



Association between socio-demographic factors and sleep duration

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Background

- Studies suggest that sleep span, a vital indicator of health, has been associated with an individual's subjective and psychological well-being.^{1,2}
- It has become increasingly recognized that a lack of sleep is related to increased levels of adverse emotional issues, including anger, anxiety, depression, fear, and inattentiveness.^{2,3}
- Inadequate sleep has been related to fair or poor self-reported general health conditions, smoking, overweight, and obesity.^{4,5}
- There is very minimal data available on the factors that influence sleep duration.
- Knowledge of the critical determinants of sleep duration will allow to reduce the adverse health outcomes associated with sleep deprivation.

Aim

- To determine the socio-demographic factors associated with sleep duration.

Methods

- Data source: National Health And Nutrition Examination Survey (2015-2016)
- Statistical Software: STATA SE 15.1
- Methodology: Weighted Negative Binomial regression method
- Dependent variable: Number of sleep hours
- Independent variables: Sex; Age; Marital status; Race/Ethnicity; Immigration status; Education status; Number of children in the household; Annual family income; and Perceived general health condition
- Variables "Age" and "Annual family income" were transformed to correct for non-linearity using the Box-Tidwell method.
- Data were checked for multicollinearity, likelihood ratios, outliers, dispersion and zero inflation.



Results

Table 1: Descriptive Statistics (n = 4,776)¹

Variables	Central Tendency Measure	Variability Measure
Dependent Variable		
Number of sleep hours on weekdays/workdays (in hours)	7.76 (mean)	1.41 (Std. dev.)
Independent Variables		
Sex		
Female ²		51.26%
Male		48.74%
Age (in years)		
	46.25 (mean)	18.01 (Std. dev.)
Marital status		
Married ²		59.73%
Widowed		6.10%
Divorced		9.75%
Separated		3.09%
Never Married		11.84%
Living with partner		9.49%
Race/Ethnicity		
White ²		66.44%
Mexican American		8.81%
Other Hispanic		5.68%
Black		10.92%
Other Race		8.16%
Immigration status		
Native-born ²		91.43%
Immigrant		8.57%
Education status		
Less than 9 th grade ²		5.59%
9 th to 11 th grade		8.92%
High school grad		19.70%
Some college or AA degree		32.43%
College graduate or above		33.37%
Children < 5 years in HH		
None ²		83.26%
1 or more		16.74%
Children 6 to 17 years in HH		
None ²		32.91%
1 or more		67.09%
Annual family income	\$58,876 (mean)	\$32,919 (Std. dev.)
General health condition		
Poor ²		2.41%
Fair		14.80%
Good		39.95%
Very Good		32.56%
Excellent		10.28%

¹5,195 respondents excluded from analysis due to missing values on one or more variables; due to sampling design a weighting variable (wtint2yr) was used for the calculation of all statistics.
²Reference group

