

# Can Overnight Sleep Efficiency Impact Cardiovascular Risk in the Morning? [Response to Letter]

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## Dear editor

Based on our recent article in *Nature and Science of Sleep*,<sup>1</sup> Dr Rastmanesh wrote a Letter to the Editor<sup>2</sup> and brought up three main points of interpretation. We are pleased that Dr Rastmanesh is interested in our work, but we believe these points were already adequately covered in the “Discussion” section of our original paper. Nonetheless, we are happy to explain further here.

First, Dr Rastmanesh implied that we had concluded that “disturbed sleep could be implicated as a mechanism in the morning increase in adverse CV events”<sup>2</sup> yet our “study design is not appropriate for such a mechanistic conclusion”.<sup>2</sup> We found that sleep efficiency is inversely associated with morning blood pressure and we did discuss the potential clinical ramifications of such an association, but we were circumspect throughout the paper in all such comments. For example, in the “Discussion” section, we stated, “Future studies in people with existing cardiovascular risk are warranted to understand the clinical significance of these findings”,<sup>1</sup> and “Discussion of potential mechanisms is speculative at this point, and more experimental work needs to be done in a larger sample to reproduce these findings”.<sup>1</sup>

Second, Dr Rastmanesh pointed out that it is important to differentiate between the roles of vessel distensibility vs diameter. We entirely agree and had set up the study to examine the association between sleep efficiency and both of these parameters. We found that whereas sleep efficiency is associated with baseline diameter, it is not associated with the distensibility of the vessel (flow-mediated dilation). Dr Rastmanesh further suggests that baseline diameter is not static. Even if this were the case, it is highly unlikely to have affected our results or interpretation because all our measurements occurred at the same time relative to sleep in each participant.

Third, Dr Rastmanesh suggested that heterogeneous vasodilator pathways regulate flow-mediated dilation in men and women. This possibility is the reason why we explored sex differences in the association between overnight sleep and morning cardiovascular parameters. Our exploratory analyses suggest that the significant relationships between sleep efficiency and baseline arterial diameter and arterial blood pressure are driven by women and not men. We look forward to further studies that can shed light on the mechanisms to explain this sex difference.

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## Disclosure

No conflicts of interest, financial or otherwise, are declared by the authors for this communication.

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