Gender assessment of sleep disorders in an adult urban population of Mexico City

Luis M Amezcua-Guerra, MD, PhD,[1,2] Griselda Pazarán-Romero, MD,[3]
Guadalupe O Gutiérrez-Esparza, PhD,[1,4] Gabriela Fonseca-Camarillo, PhD,[1]
Mireya Martínez-García, PhD,[1] Lucero E Groves-Miralrío, BSc,[1] Malinalli Brianza-Padilla, PhD.[1]

Amezcua-Guerra LM, Pazarán-Romero G, Gutiérrez-Esparza GO, Fonseca-Camarillo G, Martínez-García M, Groves-Miralrío LE, Brianza-Padilla M.
Gender assessment of sleep disorders in an adult urban population of Mexico City.
Salud Publica Mex. 2024;66:824-830.
https://doi.org/10.21149/15654

Abstract

Objective. To investigate gender-specific patterns of sleep problems among adults residing in urban areas of Mexico City. **Materials and methods.** Utilizing cross-sectional analysis, data from the Tlalpan 2020 Cohort, comprising 2 859 healthy individuals, were examined. Clinical, anthropometric, sociodemographic, and socioeconomic factors were assessed, and sleep problems were evaluated using the Spanish version of the MOS-Sleep Scale. **Results.** Elevated rates of sleep problems were found among women, with factors such as maternity (odds ratio [OR] 1.3; 95% confidence intervals [95%CI] 1.0,1.5), passive smoking (1.4; 1.1,1.8), and educational level (1.7; 1.4,2.0) significantly increasing the likelihood of sleep problems. For men, risk factors included smoking (1.4; 1.1,1.8), and lack of access to medical attention (1.3; 1.1,1.4). **Conclusion.** This study exhibited significant gender disparities in sleep patterns, highlighting the impact of socioeconomic factors on women's sleep. These findings emphasize the importance of addressing gender-specific influences in both sleep research and healthcare interventions.

Keywords: sleep; sexual dimorphism; socioeconomic factors

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Resumen

Objetivo. Investigar los patrones por género de los problemas de sueño entre adultos que residen en la Ciudad de México. **Material y métodos.** Utilizando un análisis transversal, se examinaron datos de la cohorte Tlalpan 2020 que comprendió a 2 859 adultos sanos. Se evaluaron factores clínicos, sociodemográficos y socioeconómicos y los problemas de sueño utilizando la versión en español de la Escala de Sueño MOS. **Resultados.** Se encontraron tasas elevadas de problemas de sueño entre las mujeres, con factores como la maternidad (razón de momios [RM] 1.3, intervalos de confianza a 95% [IC95%] 1.0,1.5), tabaquismo pasivo (1.4; 1.1,1.8) y nivel educativo (1.7; 1.4,2.0) aumentando la probabilidad de problemas de sueño. Para los hombres, los factores de riesgo incluyeron tabaquismo (1.4; 1.1,1.8) y falta de acceso a atención médica (1.3; 1.1,1.4). **Conclusión.** Este estudio mostró disparidades por género en los patrones de sueño, resaltando el impacto de los factores socioeconómicos en el sueño de las mujeres. Se destaca la importancia de abordar las influencias por género en la investigación del sueño y en las intervenciones sanitarias.

Palabras clave: sueño; dimorfismo sexual; factores socioeconómicos

(1) Departamento de Inmunología, Instituto Nacional de Cardiología Ignacio Chávez. Mexico City, Mexico.
(2) Departamento de Atención a la Salud, Universidad Autónoma Metropolitana-Xochimilco. Mexico City, Mexico.
(3) Dirección General de Calidad y Educación en Salud, Secretaría de Salud. Mexico City, Mexico.
(4) Consejo Nacional de Humanidades, Ciencias y Tecnologías. Mexico City, Mexico

Received on: February 8, 2024 • **Accepted on:** June 24, 2024 • **Published online:** November 1, 2024
Corresponding author: Malinalli Brianza-Padilla. Departamento de Inmunología, Instituto Nacional de Cardiología Ignacio Chávez. Juan Badiano 1, Sección XVI. 14080 Tlalpan, Mexico City, Mexico.
email: maly.brianz@gmail.com

