TRENDS IN PREVALENCE OF SHORT SLEEP DURATION AND TROUBLE SLEEPING AMONG US ADULTS, 2005-2018

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INTRODUCTION

- Short sleep duration and trouble sleeping, also known as 'the symptom of insomnia' or 'difficulty sleeping', constitute two key dimensions of sleep health(1,2).
- Short sleep duration and trouble sleeping can increase health and economic burdens (3,4).
- Understanding trends in short sleep duration and trouble sleeping is crucial to guiding prevention efforts, as well as providing evidence for estimations of health and economic burdens.

- This study **aims** to determine
  1) Trends in prevalence of short sleep duration
  2) Trends in trouble sleeping
  3) Differences in sleep trends by sex and race/ethnicity.

METHODS

Sample

- Seven cycles of the National Health and Nutrition Examination Survey **(NHANES)** data between 2005 and 2018 were analyzed.
- Participants who were 18 years or older and provided completed data regarding sleep duration were included. Pregnant women were excluded.

Measures

- In cycles from 2005-2006 to 2013-2014, sleep duration was assessed by asking average sleep duration per night on weekdays. However, in the 2015-2016 cycle and the 2017-2018 cycle, information on sleep durations was collected by asking sleep time and wake-up time on weekdays. **Short sleep duration** was defined as sleep duration ≤ 6 hours.
- Data on **trouble sleeping** were collected by asking: 'Have you ever told a doctor or other health professional that you have trouble sleeping?' (Yes/No).

Data Analyses

- All estimates of prevalence were age-standardized to the 2000 Census population, using the age groups and weights to allow comparisons independent of age. Appropriate sample weights were used.
- Tests for trends were calculated in logistic regression models by including the survey cycles as a continuous variable. Differences in prevalence of short sleep duration between 2015-2016 cycle and 2017-2018 cycle were examined using logistic regression.

RESULTS

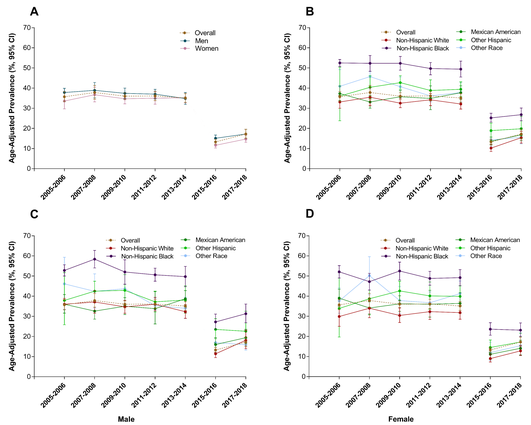

Figure 1. Age-adjusted prevalence of short sleep duration by sex and race/ethnicity

Table 1. Age-adjusted prevalence of short sleep duration by sex and race/ethnicity in the US population, 2005-2018

Characteristics	Prevalence, %								
	2005-2006 (N=5236)	2007-2008 (N=6173)	2009-2010 (N=6464)	2011-2012 (N=5812)	2013-2014 (N=6057)	*P* for trend	2015-2016 (N=5908)	2017-2018 (N=5766)	*P*
	Age-Adjusted (To 2000 US Population) Data								
Overall	35.7	37.8	36.0	36.1	35.1	0.331	13.3	17.2	**0.002**
Sex									
Men	37.8	38.9	37.4	37.0	34.8	0.054	15.1	19.8	**0.009**
Women	33.6	36.7	34.7	35.0	35.2	0.900	11.6	14.7	**0.006**
Race/Ethnicity									
Non-Hispanic White	33.1	35.5	32.5	34.2	32.1	0.317	10.2	15.4	**<0.001**
Non-Hispanic Black	52.5	52.3	52.3	49.7	49.4	0.077	25.2	26.8	0.369
Mexican American	37.3	33.1	35.7	34.9	37.7	0.453	13.6	16.8	0.103
Other Hispanic	36.0	40.4	42.7	38.8	39.4	0.798	18.9	19.8	0.793
Other Race	40.9	45.7	40.7	36.1	37.8	0.186	14.3	15.6	0.627
Sex and Race/Ethnicity									
Men									
Non-Hispanic White	36.0	37.1	34.7	36.0	32.3	0.068	11.4	18.1	**0.004**
Non-Hispanic Black	52.8	58.4	52.0	50.6	49.7	**0.039**	27.2	31.3	0.170
Mexican American	36.0	32.6	35.0	33.8	38.7	0.121	16.0	19.4	0.292
Other Hispanic	37.9	42.5	42.9	37.2	38.1	0.723	23.5	22.6	0.855
Other Race	46.1	42.4	43.7	35.3	34.0	0.057	16.9	15.9	0.697
Women									
Non-Hispanic White	29.9	34.0	30.4	32.3	31.8	0.966	9.0	12.8	**0.017**
Non-Hispanic Black	52.1	47.2	52.5	48.8	49.2	0.380	23.6	23.1	0.864
Mexican American	39.0	34.1	36.2	36.0	36.4	0.475	11.1	14.1	0.169
Other Hispanic	33.9	38.7	42.6	40.1	39.9	0.485	14.5	17.2	0.292
Other Race	37.6	50.2	37.8	36.7	41.3	0.864	11.9	15.4	0.302

P for trend denotes statistical significance over the 5 NHANES cycles between 2005 and 2014.
P denotes statistical significance between NHANES cycles 2015-2016 and 2017-2018.

