

Assessment of the correlation between sleep and weight based on real-life measurements collected over a year by connected devices

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Background: Short sleep duration is known to be associated with obesity, however, only a few studies have examined the relationship between sleep routine and weight change. The aim of this study was to investigate weight change and sleep routine among adults using both connected weighing scales and sleep trackers.

Methods: Anonymized data from a cohort of 2,338 adult users of Withings connected scales and sleep trackers were analyzed over a one year period. Users had at least 36 weight measurements (with at least 5 measures at the beginning of the year and 5 measures at the end of the year) and at least 15 sleeping nights by season, including 2 Saturdays and 2 Sundays. Sleep tracking accelerometers were validated with polysomnography. Weight change was calculated as the mean of measurements over 8 weeks at the end vs. start of each individual's observation period – for the subset of individuals with BMI > 25 kg/m².

Results: The cohort comprised 1871 (80%) men (mean age 46.5; period observed 1 year; mean start BMI 27.2) and 467 women (mean age 47.1; period observed 1 year; mean start BMI 25.8). Different weight classes of users had significantly different mean sleep durations (ANOVA P<0.0001): 7.5h for normal; 7.2h for overweight; 7.1h for obese. Concerning weight change, a linear regression model showed a relationship between weight loss and wake-up time (people waking up 1 hour earlier lost 0.4lb more; 95% CI 0.006-0.741 lb, P=0.04), but no evidence of a relationship between weight change and irregular sleep pattern (sleeping more at the weekend than during the week).

Conclusions: Among users of connected health technologies, obese individuals sleep around 25 minutes less per night than their normal weight counterparts. Additionally, early waking is slightly associated with weight loss.