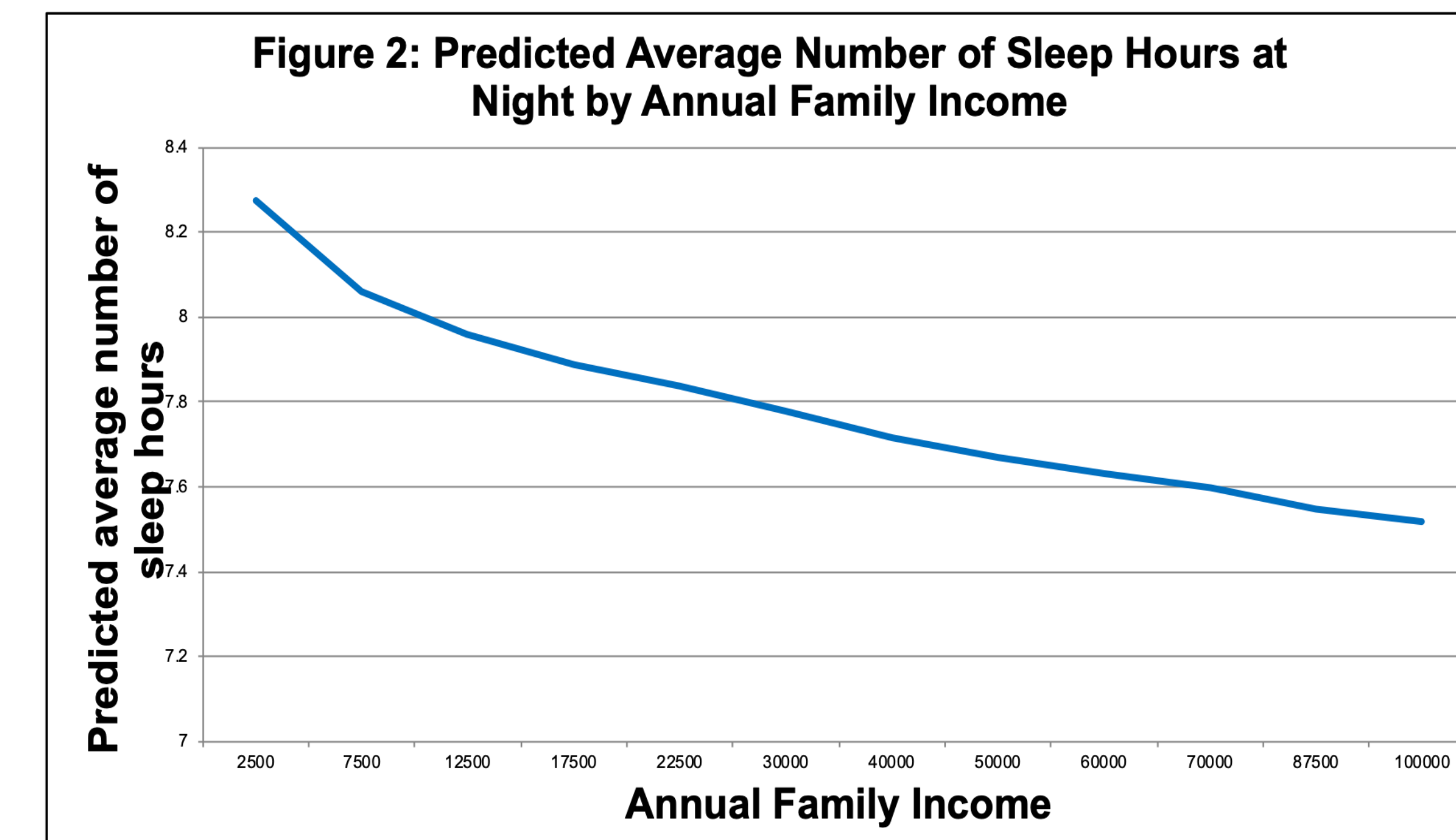
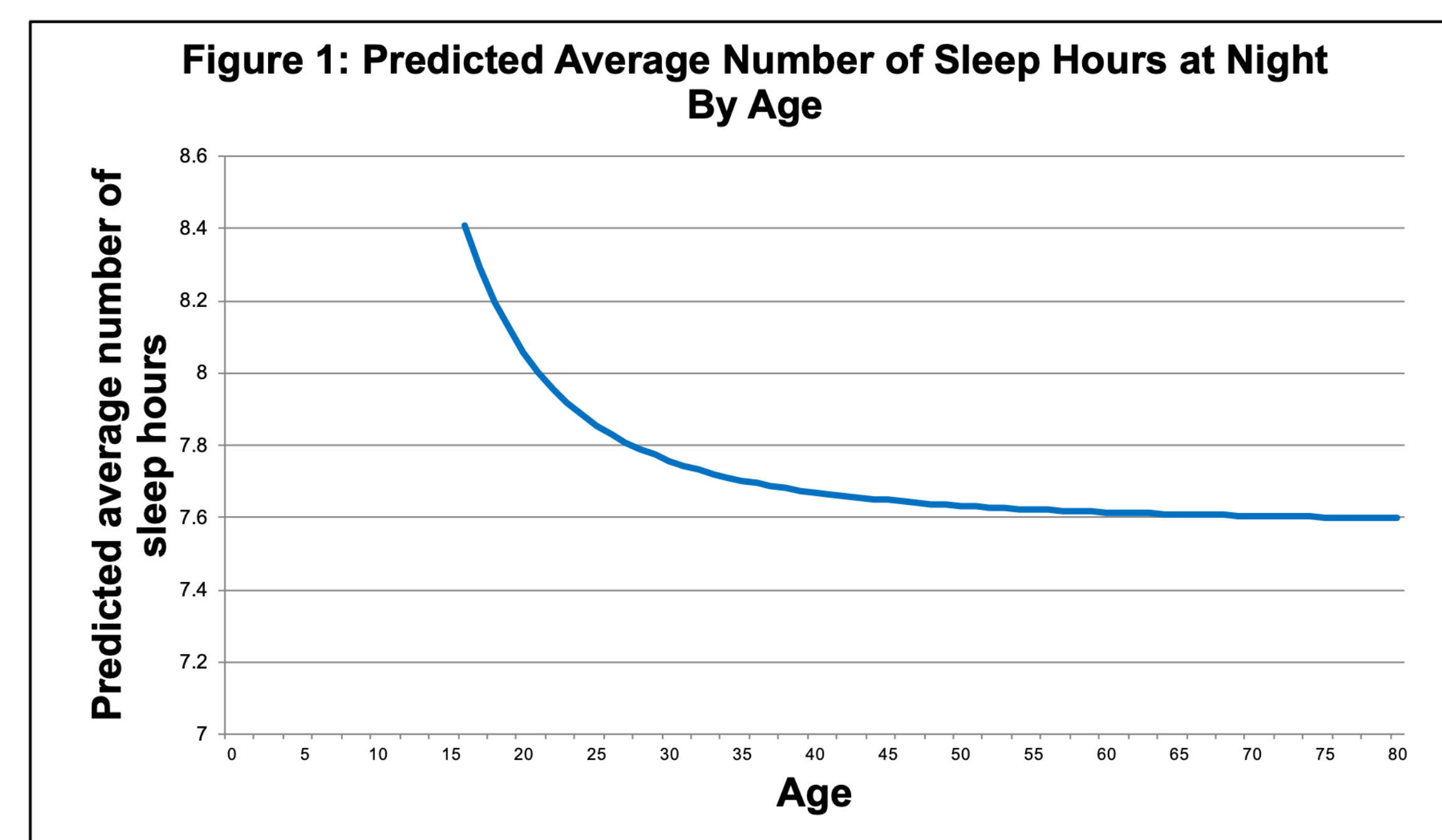