Sleep is a complex physiological phenomenon, and its assessment encompasses physical, mental, and neurobehavioral dimensions like sleep quality, state of alertness or drowsiness, synchronization or chronotype, efficiency, and duration.[1] The significance of understanding these dimensions is evidenced by their associations with metabolic syndrome, coronary artery disease, neurobehavioral impairment, and mortality.[1] While polysomnography remains the gold standard for sleep assessment, self-perception of sleep quality is a reliable and valuable alternative.[2] The Medical Outcomes Study Sleep Scale (MOS-SS) is a self-perception instrument designed to evaluate the preceding four weeks of sleep. Validated for the measurement of diverse aspects of sleep problems, the MOS-SS provides information on the quality and quantity of sleep,[3] allowing for the generation of a Sleep Problems Index (SPI), wherein a higher score indicates the presence of multiple sleep problems.[4]

Sexual dimorphism in sleep physiology has been identified, particularly in circadian rhythm variations in women influencing preferences for earlier sleep timing and extended sleep duration.[5] This divergence contributes to sex-specific sleep disorders, with sleep-disordered breathing prevailing in men, while women face a higher risk of insomnia.[6] The modulatory influence of sex steroid hormones adds to complexity, rendering women's sleep more susceptible to changes induced by ovarian steroids.[7]

The quality and quantity of sleep impact overall health, yet conflicting data on sleep disparities between genders highlight the intricate nature of this subject.[8] These discrepancies may arise from distinct data acquisition methods, societal perceptions influencing sleep assessments, biological differences, socio-environmental factors, and population heterogeneity.[9] Hence, this study aims to elucidate gender-specific patterns of sleep disorders within an urban cohort in Mexico City, Mexico. Additionally, it seeks to explore the impact of sociodemographic conditions on sleep quality.

Materials and methods

Study design

This study conducted a post-hoc analysis utilizing data from the Tlalpan 2020 Cohort, a longitudinal investigation primarily focused on hypertension incidence. The cohort consisted of 2 859 clinically healthy adults meeting specific inclusion criteria. Participants, both men and women (excluding pregnant or lactating) aged between 20 and 50 residing in Mexico City, were required to be free from cardiovascular diseases, cancer impacting survival, cognitive and mental disabilities, chronic infections, and inflammatory or immune disorders. Exclusion criteria encompassed participants identified with hypertension or diabetes during the baseline, as well as those failing to provide complete information.[10] Recruitment occurred between 2014 to 2019, with cross-sectional data analysis, comprising information from the initial visit, performed at the National Institute of Cardiology Ignacio Chávez (INCICh, by its acronym in Spanish) in early 2024. Data collection and management utilized an electronic case report form.

The study protocol received approval from the Institutional Ethics Committee of the Incich under code 13-802, and all participants provided written informed consent.

Data collection

During the initial visit, data including clinical, anthropometric, biochemical, sleep quality, alcohol and tobacco consumption, and medical services information were collected. Marital status, religion, education, and employment status were also registered. The Social Development Index of the territorial units of Mexico City served as a proxy for estimating the socioeconomic level related to participants' residential areas.[11] Clinical and anthropometric measurements, such as body mass index (BMI), waist circumference, height, and weight were assessed through individual interviews, adhering to guidelines by The International Society for the Advancement of Kinanthropometry (ISAK).

Laboratory procedures

Blood samples, collected after a 12-hour overnight fast, underwent analysis for plasma glucose (3.9-5.8 mmol/L), triglycerides (40-200 mg/dL), low-density cholesterol (LDL-C) (80-130 mg/dL), high-density cholesterol (HDL-C) (women: >50 mg/dL and men: >40 mg/dL), and total cholesterol (T-Cholesterol) (140-200 mg/dL) at the Central Laboratory of Incich.

The MOS-SS

Major sleep problems were assessed using the Spanish version of MOS-SS, a 12-question self-report questionnaire measuring six domains related to sleep problems: 1) sleep initiation problems (question [Q]1 and Q7); 2) sleep maintenance problems (Q3 and Q8); 3) respiratory problems during sleep (Q5 and Q10); 4) sleep adequacy (Q4 and Q12); 5) somnolence (Q6, Q9, and Q11); and 6) quantity of sleep (Q2). Additionally, MOS-SS returns the SPI-II, scored from 9 of the 12 items (Q1, Q3, Q4, Q5,

Q6, Q7, Q8, Q9, and Q12), and a shorter version of the SPI-I consisting of six items (Q4, Q5, Q7, Q8, Q9, and Q12) (table I).[4,12]

