated into Spanish by Sánchez-Rodríguez *et al.* was used in the present study.[36] A Cronbach's alpha of 0.67 has been reported for the SARC-F tool in older Colombian women.[37]

Sample size calculation

The sample size was calculated with OpenEpi (www.OpenEpi.com) using information from the 2018 Colombian population census, which projected 26,153,485 women for 2021, with a 95% confidence level, a 50% heterogeneity, and a 5% margin of error. One hundred women (26.0%) were added to replace those who incompletely filled out the forms. In addition, as women residing in distant geographic areas were invited, 150 (38.9%) were added as a precaution against possible loss of documents. In total, 635 forms were distributed among the selected municipalities; the correctly completed forms were filed in the "Studies" folder, and the incomplete ones in the "Discarded" folder.

Statistical analysis

The statistical analysis was performed with EPI-INFO-7 (Center for Disease Control and Prevention, Atlanta, USA). Quantitative data are presented in mean and standard deviations, and qualitative data as absolute values and percentages. Differences between quantitative data were determined with analysis of variance or Mann–Whitney *U*/or the Wilcoxon test, according to the homogeneity of variance determined with Bartlett's test. The Chi-square Mantel–Haenszel test was used to determine differences between qualitative data. Cronbach's alpha was calculated for JSS, MMSE, MRS, and the SARC-F. Spearman's correlation coefficients (rho) were calculated between the JSS and each scale. Bivariate logistic regression analysis was performed to determine the association between the presence of sleep problems (dependent variable, JSS total score 12 or more) and each of the neurocognitive, psychological, and physical impairments (independent variables). Definitions for the latter impairments are detailed in the methods section. In brief, neurocognitive impairment (total MMSE score ≤24), severe psychological impairment (score >6 for the psychological MRS subscale), and physical impairments (score >8 for the MRS somato-vegetative subscale; >3 for the MRS urogenital subscale; >16 for the total MRS score; and total SARC-F scores 4-10 implying risk of sarcopenia). The final logistic regression model was adjusted for age, menopausal age, number of postmenopausal years, daily coffee intake, smoking habit, and nutritional status. The regression model goodness of fit was calculated with the likelihood ratio. For all calculations, a $P < 0.05$ was considered statistically significant.

Ethical considerations

All participants were informed of the study's objectives and the tools to be used. No data were collected that would allow identification. Each participant signed an informed consent and did not receive incentives. They attended an educational talk on menopause and, when needed, were referred for health consultation. The Declaration of Helsinki Declaration on Human Research and the ethical principles of the Belmont Report were considered. The protocol of the SARCOL project from which this sub-analytic report is derived was revised and approved by the Ethics Committee of the University of Cartagena, Cartagena, Colombia, and was carried out within the framework of the Act of Commitment 073-2023. Furthermore, the Colombian Ministry of Health classified this study as having minimal risk for the participants (Resolution 8430-1993).

Results

A total of 668 women were invited to participate, of which 33 (4.9%) denied participation or had exclusion criteria, and 34 (5.3%) filled out the forms incompletely, hence leaving data of 601 women (56.1% above the calculated sample size) considered analysis. Table 1 presents the sociodemographic and clinical characteristics of all studied women. The mean age of participants and mean age at menopause was 60.6 ± 7.3 and 49.8 ± 3.1 years, respectively. No differences were observed between women who had sleep problems compared to those who did not, except for current smoking habits, which were higher among women with sleeping problems.

