

The effect of sleep restriction on cognitive and physical performance among recreational athletes

Purpose and value of study

There is a growing interest in sports science of how sleep influences athletic performance. However, studies investigating the effect of sleep quantity on exercise performance have produced mixed findings. Exercise performance is not impacted by sleep duration in some studies, while studies that found a reduction in performance typically involved the participants staying awake for a minimum of 24 hours.

This study aims to explore if a small reduction in sleep influences cognitive or physical performance.

You have been invited to take part in this project as you fulfil the following criteria:

- You are aged between 18-45
- You perform at least 150 minutes of exercise per week, which includes some high-intensity exercise (e.g., team sports, tennis, interval training).

Who is organising the research?

Paul Hough (PhD candidate at St Mary's University; Lecturer at the University of Westminster).

What will happen to your data?

The data from the study will be stored electronically on a password-protected server. Only the research team can access the data. Your data will be anonymous. The findings may be published in an academic journal or at a conference.

Who is funding the research:

St Mary's University, Twickenham.

Participation criteria

It is your decision if you want to participate in this study. You are allowed to withdraw at any time, and you have the right to request for your data to be withdrawn and deleted. Should you decide to take part, you will be required to complete a physical activity readiness questionnaire (PAR-Q) and consent form.

What does the research involve?

During the study, you will be asked to wear a small wristband which measures movement and estimates when you are asleep. The sleep/wake data calculates your readiness (alertness) on a scale of 0-100. You will also be asked to complete a sleep diary every morning.

You will be required to report to the human performance laboratory at St Mary's on three separate occasions between 1-5 pm. If you live within 5 miles of St Mary's, we can arrange transport for you if you wish.

Sleep

You will be requested to go to bed two hours later than usual for three consecutive nights before one of the lab visits. The purpose of this is to understand if a small reduction in sleep influences your performance. You are requested to maintain your usual sleep habits before the other lab visits.

Laboratory tests

Upon arrival at the lab, your height, body mass, and body composition (fat/lean mass) will be measured using a specialist scale (session 1). You will then complete the following tests: reaction time, manual dexterity, subjective scales (how you feel), muscle force (isometric mid-thigh pull), and 5 sprints on a cycle ergometer. Each sprint lasts 10 seconds and is separated by 2 minutes of rest.

Are there any benefits to taking part?

The tests used in this study are not usually accessible outside of research and professional sports organisations. After completing the final lab test, you will receive a report of your results via email. The data will show how sleep influences your cognitive and physical performance, and your perception of fatigue.

After completing the study, you will gain an insight into your:

- habitual sleep patterns (duration and quality)
- maximum strength (mid-thigh pull)
- peak lower body power (cycling)
- repeated sprint ability (cycling)
- concentration ability (vigilance test)

Are there any risks involved?

You might feel fatigued after the cycling protocol. However, this fatigue should not exceed what you are accustomed to from other forms of high-intensity exercises. An experienced sports scientist will ensure your well-being and safety are maintained. You might feel more tired than usual on some days during the study, in which case you should avoid driving to St Mary's.

Preparations required before taking part in the study

You will be instructed not to eat or drink anything other than water in the three hours preceding each laboratory visit. In the 24 hours before each visit, you are requested to avoid strenuous exercise and alcohol. You should also avoid consuming more than your habitual intake of caffeine or nicotine. You must maintain a consistent bed and wake time throughout the study, except on three days specified by the researcher.

How much time will the project involve?

Each of the lab visits will take approximately one hour. All lab visits will be scheduled between 1-5 pm.

How will your participation in the project will be kept confidential?

Your data will be stored and handled following the General Data Protection Regulations brought in under the Data Protection Act 2018. All data will be anonymised and stored on St Mary's One Drive (St Mary's University Servers).

If you are interested in participating in this study or have any questions, please email Paul Hough mailhough@gmail.com