Sleep Science and Practice

REVIEW

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Sleep as a vital sign

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Abstract

Sleep is causally linked to the maintenance of every major physiological body system and disturbed sleep contributes to myriad diseases. The problem is, however, is that patients do not consistently, nor spontaneously, report sleep problems to their clinicians. Compounding the problem, there is no standard-of-care approach to even the most rudimentary of sleep queries. As a result, sleep disturbances remain largely invisible to most clinicians, and consequentially, unaddressed for the patient themselves – thereby exacerbating physical and mental health challenges due to unaddressed sleep problems. In this review, we argue that all patients should be routinely screened with a short, readily available, and validated assessment for sleep disturbances in clinical encounters. If the initial assessment is positive for any subjective sleep-related problems, it should prompt a more thorough investigation for specific sleep disorders. We further describe how a program of short and simple sleep health screening is a viable, efficacious yet currently missing pathway through which clinicians can 1) screen for sleep-related problems, 2) identify patients with sleep disorders, 3) rapidly offer evidence-based treatment, and (if indicated) 4) refer patients with complex presentations to sleep medicine specialists.

Keywords Insomnia, Universal screening, Referrals, Public health

The vital signs: heart rate, blood pressure, temperature, and respirations. These are enshrined in medical practice, and for good reason: Perturbations in any of these objective measures can both indicate and exacerbate underlying disorders. However, sleep – another essential physiological process for life – is not part of our vital-sign collective.

Why not?

One possible explanation is that sleep disturbance is often considered inconsequential by the patient or, if reported, perceived as a symptom of another condition. Rarely is sleep proactively assessed by clinicians in standard patient appointments. Another challenge is that poor sleep manifests in numerous forms; sleep disturbance is heterogeneous. Symptoms include difficulty initiating sleep, difficulty staying asleep, and excessive daytime sleepiness. This multidimensional aspect of sleep disturbance contrasts with the more easily assessed, unidimensional classical vital signs. As a result, sleep disturbance has understandably been more daunting to address outside of sleep medicine clinics.

We propose that quantifying sleep health in a patient does not pose an insurmountable challenge for clinicians. Instead, sleep in its first pass can be easily—and importantly—objectively quantified. Moreover, sleep disturbances are frequently treatable, and when treated, have manifold health and cost-savings implications. Given that sleep disturbances are so common and intimately linked with overall health and numerous diseases, and that barriers to sleep assessment and treatment can be addressed, we describe a path to overcome this assessment neglect in patients, and in doing so, give sleep the equal attention currently offered to the standard vital signs. More specifically, we suggest a framework for universal sleep

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screening and referral to treatment. We additionally emphasize the highest priority targets that can be addressed to integrate sleep into routine clinician-patient encounters.

Identifying and treating sleep-related problems and disorders is a public health priority. In 2018 alone, nearly 14 million adults in the United States had a diagnosed sleep disorder. Disturbed sleep is also costly. Patients with sleep disorders use outpatient, emergency department, and prescription medication services significantly more often than those without sleep disorders. The total health-care costs of such dependence are estimated to be $94.9 billion per annum in the US alone (Huyett and Bhattacharyya 2021). In another study using Australian data from 2016–2017, the total estimated cost of inadequate sleep (expressed in US dollars) was $45.21 billion, $27.33 billion of which were attributable to loss of quality of life and premature death (Hillman et al. 2018).

These inimical costs extend to patients' health. Short-term consequences of sleep disruption include weight gain, hypertension, inflammation, increased pain, emotional and mood disturbance, increased suicide risk, motor-vehicle accidents, and reduced overall quality of life (Medic et al. 2017). Left untreated, chronic sleep disruption is associated with cardiovascular disease, stroke, metabolic diseases including type 2 diabetes, major depression, substance use disorders, certain forms of cancer, Alzheimer's disease, and all-cause mortality (Medic et al. 2017; Czeisler 2015). In contrast, when sleep problems are successfully treated, numerous physical health metrics improve, such as fasting insulin sensitivity – as do mental health indices, including depressive, anxiety-related and psychotic symptoms (Scott et al. 2021).

