



Reply to Comment to: The relationship between sleep and cognitive function in patients with prediabetes and type 2 diabetes

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We appreciate the comment by Dr. Kawada [1] in our recently published manuscript on the relationship between sleep and cognitive function in patients with prediabetes and type 2 diabetes [2]. In this study, we found that worse sleep efficiency and having diabetes were associated with worse cognitive function, while the severity of obstructive sleep apnea (OSA) was not. In our separate work, OSA severity was found to be related to the area under the curve of glucagon-like peptide 1 (GLP-1) in response to glucose challenge test in prediabetes patients [3]. While one might want to infer that by affecting glucose metabolism, OSA could possibly affect cognition, we did not find this in our study. This does not mean that the relationship between OSA and cognition does not exist as others have demonstrated such findings, as in the study by Haba-Rubio et al. [4], cited by Dr. Kawada, as well as others [5]. The study by Haba-Rubio et al. was much larger (580 participants) and differed from ours since it included general population, not only those with abnormal

glucose tolerance, and the participants were older than ours (> 65 years). The study used 4% criteria for oxygen desaturation while ours used 3%, both of which have been used in the literature. These differences in study designs, population enrolled and methods of sleep measurement could explain the different results. Whether the mechanisms by which OSA could affect cognitive function are partly mediated through abnormal glucose metabolism requires further studies. Our study was limited, as previously addressed, due to a small number of participants having severe OSA. Lastly, as correctly pointed out by Dr. Kawada, the cross-sectional nature of our studies precludes a causal assumption of the relationship between different variables and will require prospective or interventional studies.

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Compliance with ethical standards

Conflict of interest Dr. Reutrakul reports grants from Merck Sharp and Dohme, non-financial support from ResMed, personal fees from Novo Nordisk, personal fees from Sanofi Aventis, and personal fees from Medtronic, outside the submitted work. All other authors have nothing to disclose.

Human and animal rights All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) A and with the Helsinki Declaration of 1975, as revised in 2008.

Informed consent Informed consent was obtained from all patients for being included in the study.

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