Assessing the impact of physical activity on sleep outside clinical setting using data from a large population of connected devices users

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Objectives: the positive effects of physical exercise on sleep are becoming more and more widely acknowledged. At the same time, the emergence of connected devices enables people to monitor their physical activity and sleep. Our aim was to assess the impact of physical activity on sleep, using data from connected activity trackers.
Materials and methods: the study is based on the data from an anonymous cohort of 9,000 adult users of the Withings Pulse (WP) over 8 months. The WP tracks the number of daily steps, the intensity of physical activity (metabolic equivalent of task [MET] and speed) as well as the durations of deep and light sleep phases. The WP has been validated using polysomnography. The study compared sleep characteristics following a day in which physical exercise was observed to those following a day without significant exercise. Collected data was classified according to the time of exercise: during the daytime (between 6am and 6pm) or during the evening (between 6pm and 2am).
Results: on average, people who were physically active (activity >3 METs), compared to those who did not exercise (activity <3 METs), slept 15 minutes more (p<0.001) and were in a calm sleep cycle for 19 minutes longer (p<0.001). Moreover, they went to bed on average 36 minutes earlier (p<0.001). Increase in sleep duration is significant for both women (17 minutes, p = 0.006) and men (13 minutes, p<0.001). Results also indicate that people who exercised woke up 13% less during the night (p<0.001).
Those who exercised during the evening went to bed earlier than those who exercised during the daytime (p<0.001); however, no statistically significant difference was observed in sleep duration.
Conclusion: the study shows a positive correlation between physical activity levels and sleep quality, assessed by the use of connected devices.