Answers to most of the questions are on a Likert-style scale. For all responses, respondents had to think about the last four weeks. The responses were recoded into a range from 0 to 100, which represents the percentage of each evaluated aspect of sleep. In this format, higher scores for the subscales: sleep initiation problems, sleep maintenance problems, respiratory problems during sleep and somnolence, as well as the SPI-I and SPI-II indices, indicate worse sleep problems. Conversely, lower scores on the subscales: sleep adequacy and quantity of sleep, indicate worse sleep problems.[13]

Statistical analysis

The analysis was conducted using data collected during the initial visit of the Tlalpan 2020 Cohort (cross-sectional data). Normal distribution was assessed using the Kolmogorov-Smirnov test. Qualitative variables were reported as percentages, while quantitative variables were expressed as mean ± standard deviation. Chi-square and Student's t-tests were used to assess differences between groups.

Logistic regression models, adjusted for covariates derived from SPI scores, where scores greater than 33.33 indicated the presence of sleep problems and scores less than 33.33 indicated the absence of sleep problems, identified sociodemographic and socioeconomic predictors associated with sleep problems.

Risk factors were defined as follows: alcohol consumption= subjects who drink alcohol at least once a month; age= people over 40 years old; maternity= women who report having at least one child; passive smoker= people who report living with smokers and inhaling tobacco smoke at least once a week; tobacco consumption= individuals who use tobacco at least once a week; religion= not having religious beliefs; economic income= people who do not receive a salary; education level= individuals who presented basic education as the highest level of education; economic status= individuals who presented low and very low economic status; medical attention= people who lack medical service; waist circumference= women with a circumference greater than 88 cm and men with a circumference greater than 102 cm; BMI= people who BMI greater than 25.

Receiver operating characteristic (ROC) curve analysis evaluated the predictive value of laboratory data on sleep problems. Subjects were categorized into a control group (SPI-II <33.3) and a case group (SPI-II ≥33.3).[14]

Table I
Contents of the MOS-SS in both English and Spanish versions

Question number / *Item*	*Question content* / *Question asked*
1	How long did it usually take for you to fall asleep during the past four weeks?
	Pensando en las últimas cuatro semanas, ¿en promedio, cuánto tiempo tardó en quedarse dormido?
2	On the average, how many hours did you sleep each night during the past four weeks?
	Pensando en las últimas cuatro semanas, ¿en promedio, cuántas horas durmió cada noche?
3	How often during the past four weeks did you feel that your sleep was not quiet (moving restlessly, feeling tense, speaking, etc.) while sleeping?
	Durante las últimas cuatro semanas, ¿con qué frecuencia sintió que su sueño no era adecuado (se sintió inquieto, sintió tensión, habló, etc.) mientras dormía?
4	How often during the past four weeks did you get enough sleep to feel rested upon waking in the morning?
	Durante las últimas cuatro semanas, ¿con qué frecuencia durmió lo suficiente como para sentirse bien descansado al despertar por la mañana?
5	How often during the past four weeks did you awaken short of breath or with a headache?
	Durante las últimas cuatro semanas, ¿con qué frecuencia se despertó con dificultad para respirar o con dolor de cabeza?
6	How often during the past four weeks did you feel drowsy or sleepy during the day?
	Durante las últimas cuatro semanas, ¿con qué frecuencia se sintió con somnolencia o mucho sueño durante el día?
7	How often during the past four weeks did you have trouble falling asleep?
	Durante las últimas cuatro semanas, ¿con qué frecuencia tuvo problemas para conciliar el sueño?
8	How often during the past four weeks did you awaken during your sleep time and have trouble falling asleep again?
	Durante las últimas cuatro semanas, ¿con qué frecuencia se despertó durante sus horas de sueño y tuvo problemas para volver a dormirse?
9	How often during the past four weeks did you have trouble staying awaken during the day?
	Durante las últimas cuatro semanas, ¿con qué frecuencia tuvo problemas para mantenerse despierto durante el día?
10	How often during the past four weeks did you snore during your sleep?
	Durante las últimas cuatro semanas, ¿con qué frecuencia roncó mientras dormía?
11	How often during the past four weeks did you take naps (five minutes or longer) during the day?
	Durante las últimas cuatro semanas, ¿con qué frecuencia tomó siestas de cinco minutos o más durante el día?
12	How often during the past four weeks did you get the amount of sleep you needed?
	Durante las últimas cuatro semanas, ¿con qué frecuencia durmió la cantidad de horas que necesitaba?

