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LETTERS TO THE EDITOR

Seizing the opportunity: factors influencing the discrepancy between self-reported and objective sleep

Karin Trimmel; MD, PhD; Marion Böck, MPH; Stefan Seidel, MD

Department of Neurology, Medical University of Vienna, Vienna, Austria

We appreciate the concerns raised by Sharman et al[1] regarding methodological aspects of our work. We would therefore like to take the opportunity to present additional details on polysomnographic recordings and scoring, as well as a supplementary analysis accounting for independence of all individual recordings and potential effects of outliers.

Polysomnographs were performed with a MEPAL system (MAP, Martinsried, Germany) between January 2012 and December 2016. Electroencephalogram (EEG; C3 and C4 with linked M1 and M2 as reference electrodes until February 2016; F3, C3, and O1 with M2 as reference electrode thereafter) and electrooculogram (EOG; 2 channels) were analyzed with a low-pass filter at 35 Hz and high-pass filter at 0.5 Hz, with a sampling rate of 100 Hz. Chin electromyography (EMG; 2 channels) was analyzed with a low-pass filter at 35 Hz, high-pass filter at 10 Hz, and a sampling rate of 100 Hz.

Since our equipment did not fulfill all American Academy of Sleep Medicine (AASM) recommendations[2] (EEG/EMG sampling rates of 100 Hz instead of ≥ 200 Hz, 2-channel instead of 3-channel chin EMG), sleep was scored according to R&K.[3] All recordings were scored by a single polysomnographic technologist (M.B.) with > 20 years of experience. We acknowledge that recordings prior to 2016 did not include occipital electrodes; however, we want to emphasize that the lack of occipital derivations does not violate Rechtschaffen and Kales recommendations.[3]

We want to clarify that the arousal index is not the key result of our study. Compared to Rechtschaffen and Kales, AASM criteria affect the distribution of non–rapid eye movement stages,[4] which may relate to differences in arousal scoring. However, differences in total sleep time, sleep efficiency, or rapid eye movement sleep are minor when comparing Rechtschaffen and Kales and AASM standards.[4]

We analyzed a total of 303 recordings of 275 individuals. Twenty-four patients who had 2 or more consecutive nights, and 4 of these patients additionally had a third night (ie, a total of 28 recordings from second or third consecutive nights). To overcome the limitation of lack of independence resulting from consecutive recording nights, we repeated the linear regression analyses, including only recordings of the first night of all participants (n = 275). Sharman et al[1] also addressed concerns about the effects of 6 outliers in arousal index. We therefore performed a sensitivity analysis excluding an additional 5 individuals (n = 270), as one outlier related to a patient's second recording night. Both with and without these outliers included, the linear regression results remained substantively unchanged from the published version (**Table 1**).

In summary, we deeply appreciate the letter by Sharman et al[1] but hope to have clarified all issues raised. As reported by the authors' research group earlier,[5] differences between self-reported and objective sleep measures are common, even in healthy individuals. We expand on this topic by reporting effects of different types of sleep disorders on sleep misperception. Following our additional analyses, we confirm all aspects of the published results and interpretation.

CITATION

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Table 1—Linear regression results for prediction of a discrepancy of self-reported and objective sleep time (Δ TST), sleep efficiency index (Δ SEI), and sleep onset latency (Δ SOL).

Model Results				
	***F* (*df*)**		***P***	
	Outliers Included	**Outliers Excluded**	**Outliers Included**	**Outliers Excluded**
Δ TST	5.39 (8,266)	5.02 (8,261)	< .001	< .001
Δ SEI	5.39 (8,266)	5.81 (8,261)	< .001	< .001
Δ SOL	1.18 (8,266)	1.27 (8,261)	.31	.26
Coefficients				
	Beta		***P***	
	Outliers Included	**Outliers Excluded**	**Outliers Included**	**Outliers Excluded**
Δ TST				
Insomnia vs SRBD	–0.27	–0.26	.001	.001
Insomnia vs parasomnia	–0.19	–0.20	.004	.004
Insomnia vs hypersomnia	–0.19	–0.20	.003	.002
Arousal index	–0.14	0.14	.02	.03
Δ SEI				
Insomnia vs SRBD	–0.30	–0.19	< .001	< .001
Insomnia vs parasomnia	–0.22	–0.23	.001	.001
Insomnia vs hypersomnia	–0.20	–0.21	.002	.001
Insomnia vs SRMD	–0.24	–0.24	.001	.001
Arousal index	–0.18	–0.18	.004	.004

Analyses were performed separately after inclusion (n = 275) or exclusion (n = 270) of arousal index outliers. Coefficients are presented for significant regression models only (Δ TST and Δ SEI). Δ = difference value objective – self-reported, *df* = degrees of freedom, SEI = sleep efficiency index in percentage of total sleep time, SOL = sleep onset latency, SRBD = sleep-related breathing disorder, SRMD = sleep-related movement disorder, TST = total sleep time.

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Address correspondence to: Karin Trimmel, MD, PhD, Department of Neurology, Medical University of Vienna, Waehringer Guertel 18-20, A-1090 Vienna, Austria; Tel: +43 1 40400 34280; Email: karin.trimmel@meduniwien.ac.at

DISCLOSURE STATEMENT

All authors have seen and approved the manuscript. The authors report no conflicts of interest.