

## Supplemental Digital Content

### Supplementary Methods:

Categorization of all variables used in regression model was as follows:

Age was measured as continuous variable.

Marital status was evaluated in 3 categories: Single or never married/ married or living with partner/ widowed, divorced or separated.

Child number was measured numerically, based on self-report.

Education was categorized in 3 groups: Without secondary diploma/ with secondary diploma/ college degree and above.

Use and type of HT was based on their response to the question “Have you ever used any hormone therapy, sometimes called HT, for any reason?” into 5 categories: no/ yes, both estrogen and progesterone/ yes, only estrogen/ yes, only progesterone/ yes, unknown type”.

Height and weight were measured during the interview. BMI was calculated as:  $\frac{\text{weight (kg)}}{\text{height (m)}^2}$  and entered in the regression model as numerical value.

Income was stratified in 3 clusters: Less than \$50,000/ \$50,000 - \$100,000/ and \$100,000 or more. Satisfaction with income was evaluated in two groups as: adequate/ inadequate or with some difficulty.

Physical activity was assessed in two groups based on their response to question “In the past 12 months, how often did you participate in sports or physical activities that you do with other people?”: at least once a week/ <once a week.

We analyzed smoking habits in 3 groups: never smoker/ previous smoker/ and current daily smoker.

Frequency of alcohol consumption was assessed in two groups: at least once a week/ <once a week.

Diet was based on frequency of using each main food groups. So, for each food group (carbohydrates, protein, fruit and vegetable, milk and dairy, fat and sugar) the frequency was considered in 3 categories: consumption of each food group never/ occasionally and at least once a week.

Anxiety disorder was categorized to negative or positive based on their response to question “Has a doctor ever told you that you have an anxiety disorder such as a phobia, obsessive-compulsive disorder or a panic disorder?”.

Depression was diagnosed by CESD-R-10 questionnaire in two classes: Score $\geq$ 10 was considered positive and score  $<$ 10 was categorized as negative <sup>46</sup>.

Post-traumatic stress disorder was identified by PC-PTSD questionnaire, including 4 questions. A score of 3 or 4 were evaluated as positive and score of 2 or less was grouped as negative <sup>47</sup>.

Psychological distress was measured on the K10 questionnaire, in our study, we classified them in well to mild psychological distress (score $<$ 25), or moderate to severe disorder (score $\geq$ 25) <sup>48,49</sup>.

Hypertension was described as systolic blood pressure $\geq$ 140, or diastolic blood pressure $\geq$ 90 measured at the time of interview (mean of 4 measures), or self-reported history of being diagnosed with hypertension/taking antihypertensive medications.

Physician-diagnosed hypo- or hyperthyroidism was categorized as positive for thyroid dysfunction.

Cancer was evaluated in 3 categories: No cancer, breast or ovarian cancer, other types of cancer.

## Supplementary Tables:

Table S1: CLSA Sleep Questionnaire		
No.	Criteria	Questions
1	Overall sleep satisfaction	How satisfied or dissatisfied are you with your current sleep pattern? Very Satisfied / Satisfied / Neutral / Dissatisfied / Very Dissatisfied
2	Total hours of sleep per day	During the past month on average how many hours of actual sleep did you get at night?
3	Sleep-onset insomnia disorder	<p>Over the last month, how often did it take you more than 30 minutes to fall asleep? Never / &lt;1/week / once or twice/week / 3-5 times/week / 6-7 times/week</p> <p>If responded “Never” or “&lt;1/week”, skip to question 4; if others, continue:</p> <p style="padding-left: 40px;">a) For how long have you had this trouble going to sleep?</p> <p>To what extent do you consider your problem falling asleep to interfere with your daily functioning? Not at all / A little / Somewhat / Much / Very much</p>
4	Sleep-maintenance insomnia disorder	<p>Over the last month, how often did you wake in the middle of the night or too early in the morning and found it difficult to fall asleep again? Never / &lt;1/week / once or twice/week / 3-5 times/week / 6-7 times/week</p> <p>If responded “Never” or “&lt;1/week”, skip to question 5; if others, continue:</p> <p style="padding-left: 40px;">a) For how long have you had this trouble with staying asleep?</p> <p>To what extent do you consider your problem staying asleep to interfere with your daily functioning? Not at all / A little / Somewhat / Much / Very much</p>
5	Possible daytime somnolence disorder	<p>Over the last month, how often do you find it difficult to stay awake during your normal waking hours when you want to? Never / &lt;1/week / once or twice/week / 3-5 times/week / 6-7 times/week</p> <p>If responded “Never” or “&lt;1/week”, skip to question 6; if others, continue:</p> <p style="padding-left: 40px;">a) For how long have you had trouble staying awake?</p> <p>To what extent do you consider your problem staying awake to interfere with your daily functioning? Not at all / A little / Somewhat / Much / Very much</p>

