



Original Investigation | Public Health

Timing and Length of Nocturnal Sleep and Daytime Napping and Associations With Obesity Types in High-, Middle-, and Low-Income Countries

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Abstract

IMPORTANCE Obesity is a growing public health threat leading to serious health consequences. Late bedtime and sleep loss are common in modern society, but their associations with specific obesity types are not well characterized.

OBJECTIVE To assess whether sleep timing and napping behavior are associated with increased obesity, independent of nocturnal sleep length.

DESIGN, SETTING, AND PARTICIPANTS This large, multinational, population-based cross-sectional study used data of participants from 60 study centers in 26 countries with varying income levels as part of the Prospective Urban Rural Epidemiology study. Participants were aged 35 to 70 years and were mainly recruited during 2005 and 2009. Data analysis occurred from October 2020 through March 2021.

EXPOSURES Sleep timing (ie, bedtime and wake-up time), nocturnal sleep duration, daytime napping.

MAIN OUTCOMES AND MEASURES The primary outcomes were prevalence of obesity, specified as general obesity, defined as body mass index (BMI; calculated as weight in kilograms divided by height in meters squared) of 30 or greater, and abdominal obesity, defined as waist circumference greater than 102 cm for men or greater than 88 cm for women. Multilevel logistic regression models with random effects for study centers were performed to calculate adjusted odds ratios (AORs) and 95% CIs.

RESULTS Overall, 136 652 participants (81 652 [59.8%] women; mean [SD] age, 51.0 [9.8] years) were included in analysis. A total of 27 195 participants (19.9%) had general obesity, and 37 024 participants (27.1%) had abdominal obesity. The mean (SD) nocturnal sleep duration was 7.8 (1.4) hours, and the median (interquartile range) midsleep time was 2:15 AM (1:30 AM–3:00 AM). A total of 19 660 participants (14.4%) had late bedtime behavior (ie, midnight or later). Compared with bedtime between 8 PM and 10 PM, late bedtime was associated with general obesity (AOR, 1.20; 95% CI, 1.12–1.29) and abdominal obesity (AOR, 1.20; 95% CI, 1.12–1.28), particularly among participants who went to bed between 2 AM and 6 AM (general obesity: AOR, 1.35; 95% CI, 1.18–1.54; abdominal obesity: AOR, 1.38; 95% CI, 1.21–1.58). Short nocturnal sleep of less than 6 hours was associated with general obesity (eg, <5 hours: AOR, 1.27; 95% CI, 1.13–1.43), but longer napping was associated with higher abdominal obesity prevalence (eg, >1 hours: AOR, 1.39; 95% CI, 1.31–1.47). Neither going to bed during the day (ie, before 8 PM) nor wake-up time was associated with obesity.

(continued)

Key Points

Question Is late bedtime associated with general and abdominal obesity and does a heterogeneous association exist between men and women?

Findings In this cross-sectional study of 136 652 participants from 26 countries from the Prospective Urban Rural Epidemiology study, after adjustment for a wide range of potential confounding factors, late nocturnal bedtime and short nocturnal sleep were associated with increased risk of general and abdominal obesity, while longer daytime napping could not compensate for the loss but further increased risk of abdominal obesity, especially among women.

Meaning These findings suggest that encouraging earlier bedtime and avoiding short nocturnal sleep may benefit weight control.

+ Supplemental content

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