Preface

Piecing Together the Puzzle of Adherence in Sleep Medicine

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Editor

This issue of *Sleep Medicine Clinics* focuses primarily on our current understanding and future directions regarding adherence to therapy for sleep disorders, as described by experts in the field. The title, “Piecing Together the Puzzle of Adherence,” nods to how much we have learned to date while acknowledging that adherence remains a complex and puzzling behavioral phenomenon.

Much of our understanding of adherence to sleep therapies has arisen from studies of positive airway pressure (PAP) treatment of sleep-disordered breathing, and as such, eight reviews in this issue are devoted to various PAP topics. Successful application of PAP was first reported in a seminal 1981 publication,¹ and although widespread thought at the time was that PAP would represent a useful research tool rather than a first-line therapy,² research regarding self-reported use of PAP at home appeared just three years later³ and has remained a major focus of study since. Early home use of PAP required medical-grade silicone rubber to seal the mask that was made for each patient from a facial mold,⁴ and thus, the rate of adhesive consumption provided the first surrogate measure of objective adherence. This metric soon gave way to meter readings beginning in the late 1980s,⁵ and eventually it became possible to identify “mask on” time linked to clock time, providing a temporal understanding of usage patterns. Data transmission progressed similarly, moving from pen-and-paper readings, to secure digital and

universal serial bus memory cards, and more recently, to wireless transmission with cloud-based remote access. These advancements have allowed adherence research to flourish alongside the expanding use of PAP in various settings.

Looking beyond PAP, Sutherland and colleagues present a review of adherence to oral appliances, which can now be monitored objectively using temperature microsensors. Agnew and colleagues present a systematic review of the cognitive behavioral therapy for insomnia literature and provide five key recommendations regarding the measurement and reporting of adherence to behavioral therapy in future studies. New and emerging therapies for sleep-disordered breathing, including hypoglossal nerve stimulation, expiratory resistance valves, suction devices, and pharmaceuticals, present their own adherence-related challenges, as reviewed by Joosten and colleagues. Together, these articles emphasize that as various modalities for treating complex and often overlapping sleep disorders become more established, methods for supporting adherence will continue to be needed.

As the 40th anniversary of PAP approaches this year, it is timely to reflect on the fact that in this short period of time, PAP technology has advanced to the point of providing what is arguably the most prolific method of monitoring detailed, objective therapy adherence in real-world settings.^{6,7} The recent expansion of digital

medicine, however, has led to substantial technological advancements in digital monitoring tools across other therapeutic areas.^{8,9} Until recently, monitoring adherence to pharmaceutical treatments has been limited to assaying biomarkers, which is impractical in most settings, or surrogate measurements, such as refill rates, pill counts, and Bluetooth-enabled pill bottles, which record the times at which the device is used, but not whether the drug was actually taken.¹⁰ It is now possible to measure objective adherence to pharmaceuticals with devices such as digital pills, which are capsules containing a digital radiofrequency emitter alongside the medication,¹¹ or smart inhalers, which allow for audio analysis of inhalation, breath-hold, and exhalation.¹² Thus, despite sleep medicine being one of the more advanced fields of adherence research, there is much we can learn from investigators focused on other diseases. As such, this issue concludes with a review by Bianco and colleagues of smartphone app interventions designed to assist people with mental illness take their medications as prescribed, as a perspective on adherence research from outside of the sleep field. I wish to thank all authors sincerely for their valuable contributions to this issue.

DISCLOSURE

Dr Bakker is a full-time employee of Philips, which is a company that focuses on sleep and respiratory care. Dr Bakker also has a part-time appointment at Brigham and Women's Hospital. Dr Bakker's interests were reviewed and are managed by Brigham and Women's Hospital and Partners HealthCare in accordance with their conflict-of-interest policies.

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