Continued: Table S1

No.	Criteria	Questions
6	Possible idiopathic REM sleep behavior disorder	<p>Have you ever been told, or suspected yourself, that you seem to "act out your dreams" while asleep (for example, punching, flailing your arms in the air, making running movements, etc.)? Yes / No</p> <p>If responded "No", skip to question 7; if answered "Yes", continue:</p> <p>For how long have you had this "acting out" of your dreams?</p>
7	Possible Restless Leg Syndrome	<p>Do you have, or have you sometimes experienced, recurrent, uncomfortable feelings or sensations in your legs while sitting or lying down? Yes / No</p> <p>Do you have, or have you sometimes experienced, a recurrent need or urge to move your legs while sitting or lying down? Yes / No</p> <p>If responded "No" to the both questions above, skip to question 8, if answered "Yes", continue:</p> <p>a) For how long have you had these uncomfortable feelings or urge to move?</p> <p>b) Over the last month, how many times (per week, on average) have you experienced these uncomfortable feelings or urge to move? Less than once / once or twice / Three or four times / More than four times</p> <p>c) Do these uncomfortable feelings or sensations in your legs, or the urge to move, disappear/improve when you are active or moving around? Yes / No</p> <p>Are these uncomfortable feelings, or this urge to move, worse in the evening or at night compared with the morning? Yes / No</p>
8	Snoring	Do you snore loudly? By 'loudly' I mean louder than talking or loud enough to be heard through closed doors. Yes / No
9	Stop Breathing	Has anyone ever observed you stop breathing in your sleep? Yes / No

Table S2: Characteristics of Post- and Pre/Perimenopausal groups included in the adjustment model

Characteristics	Post-Menopause (N=3713)	Pre/Peri-Menopause (N=2466)	p-Value
Age			
Mean±SD	55.72±3.3	49.80±3.1	<0.001
Type of HT – % (n)			
No HT	77.1 (2795)	91.8 (2242)	<0.001
Both Estrogen & Progesterone	12.1 (439)	3.1 (76)	
Estrogen	7.9 (288)	1.5 (36)	
Progesterone	2.9 (105)	3.6 (87)	
Marital Status – % (n)			
Single/Never married	11.9 (419)	10.0 (234)	<0.001
Married/Living with partner	68.1 (2399)	74.6 (1744)	
Widowed, Divorced or Separated	20.0 (704)	15.4 (360)	
Number of living biological children			
Mean±SD	1.65±1.2	1.76±1.2	<0.001
Education – % (n)			
Without secondary diploma	2.6 (97)	1.4 (34)	<0.001
With secondary diploma	51.8 (1923)	45.7 (1127)	
College degree and above	45.6 (1692)	52.9 (1303)	
BMI			
Mean±SD	26.93±5.0	26.56±5.1	0.006
Total household income – % (n)			
< \$50,000	20.9 (734)	13.5 (320)	<0.001
\$50,000 - \$100,000	34.0 (1197)	30.8 (728)	
> \$100,000	45.1 (1585)	55.7 (1316)	
Income satisfies basic needs – % (n)			
Adequate	89.4 (3157)	88.2 (2063)	N/S
Inadequate or with some difficulty	10.6 (376)	11.8 (276)	
Physical activity (past 12 months) – % (n)			
<Once a week	42.1 (1561)	39.8 (981)	N/S
≥Once a week	57.9 (2148)	60.2 (1484)	
Smoke – % (n)			
Never Smoker	52.8 (1952)	63.8 (1564)	<0.001
Previous Smoker	37.0 (1369)	29.1 (714)	
Current Daily Smoker	10.2 (377)	7.1 (175)	
Alcohol consumption (past year) – % (n)			
<Once a week	45.8 (1700)	44.9 (1106)	N/S
≥Once a week	54.2 (2013)	55.1 (1358)	

