Review of: "Light exposure during sleep impairs cardiometabolic function"

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Potential competing interests: The author(s) declared that no potential competing interests exist.

This study aimed to verify whether exposure to environmental light during habitual nighttime sleep could cause insulin resistance the next morning, as well as suggesting hypotheses to explain metabolic and heart rate changes observed in the study. Volunteers with similar characteristics were randomized into two groups of 10 participants: one group exposed to conditions <3 lux on two nights of observation and another group exposed to <3 lux on the first night and 100 lux on the second night. All participants underwent one-week prior actigraphy to determine eligibility. The inclusion and exclusion criteria were well defined to avoid bias.

Participants were monitored both nights by polysomnography with electroencephalographic recordings, electro-oculograms, electromyograms and electrocardiogram. In addition, subjective sleepiness assessments were performed every 2 h during wakefulness, hourly melatonin dosage throughout the period and applied every 2 h, during wakefulness, a visual analogue scale to assess subjective hunger (VAS-H) and another for vigor and subjective global affect. Cardiac function (blood pressure, heart rate and its variability) and insulin resistance (HOMA-IR, Matsuda index, Oral Glucose Tolerance Test and AUC) were evaluated by validated methods.

The findings allow us to infer that insulin resistance was reduced in the group that slept with exposure to 100 lux, especially in the initial response to insulin, that is, after the first 30 minutes (verified after the ingestion of the glucose bolus during the tolerance test). Heart rate was higher and sustained and rate variability was lower (higher sympathovagal balance) in the group exposed to 100 lux, which predicts higher cardiovascular risk.

This study points out to a new look at the cardiometabolic changes caused by exposure to light at night and especially when one is sleeping. A possible explanation for the cardiovascular and insulin resistance changes would be the hyperexcitation of the autonomic nervous system, associated with lower production of melatonin, which could misalign circadian rhythms, reduce deep sleep (which was observed by changes in sleep macrostructure), alter pancreatic beta cell secretions (decreasing glucose tolerance and increasing insulin resistance) and modify heart rate.

As exposure to light at night and, often, even during sleep is a constant practice of modern life, the study reinforces a new area of investigation into the short, medium and long term implications of light at night and its consequences for cardiometabolic health. According to the authors, it should be noted that studies with a larger sample size, with longer follow-up time and that assess wavelengths, intensity and duration of light exposure, as well as differences between exposure to light during the day and at night should be carried out. Another aspect to be studied is gender differences, mainly in relation to the activation of the autonomic nervous system, what can be predictive and promising from the point of view of preventing diabetes and cardiovascular diseases.

However, previous research has shown that exposure to light intensity of less than 100 light was sufficient to increase heart rate and heart rate variability (1,2), as well as suppress melatonin production and misalign biological rhythms (3,4). Thus, it would be interesting for future research to have study designs with light intensity lower than 100 lux during sleep to simulate similar conditions with the real lighting of people who sleep with the light on.

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