Table 2: Negative Binomial Regression Model to assess factors associated with number of sleep hours on weekdays/workdays¹

Variables	Rate Ratio	P-value
Sex		
Female ²		
Male	0.964	<0.001
Age ³	3193.808	<0.001
Marital status		
Married ²		
Widowed	0.988	0.452
Divorced	0.969	<0.05
Separated	0.992	0.75
Never married	0.979	<0.05
Living with partner	0.986	0.206
Race/Ethnicity		
White ²		
Mexican American	0.980	<0.05
Other Hispanic	0.977	<0.05
Black	0.950	<0.001
Other Race	0.972	<0.01
Immigration status		
Native-born ²		
Immigrant	0.992	0.421
Education status		
Less than 9 th grade ²		
9 th to 11 th grade	0.986	0.363
High school grad	0.981	0.176
Some college or AA degree	0.962	<0.01
College graduate or above	0.975	0.083
Children younger than 5 years in HH		
Zero ²		
1 or more	1.003	0.730
Children aged 6 to 17 years in HH		
Zero ²		
1 or more	0.976	<0.001
Annual Family Income ⁴	0.799	<0.001
General health condition		
Poor ²		
Fair	0.992	0.765
Good	0.980	0.473
Very Good	0.995	0.857
Excellent	1.004	0.904
Constant	12.85	<0.001

¹Based on n = 4,776 respondents; due to sampling design a weighting variable (wtint2yr) was used for the calculation of all statistics.

²Reference group

³Age transformed to correct for non-linearity using the Box-Tidwell method (which indicated age should be raised to the power of -2.401455). The transformed variable was rescaled by multiplying by 10 in order to improve the interpretability of the results.

⁴Annual family income transformed to correct for non-linearity using the Box-Tidwell method (which indicated annual family income should be raised to the power of 0.0628472).

Discussion

- The sample population comprised of 4,776 observations, with a mean age of 46.25 years and average sleep duration of 7.76 hours. Most of the sample population were married (59.73%), Whites (66.44%), native-born (91.43%), and at least a college graduate (33.37%).
- The average sleep duration at night for males was 3.6% lower than that for females. Compared to the married people, the sleep duration at night for divorced was 3.1% lower and for never married was 2.1% lower. Compared to Whites, the average sleep duration was 5% lower for Blacks, 2% lower for Mexican Americans, 2.3% lower for Hispanics, and 2.8% lower for people of any other race/ethnicity. The average number of sleep hours at night for households with children aged 6 to 17 years was 2.4% lower than those without children in the household.
- Average sleep duration decreased as age and annual family income increased, but most of this decrease occurred at younger ages and lower family incomes.
- This data and results are generalizable to the adult population aged 16 years and above of the United States of America.

Conclusion

- The potential adverse health effects due to inadequate sleep can be better understood if we **know the socio-demographic characteristics of most at-risk people.**
- This knowledge allows for a **more targeted provision of medical care**, which ultimately can **mitigate disease risk and increased health care costs.**
- Research studies need to control for socio-demographic factors so that the **effects of sleep duration are not confounded.**

Acknowledgement

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References

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