Characteristics	Post-Menopause (N=3713)	Pre/Peri-Menopause (N=2466)	p-Value
Carbohydrates – % (n)			
Never	1.1 (41)	1.3 (31)	N/S
Occasionally	37.6 (1397)	39.1 (963)	
≥Once a week	61.3 (2275)	59.7 (1472)	
Protein – % (n)			
Occasionally	85.9 (3188)	85.4 (2107)	N/S
≥Once a week	14.1 (525)	14.6 (359)	
Fruit and vegetables – % (n)			
Occasionally	50.6 (1878)	50.3 (1240)	N/S
≥Once a week	49.4 (1835)	49.7 (1226)	
Milk and dairy – % (n)			
Never	1.6 (69)	2.0 (49)	N/S
Occasionally	56.9 (2114)	59.0 (1454)	
≥Once a week	41.5 (1540)	39.1 (963)	
Fats and sugars – % (n)			
Never	0.3 (11)	0.3 (7)	N/S
Occasionally	81.8 (3036)	81.0 (1998)	
≥Once a week	17.9 (666)	18.7 (461)	
Cancer – % (n)			
No Cancer	89.3 (3311)	94.4 (2326)	<0.001
Breast or Ovarian	4.2 (156)	1.3 (33)	
Other Cancers	6.5 (240)	4.2 (104)	
Anxiety disorders – % (n)			
No	88.3 (3270)	89.1 (2190)	N/S
Yes	11.7 (435)	10.9 (269)	
Post-traumatic stress disorder – % (n)			
No	94.7 (3517)	95.2 (2348)	N/S
Yes	5.3 (196)	4.8 (118)	
Depression – % (n)			
No	81.3 (3018)	81.5 (2011)	N/S
Yes	18.7 (695)	18.5 (455)	
Psychologic Distress – % (n)			
Normal or Mild	94.7 (3341)	94.0 (2202)	N/S
Moderate or Severe	5.3 (187)	6.0 (140)	
Thyroid dysfunction – % (n)			
No	85.8 (3139)	84.9 (2066)	N/S
Yes	14.2 (520)	15.1 (368)	
Hypertension – % (n)			
No	71.9 (2644)	80.2 (1961)	<0.001
Yes	28.1 (1032)	19.8 (484)	

**Table S3: Sleep dissatisfaction, sleep hours, and sleep disorders in 48-56-year-old post-menopausal and pre/peri-menopausal groups**