Despite these steep economic, medical, and personal health burdens, sleep is rarely assessed in routine clinician-patient medical encounters. A recent survey of American primary care physicians (PCPs) found that 33% of PCPs never asked their patients about their sleep habits. It is a two-way problem, since over 55% of adults with sleep problems never report sleep issues to their physician (Alliance and for Sleep.Wake Up America 2022).

One bottleneck in this stalemate is a lack of available knowledge, skills, and systems-related support for clinicians. This situation is compound by low rates of patient awareness of the causal health implications of poor sleep, and knowledge that there are effective treatments (Ogeil et al. 2020). Of relevance for disparities in medical care, Black, indigenous, and multiracial patients more frequently suffer from insufficient sleep duration compared with non-Hispanic White patients (Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division of Population Health. 2017).

Assessment

Developing a sensitive and brief screening method for assessing sleep problems has, to date, been complicated by the diverse presentations and etiologies of sleep issues. Though there are well validated, self-report screening tools for sleep problems ranging from sleep apnea to daytime sleepiness, the few that simultaneously assess multiple types of sleep disturbance are too long to be administered in most medical encounters. However, carefully selected self-report tools can help rule out, or estimate the severity of, specific sleep disorders.

Rather than attempting to assess for the full panoply of sleep disorders, we suggest an alternate approach that involves the clinician asking their patient about their subjective degree of sleep health. In this context, the RU-SATED scale represents a short and simple starting point (Ravyts et al. 2021). Patients are instructed to rate their subjective sleep regularity, satisfaction with sleep, daytime alertness, ability to remain asleep during the night (timing), sleep efficiency, and sleep duration. This provides a framework for creating a rapid and convenient universal preliminary screening tool for sleep health. In this patient-health-centered (rather than pathology-centered) approach, the clinician is quickly alerted to the potential of sleep-related problems, thereby prompting further investigation into causative and exacerbating factors. That is, the RU-SATED scale is one example of the type of entry point that could easily be used by all clinicians as a first-pass screening of their patients' sleep health, which if flagged as concerning, helps the clinician seek higher-specificity assessment thereafter, but not before.

Universal administration of the RU-SATED scale (or a similar brief, nonspecific, sleep health-related set of questions), the clinician can identify patients who may be at higher risk of having a sleep disorder. A "positive" score on the RU-SATED should prompt the clinician to ask the patient about the specific symptoms they are experiencing as they relate to sleep quantity and quality. Using this information, the patient can then be offered a more specific, validated sleep disorder scale or referral to a sleep specialist. The RU-SATED may not serve as an ideal scale in all clinical settings; however, it is one example of a brief screener that allows the clinician to identify patients who are at higher risk of having a sleep disorder. Choosing among the many sleep-related patient questionnaires can initially seem an overwhelming task given the variety of tools currently available (Klingman et al. 2017). Though any attempt to narrow down the number of sleep disorder-specific scales to a manageable set of options is bound to be both subjective and idiosyncratic, we offer the following scales for consideration based on the relative prevalence of the disorders for which they

assess, their strong psychometric properties, and their relative ease of use (e.g., short administration time, feasibly administered during or shortly following a brief outpatient encounter):

- for suspected insomnia, the Insomnia Severity Index (ISI); (Bastien et al. 2001)
- for suspected restless legs syndrome, the International Restless Legs Syndrome Scale (IRLS); (Walters et al. 2003)
- for suspected obstructive sleep apnea, the STOP-Bang; (Chung et al. 2016)
- for suspected excessive daytime sleepiness, the Epworth Sleepiness Scale (ESS); (Johns 1991; Kendzerska et al. 2014; Pilcher et al. 2018) and
- for suspected circadian rhythm disorders, the Morningness-Eveningness Questionnaire (MEQ). (Horne and Ostberg 1976)

Each of these scales, like the RU-SATED, is available without cost online; clinicians may print out copies for the patient to complete in the office or at home, the scales may be integrated into the electronic health record, or the patient may be instructed to complete the scale at home using an online version.

