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COMMENTARY

A Snapshot in Time: Subjective-Objective Discrepancies during In-Lab Polysomnography

Commentary on Choi et al. Sleep misperception in chronic insomnia patients with obstructive sleep apnea syndrome: implications for clinical assessment. *J Clin Sleep Med* 2016;12(11):1517–1525.

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Sleep medicine specialists are well aware that patients suffering from insomnia have difficulty estimating the amount of sleep that they obtain on any given night.[1] The resultant discrepancy between subjective and objective sleep presents challenges for the evaluation and management of insomnia. At the extreme, the now defunct ICSD-2 diagnosis "paradoxical insomnia" described a severe discordance between patient report and measured sleep.[2] More commonly, a milder discrepancy exists but nonetheless has the potential to heighten the patient's sleep-related anxiety, which may in turn perpetuate insomnia. Perhaps most important, when patients undergoing cognitive behavioral treatment for insomnia underestimate their total sleep time (TST) and these estimates are used to prescribe time-in-bed, the risks of sleep restriction therapy are increased.[3]

To date, there is a lack of consensus regarding how to recognize and quantify differences between self-reported and objectively measured sleep parameters. Presently, the sleep diary remains the most commonly employed measure of subjective sleep among patients with insomnia, but advanced objective measurement techniques such as power spectral analysis, cyclic alternating patterns, and event-related potentials have also been investigated.[4] It is worth noting that in a recent article in *JCSM*, Saline and colleagues presented a novel way to evaluate the relationship between subjective and objective latency to sleep onset.

In the current issue of *JCSM*, Choi and colleagues assessed subjective-objective discrepancies of TST during one night of in-lab polysomnography (PSG).[5] To describe this phenomenon, the authors employ a term first used by Pinto and colleagues, "sleep perception (SP)."[6] SP of TST is expressed numerically by the equation [(Subjective TST/Objective TST)*100]. Results indicated that SP was lowest for those with chronic insomnia and highest for "good sleepers" with OSA. Similarly, patients with insomnia demonstrated lower SP than those without a sleep-related diagnosis. Conversely, no differences were observed between those with insomnia alone and those with comorbid insomnia and OSA ($p = 0.304$). In other words, patients with insomnia demonstrate worse SP than those without insomnia, regardless of OSA status.

In addition to SP, the authors also compared participants' habitual sleep period with a single night in the sleep lab. The authors did an admirable job trying to align the timing of the PSG with the typical sleep-wake schedule of each subject. Consistent with the well-recognized "first night effect," those without insomnia demonstrated reduced objective TST when compared to their self-reported habitual TST.[7] In contrast, patients with insomnia actually slept longer than their self-reported habitual sleep time.

As the authors acknowledge, insomnia is a heterogeneous condition that encompasses multiple subtypes. Further, night-to-night variability is frequent among patients with insomnia and is associated with worsened outcomes.[8] In light of these differences between and within individuals, findings from one night of EEG-derived data should be interpreted with caution. It is also important to place their results regarding habitual sleep duration into context. The authors note that most PSGs were performed during the week, but some were performed on the weekend. It is thus unknown how well the PSG aligned with subjects' habitual sleep window, which might be particularly problematic for those with a tendency toward delayed sleep phase. Given the previously described difficulty for insomnia patients to perceive their sleep quantity, it is also unknown how accurate the self-reported sleep window actually was, making it impossible to discern the absolute impact of the laboratory sleep environment on the study results.

Despite these limitations, the findings generally support the assertion that objective measures of sleep such as actigraphy can provide additional insight in the evaluation and management of insomnia.[9] This indication is acknowledged by current AASM practice parameters for the use of actigraphy, although strength of the recommendation was impacted by a paucity of high-quality data at the time of publication.[10] While it is inappropriate to conclude that evaluation for insomnia should be an indication for attended polysomnography, objective measures

are clearly useful for both the characterization of insomnia as well as for quantification and confirmation of treatment response. Future research should seek to continue to develop and test equipment such as commercially available wearable technology and devices that incorporate EEG monitoring in addition to movement.

Chronic insomnia is not just about one night of data, but clinically relevant information can be gained from a snapshot in time. If patients are referred for polysomnography to evaluate sleep disordered breathing, sleep clinicians would do well to take full advantage of all information obtained. Incorporating questionnaires to assess habitual sleep parameters as well as subjective sleep continuity during the PSG, and considering their relation to objective measures, can provide sleep clinicians with important and often neglected data to craft a more personalized treatment plan.

CITATION

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