Sleep Duration and Depressive Symptoms in U.S. Adults: NHANES 2017–2018

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Abstract

Background: Both short and long sleep duration have been linked to depressive symptoms in prior literature. Nationally representative estimates using validated depression screening tools support evaluation of this association.

Methods: We conducted a cross-sectional analysis of NHANES 2017–2018 adults (≥18 years), excluding pregnant participants and using complete-case data for covariate adjustment. Usual sleep duration on weekdays/workdays was measured in hours. Depressive symptoms were defined as PHQ-9 score ≥ 10 [Kroenke et al., 2001]. We fit survey-weighted logistic regression models accounting for NHANES design (SDMVPSU/SDMVSTRA) and interview weights (WTINT2YR), adjusting for age, sex, race/ethnicity, education, family income-to-poverty ratio, body mass index, and ever smoking.

Results: The analytic sample included 2,944 adults (unweighted). Weighted prevalence of PHQ-9 ≥ 10 was 6.1% (95% CI 4.7%–7.5%) among those reporting 7–<9 hours of sleep, 14.9% (11.7%–18.0%) for <6 hours, and 12.8% (9.8%–15.7%) for ≥ 9 hours. In adjusted models using 7–<9 hours as the reference, odds of PHQ-9 ≥ 10 were higher for <6 hours (OR 2.51, 95% CI 1.65–3.80) and ≥ 9 hours (OR 1.87, 95% CI 1.37–2.55).

Conclusions: In NHANES 2017–2018, both short and long reported sleep duration were associated with higher odds of clinically relevant depressive symptoms compared with mid-range sleep. Findings are cross-sectional and do not establish causality.

1 Introduction

Sleep health is a multidimensional construct relevant to physical and mental health [Buysse, 2014]. Prior evidence, including prospective meta-analytic work, suggests that both short and long sleep duration are associated with elevated risk of depression compared with normal sleep duration [Zhai et al., 2015]. National survey data such as NHANES allow estimation of this association in the U.S. population using validated screening instruments, including the PHQ-9 [Kroenke et al., 2001].

2 Methods

2.1 Data source and study population

We used publicly available NHANES 2017–2018 data and followed NHANES analytic guidance [National Center for Health Statistics, 2018]. Participants aged 18 years and older were included. We excluded participants who were pregnant (when pregnancy status was available) and restricted to complete-case observations for exposure, outcome, design variables, and covariates.

2.2 Exposure: sleep duration

Usual sleep duration on weekdays/workdays (hours) was used as the primary exposure. For interpretability, we categorized sleep duration into < 6, 6–< 7, 7–< 9, and ≥ 9 hours, using 7–< 9 hours as the reference category.

2.3 Outcome: depressive symptoms

Depressive symptoms were assessed using the PHQ-9. Following standard practice, clinically relevant depressive symptoms were defined as PHQ-9 score ≥ 10 [Kroenke et al., 2001].

2.4 Covariates

We adjusted for age, sex, race/ethnicity, education, family income-to-poverty ratio (PIR), body mass index (BMI), and ever smoking.

2.5 Statistical analysis

All analyses accounted for the NHANES complex survey design using SDMVPSU (primary sampling unit), SDMVSTRA (strata), and interview weights (WTINT2YR). We estimated weighted prevalence of PHQ-9 ≥ 10 across sleep categories. We fit survey-weighted logistic regression models for PHQ-9 ≥ 10 with sleep duration categories and covariate adjustment.

3 Results

The analytic sample included 2,944 adults (unweighted). Weighted prevalence of PHQ-9 ≥ 10 varied by sleep category: 14.9% (95% CI 11.7%–18.0%) for < 6 hours, 8.7% (4.0%–13.4%) for 6–< 7 hours, 6.1% (4.7%–7.5%) for 7–< 9 hours, and 12.8% (9.8%–15.7%) for ≥ 9 hours.