Note: Major sleep problems were assessed using the Spanish version of MOS-SS.
MOS-SS: Medical Outcomes Study Sleep Scale

Statistical significance was set at $p \leq 0.05$. Data analysis was performed using the Real Statistics Resource Pack software* and graph creation using GraphPad Prism v9.4.‡

Results

The study included 2 859 participants, 1 824 women and 1 035 men, residing primarily in the southern region of Mexico City. Significant gender-based differences were observed in various parameters. Men were found to be younger (36.7 vs. 37.9 years; $p= 0.001$) and had higher BMI (27.3 vs. 26.7 kg/m^2; $p <0.001$) compared to women. Additionally, men exhibited elevated systolic (111.1 vs. 104.1 mmHg; $p <0.001$) and diastolic blood pressure (74.6 vs. 69.9 mmHg; $p <0.001$), along with higher levels of glucose (5.28 vs. 5.11 mmol/L; $p <0.001$), LDL-C (122.2 vs. 117.1 mg/dL; $p <0.001$), T-Cholesterol (185 vs. 182 mg/dL; $p= 0.025$), and triglycerides (174 vs. 129 mg/dL; $p <0.001$). Conversely, HDL-C levels were lower in men (42.4 vs. 51.4 mg/dL; $p <0.001$). Clinical and laboratory data are summarized in table II.

Men exhibited a lower rate of access to medical services compared to women (68.9 vs. 72.5%; $p= 0.047$), while no significant differences were observed in economic status and education levels. Analysis of substance consumption patterns revealed higher prevalence of tobacco use among men (29.2 vs. 19.4%; $p <0.001$), whereas women reported higher alcohol consumption (64.2 vs. 40.6%; $p <0.001$). Sociodemographic characteristics are presented in table III.

Evaluation of MOS-SS subscales (figure 1A) indicated that women faced greater challenges in sleep maintenance (31.8 vs. 28.0%; $p <0.001$) and initiation (24.7 vs. 21.3%; $p <0.001$), along with lower sleep adequacy (52.7 vs. 55.8%; $p= 0.004$). Conversely, men experienced more sleep breathing problems (27.9 vs. 23.1%; $p <0.001$) and shorter sleep duration (6.4 vs. 6.6 hours; $p= 0.001$). No differences were found in the level of somnolence (28.9% in women vs. 29.06 % in men; $p= 0.904$). Overall, rates of sleep problems in SPI-II (31.4 vs. 29%; $p <0.001$) and SPI-I (31.1 vs. 28.9%; $p <0.001$) were higher in women (figure 1B).

Logistic regression analyses revealed associations between risk of sleep problems and several factors (figure 2). In women, risks were associated with maternity (odds ratio [OR] 1.3, 95% confidence interval [95%CI] 1.0,1.5; $p= 0.003$), tobacco consumption (1.3; 1.1,1.5; $p <0.001$), passive smoking (1.4; 1.2,1.6; $p <0.001$), educational level (1.7; 1.4,2.0; $p <0.001$), economic status (1.2; 1.1,1.4; $p= 0.003$), medical attention (1.2; 1.05,1.5; $p= 0.009$), waist circumference (1.2; 1.0,1.4; $p= 0.017$), and BMI (1.2; 1.05,1.4; $p= 0.012$). In men, risks were associated with passive smoking (1.6; 1.3,1.9; $p <0.001$), smoking (1.4; 1.1,1.8; $p= 0.003$), education level (1.3; 1.0,1.7; $p= 0.027$), and lack of access to medical attention (1.3; 1.1,1.4; $p= 0.004$).

Finally, ROC curve analysis did not reveal predictive values for sleep quality based on circulating levels of biochemical markers.

