

The power of movement: how physical activity can mitigate the risks of inadequate sleep

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This editorial refers to ‘Joint association of physical activity and sleep duration with risk of all-cause and cause-specific mortality: a population-based cohort study using accelerometry’, by Y.Y. Liang et al., <https://doi.org/10.1093/eurjpc/zwad060>.

The cardiovascular health benefits of physical activity (PA) and healthy sleep duration are well established.^{1,2} In the literature, however, findings on the interaction of objectively measured PA and sleep duration have been scarce and often contradictory.^{3–5}

In this issue, Liang et al. provide important information about this topic through a population-based cohort study to investigate the association of accelerometer-measured PA and sleep duration with all-cause mortality, cardiovascular disease (CVD), and cancer mortality. Using the UK Biobank data, they identified 92 221 participants in whom PA and sleep duration were measured by a 7-day accelerometer recording. The results demonstrate an independent association between PA and sleep duration with mortality risk. Sleep duration (both short and long sleep duration) was associated with higher all-cause and CVD mortality. Higher moderate-to-vigorous physical activity (MVPA) was associated with a reduction of all-cause, CVD, and cancer mortality.

Interestingly, the study reveals an additive and multiplicative interaction between PA and sleep duration on mortality risk. The lowest volume of PA combined with short or long sleep duration is associated with the highest risk of all-cause mortality. In contrast, a higher volume of PA seems to eliminate the risk associated with short or long sleep duration, as similar mortality risks were found in the short, normal, and long sleep duration groups.

Sleep, physical activity, and their interaction

According to the 2021 European Society of Cardiology (ESC) guidelines on CVD prevention, a sleep duration target of 7 h is seen as optimal.⁶ The American Heart Association (AHA) integrates sleep in a risk score with its Life's Essential 8 (LE8) score.⁷ This score comprises eight modifiable metrics: diet, PA, nicotine exposure, sleep health, body mass index, blood lipids (non-HDL cholesterol), blood glucose, and blood pressure. This sleep health metric is added in the last version of the risk score, which this score has been updated from Life's Simple 7 to Life's Essential 8. In this LE8 score, the ideal sleep duration

is defined as 7–9 h per day. The score only penalizes shorter sleep duration, which should thus be associated with higher CVD risk.

What is new in this study is the fact that PA seems to eliminate the adverse effects of short and long sleep duration. This could mean that when adequate PA is achieved, it counteracts the effects of inadequate sleep duration, and the LE8 risk score could thus be inadequate in this situation. Regarding the amount of PA, the authors suggested that the greatest gains of health benefits come from PA at about the lower threshold of the WHO recommendation for PA. It can be concluded that individuals who have limited time for sleep or naturally sleep very little can actually compensate for this with a small amount of physical effort.

Not only could this be very relevant for the CVD and general patient population, but this also has implications for all healthcare personnel involved in cardiovascular care, particularly physicians and nurses. These are professions where sleep is not always guaranteed because of night shifts or being on call at night, which means that they are also at risk. Moreover, the risk of coronary and cardiovascular mortality increases if this inadequate sleep is combined with work stress.⁸ The main message for each individual working in healthcare could be as follows: ‘if you can't sleep more, move more!’

Strengths and limitations

An important strength of the study in contrast with earlier studies is the fact that objective accelerometer-based data are used. In contrast to self-reported measures, which are more subjective, the accelerometer-measured data provide reliable and objective measures of PA and sleep duration.

However, as the authors themselves already indicate, it is important to consider the variability of PA and sleep duration. All conclusions in the study are based on a snapshot of PA volume and sleep duration in a period of 7 days to make conclusions over a period of 7 years of follow-up. Both PA and sleep duration can be variable over time, and thus, one should be cautious to extrapolate. At least, this study was limited in measuring parameters other than sleep duration. But in addition to sleep duration, daytime napping, daytime sleepiness, and other phenotypes of sleep health play a key role in the development of cardiometabolic diseases.⁹

Conclusions

While caution should be exerted with generalizing the data of this study to the general population, the very interesting message that even a relatively low volume of PA can eliminate the risks associated with short sleep duration is what sticks. In addition, the best benefits of PA come from doing PA in the morning, as it was associated with the lowest risks of CVD.¹⁰ PA truly remains the best pill for everyone. It is certainly studies like these that ensure sweet dreams for every caregiver in preventive cardiology.

Conflict of interest: None declared.

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