All participants were mestizo; 300 (49.9%) resided in rural and 301 (50.1%) in urban municipalities. An

Table 1: Sociodemographic and clinical characteristics of studied women (*n*=601)

	All (*n*=601)	With sleep problems (*n*=53; 8.8%)	Without Sleep problems (*n*=548; 91.2%)	*P**
Age (years)	60.6±7.3	62.4±8.6	60.4±7.1	0.05[a]
Age of menopause (years)	49.8±3.1	49.2±2.8	49.9±3.2	0.15[a]
Postmenopausal (years)	10.7±7.5	13.2±9.4	10.5±7.3	0.07[b]
Weight (kg)	65.8±11.3	67.9±12.9	65.6±11.2	0.15[a]
BMI (kg/m^2)	25.5±4.4	26.6±5.4	25.4±4.3	0.06[a]
Overweight (BMI 25.0–29.9)**	231 (38.4)	20 (37.7)	211 (38.5)	0.91[c]
Obese (BMI >30.0)**	94 (15.6)	13 (24.5)	81 (14.7)	0.06[c]
Daily coffee intake	150 (24.9)	45 (84.9)	406 (74.0)	0.08[c]
Current smoking habit	50 (8.3)	10 (18.8)	40 (7.3)	<0.01[c]
Normal nutritional status (BMI, 18.5–24.9)**	247 (41.1)	16 (30.1)	231 (42.1)	0.09[c]
Underweight (BMI ≤18.5)**	29 (4.8)	4 (7.5)	25 (4.5)	0.33[c]

**P*-value as determined with ANOVA[a], the Mann–Whitney *U*-test[b] or the Chi-square Mantel Haenszel test[c], **WHO definition. Data are presented as mean±SD or frequencies *n* (%). SD: Standard deviation, BMI: Body mass index, WHO: World Health Organization

8.8% (n = 53) of the participants presented, according to JSS criteria, sleep problems. On more than 15 days in the last month, 49 (8.1%) had difficulty falling asleep, 38 (6.3%) woke up several times during the night or before the usual time, and 45 (7.4%) woke up exhausted after the usual amount of sleep. These complaints were more frequent among women defined according to the JSS to have sleep problems than those without ($P < 0.001$). Among women with sleep disorders, 50.9% were >63 years old, and, 58.4% were >11 years postmenopausal [data not shown in Table 1].

Cronbach's alpha was determined to be 0.895, 0.784, 0.876, and 0.804, for the JSS, MMSE, MRS, and SARC-F, respectively. The correlation coefficient was negative between the JSS and the MMSE (rho = −0.182) and was positive between the JSS and the MRS (rho = 0.273) and between the JSS and the SARC-F (rho = 0.349; $P < 0.01$ for the three correlations).

Overall (n = 601), more than half of the women had difficulty climbing stairs, carrying a bag, getting up from a chair, walking in the room, or having impaired attention and calculation. A 45.9% of all surveyed women were at possible risk of sarcopenia according to the SARC-F, with no difference observed among women with or without sleep problems. Women with sleep problems presented a higher rate of impairment of overall quality of life and its somato-vegetative, psychological, and urogenital domains. Equally, those with sleep problems presented a higher rate of overall cognitive impairment, including different aspects such as memory, language, fixation, and temporal orientation, compared to women without sleep problems [Table 2].

Table 3 presents the results of the binary logistic regression analysis. In the un-adjusted model, eight situations considered as neurocognitive, psychological, or physical impairments were associated with sleep problems ($P < 0.05$). Three remained significant in the adjusted model: somato-vegetative impairment, urogenital impairment, and cognitive impairment (odds ratio [OR]: 3.44, 95% confidence interval [CI]: 1.56–7.59: OR: 2.35, 95% CI: 1.00–5.51; and OR: 2.20, 95% CI: 1.02–4.71, respectively).

