

Study finds the time of day you move your body makes a difference to your health

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Undertaking the majority of daily physical activity in the evening is linked to the greatest health benefits for people living with obesity, according to researchers from the University of Sydney, Australia who

followed the trajectory of 30,000 people over almost eight years.

Using wearable device data to categorize participant's physical activity by morning, afternoon or evening, the researchers uncovered that those who did the majority of their aerobic moderate to vigorous physical activity—the kind that raises our heart rate and gets us out of breath—between 6 p.m. and midnight had the lowest risk of premature death and death from [cardiovascular disease](#).

The frequency with which people undertook moderate to [vigorous physical activity](#) (MVPA) in the evening, measured in short bouts up to or exceeding three minutes, also appeared to be more important than their total amount of physical activity daily.

The study, led by researchers from the University's Charles Perkins Center is published in the journal [Diabetes Care](#).

"Due to a number of complex societal factors, around two in three Australians have excess weight or obesity which puts them at a much greater risk of major cardiovascular conditions such as heart attacks and stroke, and premature death," said Dr. Angelo Sabag, Lecturer in Exercise Physiology at the University of Sydney.

"Exercise is by no means the only solution to the obesity crisis, but this research does suggest that people who can plan their activity into certain times of the day may best offset some of these health risks."

Smaller [clinical trials](#) have shown similar results, however the large scale of participant data in this study, the use of objective measures of physical activity and hard outcomes, such as premature death, makes these findings significant.

Joint first author Dr. Matthew Ahmadi also stressed that the study did

not just track structured exercise. Rather researchers focused on tracking continuous aerobic MVPA in bouts of three minutes or more as previous research shows a strong association between this type of activity, glucose control and lowered cardiovascular disease risk compared with shorter (non-aerobic) bouts.

"We didn't discriminate on the kind of activity we tracked, it could be anything from power walking to climbing the stairs, but could also include structured exercise such as running, occupational labor or even vigorously cleaning the house," said Dr. Ahmadi, National Heart Foundation postdoctoral research fellow at the Charles Perkins Center, University of Sydney.

While observational, the findings of the study support the authors original hypothesis, which is the idea—based on previous research—that people living with diabetes or obesity, who are already glucose intolerant in the late evening, may be able to offset some of that intolerance and associated complications, by doing physical activity in the evening.

How was the study conducted?

The researchers used data from UK Biobank and included 29,836 adults aged over 40 years of age living with obesity, of whom 2,995 participants were also diagnosed with type 2 diabetes.

Participants were categorized into morning, afternoon or evening MVPA based on when they undertook the majority of their aerobic MVPA as measured by a wrist accelerometer worn continuously for 24 hours a day over seven days at study onset.

The team then linked health data (from the National Health Services and National Records of Scotland) to follow participants health trajectory for 7.9 years. Over this period they recorded 1,425 deaths, 3,980

cardiovascular events and 2,162 microvascular dysfunction events.

To limit bias, the researchers accounted for differences such as age, sex, smoking, alcohol intake, fruit and vegetable consumption, sedentary time, total MVPA, education, medication use and sleep duration. They also excluded participants with pre-existing cardiovascular disease and cancer.

The researchers say the length of the study follow-up and additional sensitivity analysis bolster the strength of their findings however, due to the observational design, they cannot completely rule out potential reverse causation. This is the possibility that some participants had lower aerobic MVPA levels due to underlying or undiagnosed disease.

Why is this study important?

Professor Emmanuel Stamatakis, Director of the Mackenzie Wearables Research Hub at the Charles Perkins Center and senior author on the paper, said the sophistication of studies in the wearables field is providing huge insights into the patterns of activity that are most beneficial for health.

"It is a really exciting time for researchers in this field and practitioners alike, as wearable device-captured data allow us to examine physical activity patterns at a very high resolution and accurately translate findings into advice that could play an important role in health care," said Professor Stamatakis.

"While we need to do further research to establish causal links, this study suggests that the timing of physical activity could be an important part of the recommendations for future obesity and type 2 diabetes management, and preventive health care in general."

More information: Angelo Sabag et al, Timing of Moderate to Vigorous Physical Activity, Mortality, Cardiovascular Disease, and Microvascular Disease in Adults With Obesity, *Diabetes Care* (2024). DOI: [10.2337/dc23-2448](https://doi.org/10.2337/dc23-2448)

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