Table II
CLINICAL CHARACTERISTICS AND LABORATORY DATA OF THE STUDY POPULATION. MEXICO CITY, 2014-2019

	Women n= 1 824	*Men n= 1 035*	*p Value*
Age (years), mean ± SD	37.9 ± 9.1	36.7 ± 9.3	0.001
BMI (kg/m^2), mean ± SD	26.7 ± 4.8	27.3 ± 4.5	<0.001
Respiratory rate (bpm), mean ± SD	15.9 ± 3.8	15.8 ± 6.2	0.422
Systolic pressure (mmHg), mean ± SD	104.1 ± 10.9	111.1 ± 10.1	<0.001
Diastolic pressure (mmHg), mean ± SD	69.9 ± 8.2	74.6 ± 7.8	<0.001
Heart rate (bpm), mean ± SD	66.3 ± 7.8	64.7 ± 7.7	<0.001
HDL-C (mg/dL), mean ± SD	51.4 ± 12.2	42.4 ± 9.6	<0.001
LDL-C (mg/dL), mean ± SD	117.1 ± 29.3	122.2 ± 32.0	<0.001
Glucose (mmol/L), mean ± SD	5.11 ± 0.5	5.28 ± 0.7	<0.001
Total cholesterol (mg/dL), mean ± SD	182 ± 32.8	185 ± 37.5	0.025
Triglycerides (mg/dL), mean ± SD	129 ± 79.6	174 ± 136.3	<0.001

BMI: body mass index; HDL-C: hight density cholesterol; LDL-C: low density cholesterol; SD: standar deviation

Discussion

This study uncovers prominent gender disparities in sleep patterns among an urban population in Mexico City. Women report lower sleep satisfaction and higher rates of initiation and maintenance difficulties, while men exhibit a higher prevalence of sleep breathing issues. Surprisingly, despite women reporting inadequate sleep, men sleep fewer hours. Additionally, the study suggests that women's sleep is more influenced by sociodemographic factors compared to men's sleep.

* Zaiontz C. Real Statistics Resource Pack. 2023. Available from: http://www.real-statistics.com

‡ GraphPad Inc. GraphPad Software v.9.4. 2020.

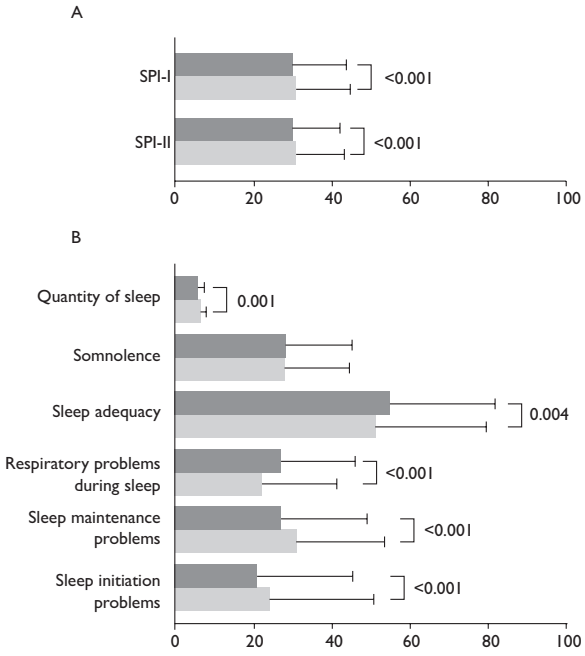
Table III
Sociodemographic characteristics of the study population. Mexico City, 2014-2019