Discussion

As determined by the JSS, the present study found that 8.8% of the sample of postmenopausal Colombian women had sleep problems. In the previous month, 8.1% had difficulty falling asleep for more than 15 days, 7.4% woke up exhausted after sleeping the usual amount, and 5.3% woke up before the usual time or several times during the night. Using the same JSS, a previous Colombian study[26] reported that 16.5% of women (peri- and postmenopausal) had sleep problems. As assessed with the JSS, this rate is higher (37.5%) among Spanish women aged 40-59 who attended gynecological consultations.[27] The JSS and the Pittsburgh Sleep Quality Index (PSQI) have been reported to have a strong correlation (rho = 0.75).[29] With the PSQI, poor sleep quality was found in 57.1% of 1078 Colombian climacteric women,[34] 56.3% of Iranian postmenopausal women,[38] half of 6079 Latin American climacteric women,[39] 46.7% of Argentine postmenopausal women attending a hospital center,[40] 34.6% of Saudi Arabian postmenopausal women,[3] 30.2% of South Korean postmenopausal women,[41] and 23.1% of Shanghai women aged 20–74 years.[42] Women older than 40 reported poor sleep quality at a higher rate. Furthermore, compared to women who were premenopausal, those with natural menopause (OR: 1.67, 95% CI: 1.44–1.94) and induced menopause (OR: 2.26, 95% CI: 1.81–2.82) were more likely to report poor sleep.[42]

Table 2: Neurocognitive, psychological, or physical impairments (*n*=601)

	All (*n*=601)	With sleep problems (*n*=53; 8.8%)	Without Sleep problems (*n*=548; 91.2%)	*P**
Somato-vegetative impairment[a]	59 (9.8)	21 (39.6)	38 (6.9)	<0.001
Psychological impairment[a]	108 (17.9)	26 (49.0)	82 (14.9)	<0.001
Urogenital impairment[a]	103 (17.1)	24 (45.2)	79 (14.4)	<0.001
Deterioration of quality of life[a]	109 (18.1)	29 (54.7)	80 (14.6)	<0.001
Cognitive impairment[b]	188 (31.2)	33 (62.2)	155 (28.2)	<0.001
Memory impairment[b]	200 (33.2)	32 (60.3)	168 (30.6)	<0.001
Language impairment[b]	287 (47.7)	41 (77.3)	246 (44.8)	<0.001
Deterioration of the fixation[b]	128 (21.3)	16 (30.1)	112 (20.4)	<0.05
Disorientation in time[b]	116 (19.3)	17 (32.0)	99 (18.0)	<0.05
Spatial disorientation[b]	207 (34.4)	12 (22.6)	195 (35.5)	0.05
Impaired attention and calculation[b]	328 (54.5)	31 (58.4)	297 (54.2)	0.54
Risk of possible sarcopenia[c]	276 (45.9)	21 (39.6)	255 (46.5)	0.33
Difficulty walking inside a room[c]	295 (49.0)	16 (30.1)	279 (50.9)	<0.01
Difficulty getting out of a chair or bed[c]	313 (52.0)	25 (47.1)	288 (52.5)	0.45
Difficulty lifting or carrying a 5-kg bag (score >1)[c]	345 (57.4)	27 (50.9)	318 (58.0)	0.31
Difficulty climbing ten or more rungs of a ladder[c]	340 (56.5)	35 (66.0)	305 (55.6)	0.14
History of one or more falls in the past year[c]	310 (51.5)	22 (41.5)	288 (52.5)	0.12

**P* values as determined with the Chi-square Mantel Haenszel test, [a]Impairment identified with the MRS, as defined in the methods section, [b]Impairment identified with Mini-Mental State Examination, as defined in the methods section, [c]Impairment identified with the SARC-F Scale, as defined in the methods section. Data are presented as frequencies *n* (%).SARC-F: Strength, Assistance with walking, Rising from a chair, Climbing stairs, and Falling, MRS: Menopause Rating Scale

Table 3: Neurocognitive, psychological, or physical impairments associated with sleep problems: logistic regression analysis

