

Screening for Obstructive Sleep Apnea in Adults

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An association of extreme obesity with hypersomnolence was recognized in antiquity and described in the early 19th century in both medical texts and, most famously, in Dickens' *Posthumous Papers of the Pickwick Club*. However, not until the first polysomnographic recordings of sleep and respiration were made in the 1960s was it recognized that apneas resulting from intermittent obstruction of the upper airway during sleep, causing hypoxemia and cortical arousal, contributed to the excessive sleepiness in these so-called "Pickwickian" patients.¹ The term "obstructive sleep apnea syndrome" was coined the following decade, and it was soon recognized that intermittent partial airway obstruction during sleep, resulting in reduced airflow (hypopnea) without apnea, could result in an identical clinical syndrome.

Although obstructive sleep apnea syndrome was initially considered an uncommon condition, epidemiology studies in the 1990s revealed that apneas and hypopneas during sleep are quite common in the general adult population.² In 1999 the American Academy of Sleep Medicine (AASM) published a task force report that defined "obstructive sleep apnea-hypopnea syndrome" as a condition characterized by an elevated frequency of apneas and hypopneas during sleep (the apnea-hypopnea index [AHI]) plus bothersome symptoms, most notably excessive sleepiness, fatigue, or unrefreshing sleep. The severity of this syndrome was classified along 2 axes: severity of sleepiness and frequency of obstructive events.³ Since that time, however, the requirement for symptoms has been largely dropped from the standard sleep disorders nosology: the diagnosis of adult obstructive sleep apnea (OSA) is made if the AHI is 15 or more events per hour of sleep regardless of associated clinical features, while for those with an AHI between 5 and 15 events per hour, the list of associated symptoms, signs, and comorbid conditions supporting the diagnosis of OSA has been expanded to include insomnia symptoms, habitual snoring, hypertension, diabetes, cardiovascular disease, and mood disorder, among others⁴—a list so broad that an AHI of 5 or greater has become a de facto sufficient criterion for diagnosis of OSA.

Thus defined, OSA is exceedingly common in the adult population. As of 2010, OSA was conservatively estimated to affect 34% of men and 17% of women between the ages of 30 and 70 years in the US⁵—estimates that would be consid-

erably higher using the more liberal hypopnea definition currently favored by the AASM. In addition to excessive sleepiness and fatigue, OSA is associated with increased risk of coronary heart disease, atrial fibrillation, heart failure, stroke, and death. Importantly, OSA can be effectively treated with a variety of interventions, including weight loss, aerobic exercise, sleep position restriction, positive airway pressure devices, mandibular repositioning devices, myofunctional therapy, and a variety of upper airway surgical procedures, including hypoglossal nerve stimulation.⁶ Moreover, it has been clearly established that treatment improves OSA-related sleepiness, the most common symptom of patients with OSA and a major cause of reduced quality of life.

The high prevalence of OSA and the availability of effective therapy suggest a potentially large clinical benefit from screening to identify patients with undiagnosed OSA. However, epidemiology studies have shown that most adults with OSA in the general community do not report excessive sleepiness on standardized instruments,⁶ and whether OSA treatment can reduce cardiovascular morbidity and mortality has not been established, raising a reasonable question as to the value of case identification in the general population.

In this issue of *JAMA*, the US Preventive Services Task Force (USPSTF) presents its updated Recommendation Statement on screening for obstructive sleep apnea in adults⁷ and the accompanying systematic review⁸ on which the recommendations are based. Echoing its 2017 report on this topic, the USPSTF recognizes both the high prevalence of OSA and its associated adverse health outcomes, and the ability of OSA treatment to reduce daytime sleepiness, improve both sleep-related and general health-related quality of life, and reduce blood pressure, albeit by a modest 2 to 3 mm Hg on average. However, the task force concludes, as it did in 2017, that "the current evidence is insufficient to assess the balance of benefits and harms of screening for OSA in the general adult population (I statement)." This conclusion rests on both a paucity of studies assessing the accuracy of OSA screening measures in the general primary care population and an absence of studies directly comparing health outcomes in screened vs unscreened populations.