	Women n= 1 824	*Men n= 1 035*	*p value*
Marital status			
Married, n (%)	870 (47.7)	490 (47.3)	0.358
Single, n (%)	675 (37)	407 (39.3)	0.198
Free union, n (%)	193 (10.6)	99 (9.6)	0.440
Separated, n (%)	31 (1.7)	15 (1.5)	0.769
Widow, n (%)	5 (0.3)	1 (0.10)	0.319
Not specified, n (%)	18 (0.9)	6 (0.6)	0.382
Divorced, n (%)	32 (1.7)	17 (1.6)	0.233
Religion			
Catholic, n (%)	831 (45)	402 (38.8)	<0.001
Non-Catholic Christian, n (%)	163 (9)	90 (8.7)	0.827
No religion, n (%)	830 (45)	543 (52.5)	<0.001
Medical service			
With medical service, n (%)	1 323 (72.5)	714 (68.9)	0.047
IMSS, n (%)	505 (27.7)	322 (31.1)	0.052
ISSSTE, n (%)	401 (30.3)	197 (19)	0.072
Seguro Popular, n (%)	340 (25.7)	137 (13.2)	<0.001
Private, n (%)	55 (4.1)	45 (4.3)	0.148
Other, n (%)	22 (1.7)	13 (1.3)	0.600
Without medical service, n (%)	501 (27.5)	321 (31.1)	0.044
Socioeconomic status			
Very low, n (%)	241 (13.3)	131 (12.7)	0.671
Low, n (%)	661 (36.2)	357 (34.5)	0.348
Middle, n (%)	405 (22.2)	215 (20.8)	0.372
High, n (%)	394 (21.6)	251 (24.2)	0.103
Not-specified, n (%)	123 (6.7)	81 (7.8)	0.001
Education			
None, n (%)	1 (0.1)	0 (0)	0.451
Primary school, n (%)	52 (2.8)	27 (2.6)	0.704
Junior high school, n (%)	226 (12.4)	138 (13.4)	0.467
Senior high school, n (%)	661 (36.3)	344 (33.2)	0.106
University, n (%)	718 (39.4)	430 (41.5)	0.253
Mastery, n (%)	134 (7.3)	76 (7.3)	0.997
Doctorate, n (%)	32 (1.7)	20 (2)	0.732
Employment status			
Agriculture and fishing, n (%)	1 (0.1)	2 (0.2)	0.272
Housewife, n (%)	447 (24.6)	1 (0.1)	<0.001
Driver, n (%)	0 (0)	48 (4.6)	<0.001
Merchant, n (%)	136 (7.5)	93 (8.9)	0.147
Temporary laid off, n (%)	38 (2.1)	24 (2.3)	0.415
Executive assistant, n (%)	13 (0.7)	14 (1.3)	0.089
Student, n (%)	199 (10.9)	150 (14.5)	0.005
Retired, n (%)	3 (0.2)	1 (0.1)	0.641
Not working, n (%)	14 (0.8)	5 (0.5)	0.368
Administrative assistant, n (%)	167 (9.2)	87 (8.4)	0.498
Other, n (%)	129 (7.1)	84 (8.1)	0.307
Professional, n (%)	516 (28.3)	337 (32.6)	0.016
Working, n (%)	161 (8.8)	189 (18.3)	<0.001
Tobacco consumption			
Has ever consumed, n (%)	1 018 (55.8)	766 (74.0)	<0.001
Current smoker, n (%)	354 (19.4)	302 (29.2)	<0.001
Passive smoker, n (%)	647 (35.5)	389 (37.6)	0.274
Alcohol consumption			
Consumption, n (%)	1 171 (64.2)	800 (40.6)	<0.001
Once a month, n (%)	236 (20.1)	164 (20.5)	0.851
Twice a month, n (%)	145 (12.4)	149 (18.6)	0.001
Weekly, n (%)	165 (14.1)	172 (21.5)	<0.001
Every three days, n (%)	23 (1.9)	47 (5.8)	<0.001
Every day, n (%)	10 (0.8)	14 (1.7)	0.075
Sporadically, n (%)	592 (50.6)	254 (31.7)	<0.001

IMSS: *Instituto Mexicano del Seguro Social*; ISSSTE: *Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado*

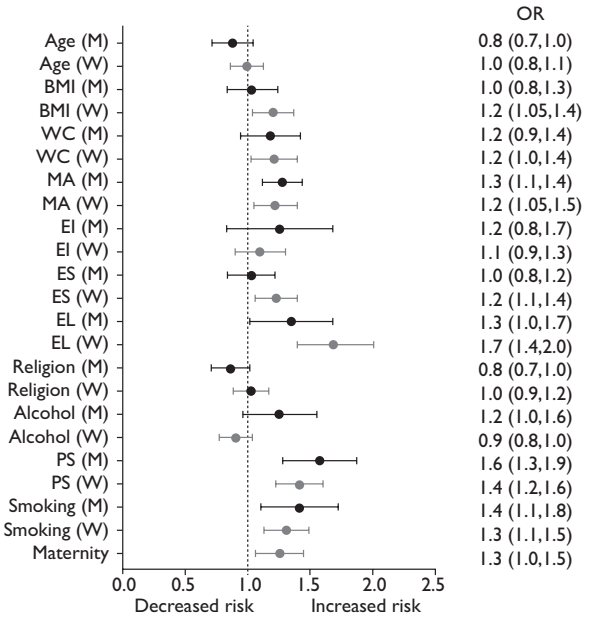
Despite extensive research on sleep quality, understanding sex-based differences remains inconclusive. Women, as observed in this study, often report more subjective sleep problems and are more likely to experience disruptions in daily activities compared to men.[15] Additionally, while sleep disorders generally increase with age, there are inherent differences in their prevalence between men and women.[16] For instance, women have a lower prevalence of sleep breathing disorders (9 vs. 24%),[17] but experience up to twice the incidence of insomnia compared to men.[17] Clinical evidence also suggests that chronic sleep disturbances have more pronounced consequences for women that for men.