	Un-adjusted model*		Adjusted model**	
	OR 95% CI	*P*	OR 95% CI	*P*
Somato-vegetative impairment[a]	8.80 (4.63–16.73)	<0.001	3.44 (1.56–7.59)	<0.01
Urogenital impairment[a]	4.91 (2.72–8.87)	<0.001	2.35 (1.00–5.51)	<0.05
Deterioration of quality of life[a]	7.06 (3.91–12.75)	<0.001	1.71 (0.55–5.28)	0.34
Psychological impairment[a]	5.47 (3.04–9.84)	<0.001	1.20 (0.45–3.16)	0.70
Cognitive impairment[b]	4.18 (2.32–7.51)	<0.001	2.20 (1.02–4.71)	<0.05
Language impairment[b]	4.19 (2.15–8.15)	<0.001	2.01 (0.91–4.42)	0.08
Memory impairment[b]	3.44 (1.93–6.15)	<0.001	1.57 (0.78–3.15)	0.20
Disorientation in time[b]	2.14 (1.15–3.96)	<0.05	0.90 (0.42–1.98)	0.83

*Only significant covariates of the un-adjusted model are presented, **Only 3 covariates remained significant after adjusting the model for age, age at menopause, postmenopausal years, daily coffee intake, current smoking habit, and nutritional status (likelihood ratio *P*<0.001), [a]Impairment identified with the MRS, as defined in the methods section, [b]Impairment identified with MMSE, as defined in the methods section. OR: Odds ratio, CI: Confidence interval, MRS: Menopause Rating Scale, MMSE: Mini-Mental State Examination

Sociocultural and cognitive aspects and individual perceptions explain the variation in the frequency of sleep problems.[2,6,26,42] What is relevant is that poor quality of sleep, observed after menopause, which also occurs with aging, is accompanied by changes in the synthesis of melatonin, serotonin, glycine, adenosine, acetylcholine, gamma-aminobutyric acid (GABA), epinephrine, histamine, orexin and other neurotransmitters that participate in the circadian rhythm and the sleep/wakefulness balance.[1,4,10,43,44] Concerning sleep, the interaction between melatonin and gonadal hormones is complex, and possibly more important is the influence of estrogens on melatonin rather than estrogen levels *per se*.[2,43]

In the present study, we found that daily physical activities and the risk of sarcopenia were not associated with sleep problems. In contrast, severe somato-vegetative and urogenital impairment, as well as cognitive impairment, were associated with sleep problems. The somato-vegetative dimension of the MRS scale involves menopausal symptoms (i.e., hot flashes and night sweats, muscle joint pain, among others).[3,33,34] The first two are the most frequent menopausal symptoms observed among Latin American women.[45] Hot flashes occur in 60%–80% of women in transition to menopause and may persist for approximately 5 years.[46] Increased frequency of cardiac discomfort, sleep problems, physical and mental fatigue, musculoskeletal pain, and

psychological, quality of life, and urogenital impairment have been observed in women with sleep problems identified with the JSS ($P < 0.05$).[26] Regarding urogenital impairment, is important to mention that vaginal dryness, vaginal burning, dyspareunia, pelvic pain, urinary urgency, and frequency, grouped as the Genitourinary Menopausal Syndrome, may affect 80% of postmenopausal women.[47]

Our findings agree with those of Abdelaziz *et al*.[3] In their study, as assessed with the MRS, women with poor sleep quality had worse somato-vegetative domain scores (4.77 ± 2.87 vs. 3.44 ± 2.56, $P < 0.001$) and worse urogenital status. Somato-vegetative and urogenital MRS domain scores significantly correlated with PSQI total scores ($r = 0.228$, and $r = 0.177$, respectively, $P < 0.001$). Several authors[3-5,13,26,41,48] support the relationship between menopausal symptoms (hot flashes, sweating, palpitations, anxiety disorders, and depression) and sleep disorders (insomnia, excessive daytime sleepiness, obstructive sleep apnea, sleep-disordered breathing). In mid-aged and older women, menopausal symptoms and sleep problems are associated with comorbidities (obesity, cancer, gastroesophageal reflux, urinary incontinence, nighttime urination, thyroid dysfunction, fibromyalgia, chronic pain syndromes, mental illness, and stress, among others), cognitive impairment, and psychosocial and environmental factors.[9,16,46]