There are multiple potential barriers to administration of an initial screening scale and, if indicated, one or more disorder-specific scale. First, integration of any additional component – however brief – into an already-busy clinical encounter is challenging. However, given the centrality of sleep in overall health and its role in causing and exacerbating other disease states, we argue that efforts should be made to integrate sleep assessment and treatment into routine clinical practice to ensure patient well-being. In addition, there are multiple examples of other successful non-traditional "vital signs" initiatives, including universal screening and brief intervention for unhealthy alcohol use in a large integrated healthcare system (Chi et al. 2022). Second, many clinicians already experience information overload with a high volume of clinical data available in the electronic health record; (Furlow 2020) adding sleep-related self-report data could easy be lost or overlooked. Therefore, health systems need to consider how to effectively integrate sleep assessment into routine clinical practice and to anticipate and respond to barriers. Again, using the example of universal alcohol screening, subsequent research demonstrated that specific patient and primary care provider characteristics were associated with receipt and delivery of brief interventions for unhealthy alcohol use; (Lu et al. 2021) this type of ongoing, implementation research will be necessary to identify areas for improvement to ensure that sleep assessment and treatment is effectively deployed in clinical settings. Third, clinicians without sleep medicine training may feel uncomfortable screening for disorders for which they do not have adequate training or experience in treating; we address this point in the following section. In brief, we contend that identification of possible sleep disorders is the biggest challenge that, when overcome, can then lead to referral for further subspecialty evaluation and treatment.

Treatment and referral

The results of a brief and universal sleep-health screen tool can make sleep problems tractable for clinicians. As summarized above, for some patients, their responses might indicate a straightforward problem (e.g., daytime sleepiness), thereby prompting the clinician to administer a specific scale, like the Epworth Sleepiness Scale. If results of the subsequent sleep dimension-specific scale suggest the presence of a specific sleep disorder, the clinician can then choose to initiate the appropriate treatment pathway. For other patients with some sleep disturbances, referral to a sleep medicine specialist might be indicated, specifically patients with excessive daytime sleepiness not attributable to intentional sleep deprivation, those with circadian rhythm disturbances, those with suspected sleep-related breathing disorders, such as sleep apnea, those who have failed usual care for their sleep condition, and those with an unclear sleep-related condition.

Once the nature of sleep dysfunction has been identified with a tool like RU-SATED, and follow-up evaluations have been completed, clinicians may choose to initiate the indicated treatment themselves, or refer the patient to a sleep medicine specialist. In addition to the level of complexity and severity of the patient's sleep-related problems, other factors that would lead the clinician to address the problem or disorder themselves or to refer to a specialist include: time available in the clinical encounter; clinician knowledge, skills, and comfort in treating sleep-related disorders; patient preference; and access to sleep-disorder specialists. Fortunately there are many continuing medical education online resources (some of which are available free of cost) for clinicians interested in enhancing their sleep medicine knowledge and skills, including live and on-demand courses and self-assessments through the American Academy of Sleep Medicine (American Academy of Sleep Medicine 2023). Fig. 1 illustrates a suggested stepwise framework approach to assessment, treatment, and referral for sleep-related problems.