Trends in short sleep duration

- From the 2005-2006 cycle through the 2013-2014 cycle, the age-adjusted prevalence of short sleep duration remained similar in the overall population (p for trend>0.05).
- Compared to women, men had a higher prevalence of short sleep duration.
- Non-Hispanic Black people had the highest prevalence of short sleep duration among all the race/ethnicity groups in all seven cycles.
- Prevalence of short sleep duration appears lower in 2015-2018 than in 2005-2014 due to different measurement methods applied.

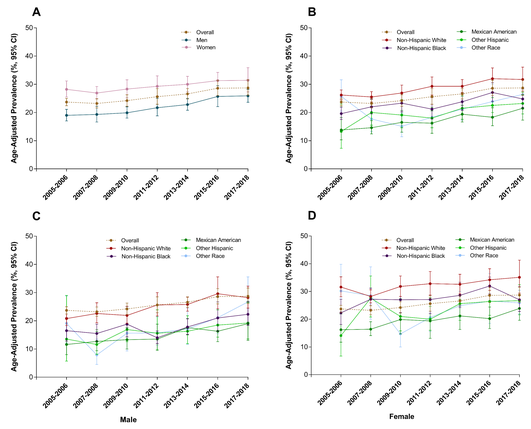

Figure 2. Age-adjusted prevalence of trouble sleeping by sex and race/ethnicity

Table 2. Age-adjusted prevalence of trouble sleeping by sex and race/ethnicity in the US population, 2005-2018

Characteristics	Prevalence, %							
	2005-2006 (N=5228)	2007-2008 (N=6169)	2009-2010 (N=6462)	2011-2012 (N=5811)	2013-2014 (N=6055)	2015-2016 (N=5904)	2017-2018 (N=5761)	*P* for trend
	Age-Adjusted (To 2000 US Population) Data							
Overall	23.7	23.2	24.2	25.6	26.6	28.6	28.7	**<0.001**
Sex								
Men	19.0	19.3	19.9	21.7	22.8	25.7	25.9	**<0.001**
Women	28.2	26.9	28.3	29.3	30.0	31.3	31.4	**0.010**
Race/Ethnicity								
Non-Hispanic White	26.2	25.5	26.9	29.3	29.3	32.0	31.7	**<0.001**
Non-Hispanic Black	19.6	22.0	23.3	21.2	23.8	27.1	24.8	**<0.001**
Mexican American	13.8	14.6	16.5	16.2	19.4	18.3	21.5	**0.001**
Other Hispanic	13.3	20.0	19.1	18.0	21.5	22.5	23.2	**0.025**
Other Race	25.7	17.7	15.1	18.3	21.2	23.9	26.4	**0.009**
Sex and Race/Ethnicity								
Men								
Non-Hispanic White	20.8	22.6	21.9	25.6	25.8	29.6	28.2	**<0.001**
Non-Hispanic Black	16.5	15.5	18.8	14.0	17.8	21.0	22.3	**0.007**
Mexican American	11.6	12.7	13.3	13.5	17.6	16.3	19.0	**0.009**
Other Hispanic	13.5[a]	11.6	16.9	15.6	16.3	18.5	19.2	NA
Other Race	19.1	7.9	15.6	15.7	17.1	21.1	26.7	**0.003**
Women								
Non-Hispanic White	31.6	28.2	31.8	32.8	32.6	34.2	35.1	**0.010**
Non-Hispanic Black	22.3	27.2	27.0	27.1	28.6	32.0	27.0	**0.020**
Mexican American	16.2	16.4	19.9	19.4	21.2	20.2	23.9	**0.012**
Other Hispanic	14.1[a]	27.6	21.0	20.0	25.6	26.4	26.7	NA
Other Race	30.2	28.5	14.7	20.6	24.9	26.5	25.9	0.516

a Relative standard error >30%. P values are not presented when the relative standard error exceeded 30%.

Trends in trouble sleeping

- From 2005-2006 to 2017-2018, there were increasing trends in age-adjusted prevalence of trouble sleeping in the overall population, among both men and women, and all race/ethnicity groups (p for trend<0.05).
- Compared to men, women had a higher prevalence of trouble sleeping.
- Among all the race/ethnicity groups, non-Hispanic White people had the highest prevalence of trouble sleeping.

CONCLUSION

- Based on NHANES data, we find that there was **no trend in short sleep duration** among the overall population from 2005 to 2014. However, the age-adjusted prevalence of short sleep duration in the 2017-2018 cycle was higher than that in the 2015-2016 cycle in the overall population.
- From 2005 to 2018, **non-Hispanic Black people** had the highest prevalence of short sleep duration.
- The prevalence of **trouble sleeping increased significantly** between 2005 and 2018, and **non-Hispanic White people** had the highest prevalence.

Implications:

- The high prevalence of short sleep duration and trouble sleeping in the US over the past decade is concerning.
- More studies are needed to explore the factors contributing to the sex and race /ethnicity differences in the prevalence of short sleep duration and trouble sleeping.
- Targeted management and prevention efforts should be made for different sex and race/ethnicity groups to address the sleep problems.

Study Limitations:

- Data on sleep duration and trouble sleeping were self-reported.
- The questions used to measure sleep duration in cycles from 2005-2006 to 2013-2014 differed from those used in the 2015-2016 and 2017-2018 cycles.
- Data on sleep quality, specific diagnoses of sleep disorders, or nap habits were not collected.

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