		Post-Menopause (N=1908)	Pre/peri-Menopause (N=1767)	Crude Odds Ratio [95% CI]	Adjusted Odds Ratio <sup>a</sup> [95% CI]
Sleep Satisfaction	Dissatisfaction with current sleep pattern – % (n)	33.2 (634)	29.2 (516)	1.21 [1.05-1.39]	1.08 [0.89-1.30]
Sleep Hours	Number of sleep hours during past month (Mean±SD)	6.68±1.2	6.79±1.2	-0.11 [(-0.19)-(-0.03)] <sup>b</sup>	-0.08 [-0.17-0.01] <sup>b</sup>
Insomnia (Onset)	Requiring more than 30 min to fall asleep for at least 3/week – % (n)	20.0 (381)	15.1 (267)	1.40 [1.18-1.67]	1.33 [1.05-1.68]
	Possible sleep-onset insomnia disorder – % (n)	10.9 (155)	7.1 (100)	1.59 [1.23-2.07]	1.52 [1.04-2.21]
Insomnia (Maintenance)	Waking up and having difficulty falling asleep again for at least 3/week – % (n)	28.9 (552)	27.7 (489)	1.06 [0.92-1.23]	0.95 [0.79-1.15]
	Possible sleep-maintenance insomnia disorder – % (n)	17.5 (222)	14.9 (168)	1.21 [0.97-1.51]	0.97 [0.71-1.31]
Daytime Somnolence	Finding difficulty to stay awake during normal hours for at least 3/week – % (n)	7.5 (143)	6.9 (121)	1.10 [0.86-1.42]	1.27 [0.90-1.79]
	Possible daytime somnolence disorder – % (n)	1.4 (22)	1.2 (18)	1.13 [0.60-2.12]	1.26 [0.49-3.24]
OSA <sup>c</sup>	Snoring loudly – % (n)	22.6 (382)	19.1 (304)	1.23 [1.04-1.46]	1.11 [0.88-1.39]
	Stopped breathing in sleep – % (n)	9.6 (172)	7.4 (123)	1.33 [1.05-1.69]	1.29 [0.93-1.80]
	Possible obstructive sleep apnea – % (n)	14.2 (252)	10.3 (170)	1.44 [1.17-1.77]	1.60 [1.19-2.15]
RBD <sup>d</sup>	Acting out on dreams while asleep – % (n)	10.7 (203)	10.0 (176)	1.08 [0.87-1.34]	0.99 [0.75-1.30]
	Possible RBD (excluding confounds) – % (n)	4.0 (54)	3.6 (48)	1.10 [0.74-1.64]	0.92 [0.55-1.56]
RLS <sup>e</sup>	Experiencing uncomfortable feeling in legs while sitting or lying down – % (n)	34.4 (655)	32.5 (574)	1.09 [0.95-1.25]	1.16 [0.96-1.39]
	Experiencing urge to move legs while sitting or lying down – % (n)	35.9 (683)	33.2 (587)	1.13 [0.98-1.29]	1.16 [0.97-1.40]
	Possible restless leg syndrome – % (n)	23.5 (341)	22.8 (319)	1.04 [0.88-1.24]	1.07 [0.85-1.35]

This table compares distribution of each sleep dissatisfaction, sleep hours, and each of the sleep disorders in 48 to 56-year old post-menopausal and pre/peri-menopausal women.

<sup>a</sup> Odds ratio adjusted for age, marital status, child numbers, education, income, satisfaction with income, use of HT, BMI, physical activity, smoke, alcohol, diet, anxiety, depression, PTSD, psychological distress, physician-diagnosed thyroid dysfunction, cancer and hypertension.

<sup>b</sup> For this cell, mean difference (B-coefficient and 95% CI) is presented, instead of odds ratio, because “sleep hours” is a continuous variable.

<sup>c</sup> OSA=Obstructive Sleep Apnea.

<sup>d</sup> RBD=Rapid eye movement sleep behavior disorder.

<sup>e</sup> RLS=Restless Leg Syndrome

Table S4: Association of age with sleep dissatisfaction, sleep hours, and sleep disorders in post-menopausal and pre/peri-menopausal groups