Socioeconomic factors significantly contribute to disparities in sleep quality. Women, particularly those who have experienced maternity, tobacco use, low education, and economic hardship, face an increased risk of sleep problems. Conversely, men are at risk due to tobacco use and lack of medical care. This study supports existing literature highlighting the impact of sociodemographic characteristics on sleep quality. For instance, studies on Iceland women have shown that being single, having lower income, tobacco use, and higher BMI are associated with greater sleep problems.[18] Moreover, socioeconomic factors affect sleep quality



A: The bars depict the percentage of each domain assessed by the MOS-SS scale. Light bars represent values in women, and dark bars represent values in men. Each bar illustrates the mean ± 1 standard deviation. Group differences were assessed using the unpaired Student's t test, and only statistically significant values are presented.
B: The bars represent the mean ± 1 standard deviation of the respective index values. Group differences were analyzed using the unpaired Student's t test, with statistical significance considered at p <0.05.
MOS-SS: Medical Outcomes Study Sleep Scale
SPI: Sleep Problems Index

Figure 1. Distribution of MOS-SS domains and SPI I-II. Mexico City, 2014-2019



M: men; W: women; BMI: body mass index; WC: waist circumference; MA: medical attention; EI: economic income; ES: economic status; EL: education level; PS: passive smoking; OR: odds ratio; SPI: Sleep Problems Index
Note: The figure presents prevalence OR for various variables influencing the occurrence of sleep problems as covariate (SPI-II >33.3). The forest plot displays horizontal lines indicating values for women (light) and men (dark). The central circle represents the OR, and the scatter bars represent the corresponding 95%CI.

Figure 2. Simple logistic regression analysis for sleep problems. Mexico City, 2014-2019

across various demographics, including children, where parental economic and educational levels influence sleep quality and health outcomes.[19,20] Our data suggest that women in Mexico City are susceptible to temporary social stressors.

In our study, we found that men tended to consume more tobacco, whereas women consumed more alcohol. Interestingly, alcohol consumption, despite its hypnotic and relaxing effects, can disrupt the sleep cycle and raise the risk of developing sleep disorders.[21,22] Studies comparing sleep quality between smokers and non-smokers indicate that smokers typically experience shorter sleep duration, more episodes of apnea, and higher rates of restless leg syndrome.[23] In our study, both direct and passive tobacco consumption were associated with increased sleep problems. Overall, both alcohol and tobacco consumption contribute to compromised sleep quality.[24]

Our study investigated the relationship between sleep, weight, and health in Mexican population, given the high prevalence of overweight and obesity. Both groups were overweight, and evidence suggests a link between insufficient sleep and overweight across all age groups.[25] While BMI alone may not be sufficient in identifying risk factors for sleep problems, elevated waist circumference appears to be a risk factor for women. Our findings support previous reports linking sleep duration of less six hours per day with increased waist circumference in both men and women,[26] highlighting the impact of sleep duration on metabolic health.

Our analysis of laboratory data revels that male subjects exhibit higher levels of LDL-C, glucose, T-Cholesterol, triglycerides, along with lower levels of HDL-C compared to women. Men's restricted access to medical services might contribute to slight metabolic alterations associated with sleep-breathing problems and being overweight.

Despite its notable findings, this study has its limitations, such as the absence of menstrual cycle data

and reliance on self-reported sleep measures rather than physiological evaluations. These limitations underscore the need for future research to explore the complex interplay between gender, socioeconomic factors, lifestyle choices, and sleep quality.

In conclusion, this study reveals significant gender-based differences in sleep patterns within the studied population. Women exhibit more difficulties with sleep initiation and maintenance, along with reduced sleep adequacy. Conversely, men have a higher prevalence of respiratory problems during sleep and sleep less. Women's sleep is notably influenced by socioeconomic factors such as maternity, tobacco consumption, low education, socioeconomic status, lack of medical attention, and overweigh. In contrast, men's sleep is affected by lack of medical services, low education level, and tobacco consumption.

Declaration of conflict of interests. The authors declare that they have no conflict of interests.

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