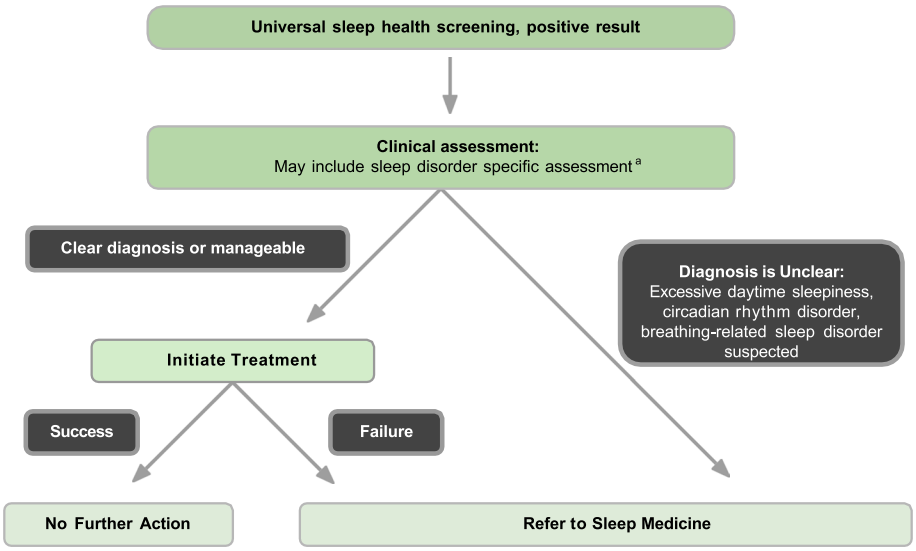

Fig. 1 Sleep Health Triage. [a] See text for suggested sleep disorder-specific scales that may be used to assess for specific sleep disorders if initial screening is positive

Conclusions

Here, we seek to raise awareness of the fundamental primacy of good sleep for good health. The goal is to help clinicians easily, quickly, effectively, and universally quantify sleep health, and in doing so, raise it to the level of importance of the vital signs.

A key barrier preventing this from happening are concerns about the complexity and burden of identifying and treating sleep disorders. We argue that it is possible to carry out a brief assessment for dysfunction in a few key dimensions of sleep as a basis for identifying, and when a problem with sleep is present, directing specific next steps for management. In addition, adding sleep as a vital sign may carry unintended risks, including the possibility that prescriptions rates for sleep-related medications, which may increase. This potential risk serves to reinforce the importance of thoughtful and cautious integration of sleep assessment and treatment into clinical practice and ongoing implementation research to assess the intended – and unintended – effects of this multifaceted intervention.

A reasonable next step would be real-world trials to establish the validity and utility of this approach, as well as the optimal methods for implementation. Drawbacks also need to be kept in mind. Universal screening for sleep health carries the risk of promoting overtreatment, including inappropriate use of hypnotics, as well as increased clinician and systems-level burdens associated with assessment and treatment of sleep disturbances. Therefore, careful assessment for sleep disorders and application of evidence-based treatments is necessary. Nevertheless, effective detection and treatment of sleep-related conditions will have a substantial positive impact on public health, and allow sleep to assume its much-deserved place as a health vital sign.

Acknowledgements
N/A.

Authors' contributions
MEH and MPW drafted the first version of the manuscript. All authors critically revised the manuscript for important intellectual content. All authors accept full responsibility for the content of the paper and have seen and approved the final version.

Authors' information
N/A.

Funding
The preparation and writing of this report received no specific grant from any funding agency.

Availability of data and materials
N/A.

Declarations

Ethics approval and consent to participate
N/A.

Consent for publication
N/A.

Competing interests
MPW serves as an advisor to and has equity interest in Oura, Bryte, OneCare Media, and StimScience. ADK has been the recipient of research grant funding

from Janssen Pharmaceuticals, Axsome Pharmaceutics, Attune, Harmony, Neurocrine Biosciences, Reveal Biosensors, The Ray and Dagmar Dolby Family Fund, and the National Institutes of Health; has consulted for Adare, Axsome Therapeutics, Big Health, Eisai, Evecxia, Ferring Pharmaceuticals, Galderma, Harmony Biosciences, Idorsia, Janssen Pharmaceuticals, Jazz Pharmaceuticals, Millenium Pharmaceuticals, Merck, Neurocrine Biosciences, Neurawell, Pernix, Otsuka Pharmaceuticals, Sage, Takeda, and Angelini; and has option ownership in Big Health and Neurawell. MEH has no financial conflicts to disclose.

Received: 17 December 2022 Accepted: 12 April 2023
Published online: 24 April 2023

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