The rate of cognitive impairment was higher among participants who had sleep problems than those who did not (60.2% vs. 28.2%, respectively, $P < 0.001$). Disturbances of the sleep/wake rhythm may be risk factors for dementia. With wakefulness, proteins such as β-amyloid, which is related to neurodegenerative entities, accumulate, while periods of sleep facilitate their clearance.[49] Guarnieri[6] notes that the reduction of ovarian hormones in the climacteric period could affect cognitive reserve directly and indirectly by increasing sleep problems and accelerating cognitive decline (memory, attention, calculation, language, learning or reaction capacity, and time and spatial orientation). Estrogens have been reported to be modulated in sleep and cognition.[16] In Mexican women, it has been identified that the older the age and the longer the postmenopausal period, the greater the impairment of cognitive function.[31] Hot flashes, sweating, and sleep problems may be early indicators of estrogen deficiency, while impairments in mental and cardiovascular health, osteoporosis, urogenital symptomatology, and deterioration of language, concentration, memory, and cognition may be late signs.[3]

A strength of the present study is that it is among the first to evaluate the association between sleep and psychobiological alterations in Latin American postmenopausal women of a community setting, with a sample size adequate for the selected population. Similarly, it is a strength to have applied validated scales in which adequate reliability was found, which facilitates future comparisons. The study has the limitation of assigning statistical and not causal associations. Our results are specific to the studied population; hence, extrapolation to other communities should be avoided. An initial evaluation of sleep, cognition, and psycho-physical aspects in middle-aged women should also be considered and additional studies should be carried out if necessary. Nutritional, hormonal aspects, sleep habits, lifestyles, and previous sleep pathologies were not explored, and are factors of interest, thus also being a limitation. Polysomnography was not performed due to economic reasons and because it is not available in community settings.

It is recommended that healthcare entities promote a consultation of postmenopausal women that explores menopausal symptoms, sleep and aging problems, and neurocognitive, psychological, and physical alterations.[2,5,9-11,13,46,48] It is emphasized that sleep disorders are increasingly frequent and have a negative impact on quality of life. Insomnia, excessive daytime sleepiness, and depression are risk factors for cognitive decline.[6,11] A multidisciplinary approach to menopausal manifestations is important because of the complex interrelationship between hypoestrogenism, sleep problems, and the potential for morbidity and mortality in early life. Regardless of their specialties, health professionals who care for climacteric women should provide information that promotes self-care and carry out primary prevention actions to preserve women's health and biopsychosocial well-being. In addition, they should make their patients aware of the need to attend periodic and timely evaluations, to receive comprehensive care that will increase the chances of reaching a healthy old age, stressing that sleep disturbances have a considerable impact c considerable impact on cognitive function.[10,11]

Conclusion

Despite the above-mentioned limitations, the present study found that 8.8% of this sample of postmenopausal Colombian women (50–75 years) had sleep problems. Somato-vegetative and urogenital, as well as cognitive impairment, were associated with a higher probability of sleep problems.

Author contributions

Álvaro Monterrosa-Castro (conceptualization, data curation, methodology, writing of the original draft, reviewing, and editing). Andrea Castilla-Casalins (statistical analysis, writing of

the original draft, reviewing and editing). Mayra Colmenares-Gúzman (statistical analysis, writing of the original draft, reviewing and editing). Peter Chedraui (statistical analysis, critical reviewing of the scientific content, and editing of the manuscript). All authors reviewed and approved the final version of the manuscript.

Data availability statement

All required information regarding the protocol of the study and collected data will be made available upon a reasonable request to the researchers who provide a methodologically sound proposal. Only the analysis required to achieve the aims in the approved proposal will be permitted. Proposals should be directed to alvaromonterrosa@gmail.com.

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Conflicts of interest

There are no conflicts of interest.

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