		Menopausal Status	Crude Odds Ratio [95% CI]	Adjusted Odds Ratio <sup>a</sup> [95% CI]
Sleep Satisfaction	Dissatisfaction with current sleep pattern	Post-Menopause	0.99 [0.97-1.01]	0.99 [0.96-1.01]
		Pre/peri-Menopause	1.03 [1.00-1.06]	1.03 [0.99-1.06]
Sleep Hours	Number of sleep hours during past month	Post-Menopause	0.02 [0.00-0.03] <sup>b</sup>	0.02 [0.00-0.03] <sup>b</sup>
		Pre/peri-Menopause	-0.01 [-0.03-0.00] <sup>b</sup>	-0.01 [-0.03-0.00] <sup>b</sup>
Insomnia (Onset)	Requiring more than 30 min to fall asleep for at least 3/week	Post-Menopause	1.00 [0.97-1.02]	1.01 [0.98-1.04]
	Pre/peri-Menopause	1.00 [0.97-1.04]	1.01 [0.96-1.05]	
Insomnia (Maintenance)	Possible sleep-onset insomnia disorder	Post-Menopause	0.98 [0.95-1.02]	0.99 [0.95-1.04]
	Pre/peri-Menopause	1.00 [0.95-1.06]	1.00 [0.93-1.07]	
Daytime Somnolence	Waking up and having difficulty falling asleep again for at least 3/week	Post-Menopause	0.99 [0.96-1.01]	0.98 [0.96-1.01]
	Pre/peri-Menopause	1.04 [1.01-1.07]	1.03 [1.00-1.07]	
OSA <sup>c</sup>	Possible sleep-maintenance insomnia disorder	Post-Menopause	0.98 [0.95-1.01]	0.99 [0.96-1.03]
	Pre/peri-Menopause	1.04 [0.99-1.09]	1.03 [0.97-1.09]	
RBD <sup>d</sup>	Finding difficulty to stay awake during normal hours for at least 3/week	Post-Menopause	0.98 [0.94-1.02]	0.97 [0.93-1.02]
	Pre/peri-Menopause	1.00 [0.95-1.05]	0.95 [0.89-1.01]	
RLS <sup>e</sup>	Possible daytime somnolence disorder	Post-Menopause	1.02 [0.94-1.11]	1.09 [0.97-1.23]
	Pre/peri-Menopause	0.95 [0.83-1.08]	0.93 [0.78-1.10]	
OSA <sup>c</sup>	Snoring loudly	Post-Menopause	1.02 [1.00-1.05]	1.01 [0.98-1.04]
	Pre/peri-Menopause	1.05 [1.01-1.09]	1.04 [1.00-1.08]	
RBD <sup>d</sup>	Stopped breathing in sleep	Post-Menopause	1.00 [0.97-1.04]	1.00 [0.96-1.04]
	Pre/peri-Menopause	1.01 [0.96-1.07]	0.99 [0.93-1.05]	
RLS <sup>e</sup>	Possible obstructive sleep apnea	Post-Menopause	1.01 [0.98-1.04]	1.00 [0.96-1.03]
	Pre/peri-Menopause	1.04 [0.99-1.08]	1.00 [0.94-1.05]	
OSA <sup>c</sup>	Acting out on dreams while asleep	Post-Menopause	0.96 [0.93-0.99]	0.96 [0.93-1.00]
	Pre/peri-Menopause	0.94 [0.91-0.99]	0.95 [0.91-1.00]	
RBD <sup>d</sup>	Possible RBD (excluding confounds)	Post-Menopause	0.97 [0.91-1.03]	0.96 [0.89-1.03]
	Pre/peri-Menopause	0.94 [0.86-1.02]	0.95 [0.87-1.04]	
RLS <sup>e</sup>	Experiencing uncomfortable feeling in legs while sitting or lying down	Post-Menopause	1.00 [0.98-1.02]	0.99 [0.96-1.01]
	Pre/peri-Menopause	1.01 [0.99-1.04]	1.01 [0.97-1.04]	
OSA <sup>c</sup>	Experiencing urge to move legs while sitting or lying down	Post-Menopause	1.00 [0.98-1.02]	0.99 [0.97-1.01]
	Pre/peri-Menopause	1.01 [0.99-1.04]	1.01 [0.98-1.04]	
RLS <sup>e</sup>	Possible restless leg syndrome	Post-Menopause	1.01 [0.98-1.04]	1.00 [0.97-1.03]
	Pre/peri-Menopause	1.02 [0.99-1.06]	1.03 [0.98-1.07]	

This table evaluates the association of age with sleep dissatisfaction, sleep hours, and each of the sleep disorders, stratified by menopausal status.

<sup>a</sup> Odds ratio adjusted for marital status, child numbers, education, income, satisfaction with income, use of HT, BMI, physical activity, smoke, alcohol, diet, anxiety, depression, PTSD, psychological distress, physician-diagnosed thyroid dysfunction, cancer and hypertension.

<sup>b</sup> For this cell, mean difference (B-coefficient and 95% CI) is presented, instead of odds ratio, because “sleep hours” is a continuous variable.

<sup>c</sup> OSA=Obstructive Sleep Apnea.

<sup>d</sup> RBD=Rapid eye movement sleep behavior disorder.

<sup>e</sup> RLS=Restless Leg Syndrome