In adjusted models using 7–< 9 hours as the reference, odds of PHQ-9 ≥ 10 were higher for < 6 hours (OR 2.51, 95% CI 1.65–3.80) and ≥ 9 hours (OR 1.87, 95% CI 1.37–2.55). The 6–< 7 hours category showed a positive but imprecise association (OR 1.41, 95% CI 0.78–2.53).

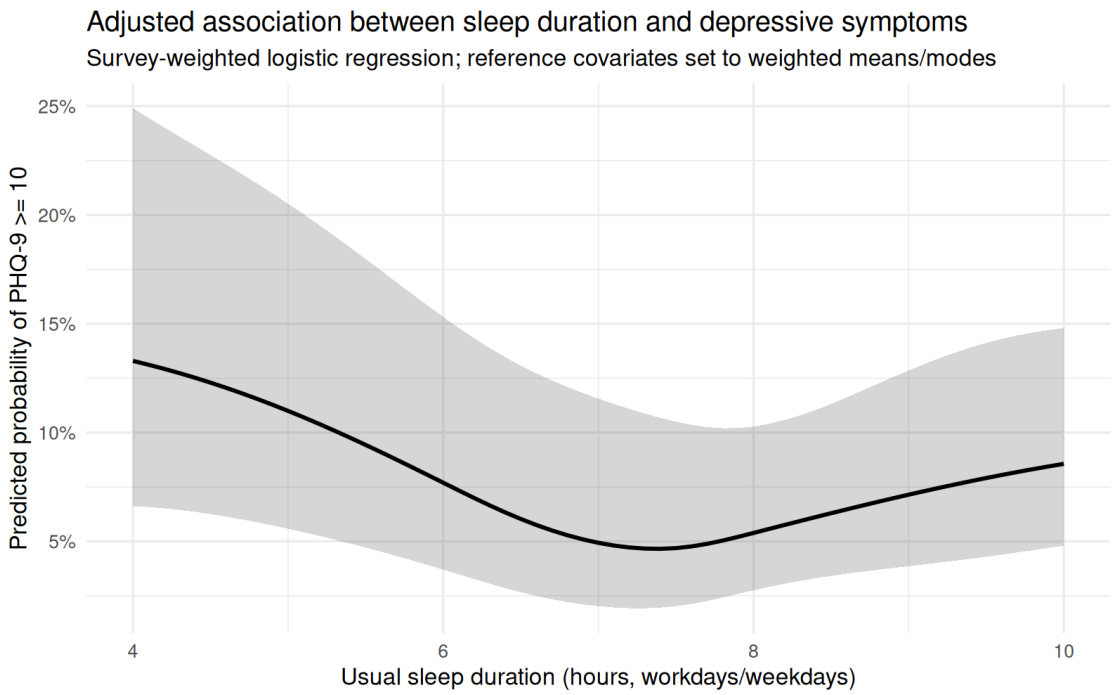

Figure 1: Adjusted predicted probability of PHQ-9 $\geq$ 10 across sleep duration (weekdays/workdays).

4 Discussion

In this NHANES 2017–2018 cross-sectional analysis, both short sleep ($<$ 6 hours) and long sleep ($\geq$ 9 hours) were associated with higher odds of clinically relevant depressive symptoms compared with 7–$<$ 9 hours. The pattern is consistent with prior literature suggesting elevated depression risk at both extremes of sleep duration [Zhai et al., 2015].

4.1 Limitations

This analysis is cross-sectional and cannot establish temporal ordering or causality. Sleep duration was self-reported and may be misclassified. We used complete-case analysis for covariates, which may introduce selection bias if missingness is not random. Residual confounding (e.g., comorbidities, medication use, sleep disorders) is possible.

5 Conclusion

Among U.S. adults in NHANES 2017–2018, short and long reported sleep duration were associated with higher odds of clinically relevant depressive symptoms compared with mid-range sleep.

References

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