The updated systematic review also notes a lack of evidence from clinical trials that treatment of OSA reduces the risk of major adverse cardiovascular events or mortality. Although the review excluded the 2 largest randomized trials addressing this question, their inclusion would only reinforce the conclusion that trials have not demonstrated a reduction in cardiovascular risk with OSA treatment.⁶ It is important to note that all of the randomized trials designed



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to evaluate the effect of OSA treatment on cardiovascular risk were small in comparison to contemporary cardiovascular secondary prevention trials and thus power to detect a potentially meaningful risk reduction was low. The trials were also limited by low adherence to therapy, possibly reflecting the exclusion of patients with excessive sleepiness from participation. Because studies in both general community and clinically referred cohorts have identified excessive sleepiness as a predictor of cardiovascular events in people with OSA, the results of these studies should not be generalized to patients with symptomatic OSA.⁹⁻¹¹ Nonetheless, with the exception of resistant hypertension, for which treatment of OSA reduces blood pressure beyond that achieved with pharmacologic therapy alone,¹² there is currently no high-quality evidence supporting screening for OSA in expectation that treatment will improve cardiovascular outcomes.

The objective of the updated systematic review was to “review the evidence on screening for OSA in asymptomatic adults or those with unrecognized OSA symptoms....”⁸ For the truly asymptomatic patient, the USPSTF recommendation is sensible, even for most patients with known cardiovascular illness. However, the conflation of “asymptomatic adults” and “those with unrecognized OSA symptoms” is troubling, as it may suggest to clinicians that such unrecognized symptoms can be safely ignored.

Yet sleep-related symptoms are highly prevalent both in the general population and in primary care practices. A study of unselected patients recruited from primary care clinic waiting rooms found that, among adults aged 30 to 64 years without a diagnosis of OSA, 57% reported loud snoring and 65% reported daytime sleepiness occurring more than weekly, with 17% reporting falling asleep while driving.¹³ However, while 90% reported at least 1 sleep-related symptom, only 22% reported having discussed these symptoms with their clinician, consistent with the 23% of primary care physicians who reported routinely asking about sleep symptoms in the review of systems. A more recent study evaluating the Patient-Reported Outcomes Measurement Information System (PROMIS) 4-item measures in a primary care setting found that, among unselected patients screened at the time of clinic check-in, T scores on the Sleep Disturbance Scale and the Fatigue Scale were 55 or greater in

more than half of patients, a threshold suggesting possible clinically significant problems.^{14,15} (A T score of 55 is 0.5 standard deviation greater than the mean.) Given the high prevalence of sleep-related symptoms in the primary care population, common sense argues that these symptoms, including excessive sleepiness and fatigue, should be solicited as part of routine medical care and that appropriate evaluation and management of these symptoms be offered.

Nonetheless, the USPSTF report correctly highlights the need for rigorous research to identify optimal screening strategies for OSA in the primary care setting and to determine whether routine screening of asymptomatic or mildly symptomatic patients leads to improved clinical outcomes. Given the high prevalence of OSA in the general adult population and the availability of increasingly inexpensive and unobtrusive home diagnostic testing modalities, strategies that involve broad application of diagnostic testing may soon be feasible. However, it is important that research focus not merely on identifying individuals with an elevated AHI but on identifying the subset of patients most likely to benefit from treatment, whether from the standpoint of ameliorating symptoms or of preventing other associated comorbidities. This is true not only in the primary care setting but also in more specialized clinical settings. For example, OSA screening has become a routine part of the presurgical evaluation and the evaluation of patients with atrial fibrillation. Although OSA is common in both settings and is associated with worse clinical outcomes, the benefit of screening for and treatment of OSA in these settings remains to be demonstrated.

Ongoing research to identify features of OSA that predict risk of major adverse cardiovascular events and death in asymptomatic people in the general community, such as the degree of associated hypoxemia, the autonomic response to obstructive events, and underlying genetic risk factors, promises to inform the design of clinical trials assessing the potential cardiovascular benefit of OSA treatment in appropriately selected asymptomatic patients. However, while much remains to be learned about the potential benefits of screening for asymptomatic OSA, this should not deter clinicians from identifying and appropriately managing the care of the many symptomatic patients whose OSA symptoms are currently unrecognized.

ARTICLE INFORMATION

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