Women's blood lipid metabolism found to be better at countering effects of sleep apnea

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Subjects were seated for six hours with an intravenous catheter to measure blood lipids, breathing medical nitrogen to simulate sleep apnea. Credit: University of Ottawa

Sleep apnea, which involves recurring, temporary interruptions of breathing during sleep, can disturb regulation of blood lipid levels, a key factor in the development of cardiovascular disease. A University of Ottawa research team has shown that the impact of sleep apnea on the metabolism of blood lipids differs by sex, with women regulating their blood lipids better than men.

The study was conducted by Nicholas Goulet, Caroline Marcoux, Renée Morin, Jean-François Mauger and Vincent Bourgon, under the supervision of Pascal Imbeault, full professor in the School of Human Kinetics of uOttawa's Faculty of Health Sciences and a member of the Institut du savoir Montfort, in collaboration with Dr. Ruwan Amaratunga, a pneumologist with the Montfort institute.

In a randomized cross-over trial including subjects of both sexes, the research team measured the impact of consuming high-fat meals and intermittent exposure to oxygen-deficient air, leading to low blood oxygen levels (hypoxemia), a key characteristic of sleep apnea. Various physiological measurements were taken during the study, including triglyceride levels, blood pressure and oxygen saturation.

The findings are published in *The Journal of Physiology* in an article titled "Biological sex-related differences in the postprandial triglyceride response to intermittent hypoxemia in young adults: a randomized crossover trial."

"We achieved our findings by measuring lipids in the bloodstream after a lipid-rich meal, with men and women in good health exposed to ambient air (normal oxygen levels) or oxygen-deficient air intermittently (the latter simulating sleep apnea)," says Imbeault.

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apnea.

The results suggest that there are significant differences between men and women in triglyceride response after a meal under conditions of intermittent hypoxemia. The study provides detailed information on the interaction among biological sex, intermittent hypoxemia and triglyceride response after a meal, with potential implications for future research and clinical applications in the area of physiology.

"Our work shows that women present a metabolic advantage in managing blood lipids, protecting them from the disruptive effects of sleep apnea. This could potentially explain why women living with sleep apnea present a lower prevalence of co-morbidities (type II diabetes, cardiovascular disease) than men," says Imbeault.

The study took place from 2018 to 2023 at the University of Ottawa. "To our knowledge, no study to date has investigated the contribution of biological sex to blood lipids during exposure to intermittent hypoxemia, a condition that simulates sleep apnea," Imbeault says.

The findings therefore add a new dimension to our understanding of the way blood lipids are managed and highlight the importance of considering the difference between the sexes in future research and clinical interventions.

More information: Nicholas Goulet et al, Biological sex-related differences in the postprandial triglyceride response to intermittent hypoxaemia in young adults: a randomized crossover trial, *The Journal of Physiology* (2024). DOI: 10.1113/JP285430

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