ORIGINAL RESEARCH

Assessing the Adequacy of Obstructive Sleep Apnea Diagnosis for High-Risk Patients in Primary Care

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Introduction: **The exact prevalence of obstructive sleep apnea (OSA) is unknown, and primary care providers are left with conflicting guidance on screening criteria from various institutions. The purpose of this study was to identify health care gaps in OSA diagnosis for patients at high risk of OSA.**

Methods: **A retrospective medical record review was performed assessing adult patients (≥ 18 years) who had outpatient visits in family medicine clinics, located in the cities of Detroit, Troy, and Commerce, Michigan in 2018. The primary outcome was the number of patients assessed for OSA. Patients determined as high risk for OSA had at least 3 of the following criteria: (1) hypertension, (2) age 50 years and older, (3) male gender, and (4) body mass index > 35 kg/m^2. Statistical approach included univariate and logistic regression analysis. Manual chart review of 200 randomly selected records was performed to determine the most common reasons for OSA screening.**

Results: **Out of 30,022 patients, 4,911 (16.4%) were at high risk for OSA, of which 1,524 (31.0%) were assessed for OSA. Logistic regression analysis of high-risk patients revealed that male sex (odds ratio, 1.84; 95% CI, 1.51–2.26; *P* < *.001*) and body mass index > 35 kg/m^2 (odds ratio, 4.96; 95% CI, 4.04–6.09; *P* < *.001*) were significantly associated with OSA evaluation. Race was not associated with OSA assessment.**

Conclusion: **Because many individuals at high risk for OSA are not referred for evaluation, improved guidance on OSA screening based on objective risk factors is needed. (J Am Board Fam Med 2022;35:320–328.)**

Keywords: **Body Mass Index, Family Medicine, Logistic Models, Michigan, Obstructive Sleep Apnea, Primary Health Care, Retrospective Studies, Risk Factors**

Introduction

Sleep apnea is the second most common sleeping disorder and is characterized by irregular breathing patterns during periods of sleep.[1] Obstructive sleep apnea (OSA) is the most common form of sleep apnea and is caused by periods of upper airway obstruction due to the relaxation of the throat muscles during sleep.[2]

Although OSA is becoming increasingly common, the exact prevalence of the disease is still unknown. The estimated prevalence of OSA in the United States varies widely in the current literature,[3] likely due to the differences in diagnostic criteria, population selection, and different time frames of study. Data collected from the Wisconsin Sleep Cohort Study showed a marked increase in OSA from 14% to 55%, which included the data collected for the periods of 1988 to 1994 and 2007 to 2010.[4] Another study estimated that 24 million people in the United States are affected by OSA but have not received an official medical diagnosis.[5] It is widely accepted that the prevalence of OSA in the general population is increasing in tandem with the increase in individual risk factors for OSA.

Known risk factors for OSA include age over 50 years, male sex, obesity, upper airway and craniofacial abnormalities, neck size, family history, nasal

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congestion, and a history of smoking.[6] OSA increases with age and is estimated to affect 26% of adults between the ages of 30 and 70 years.[4] Sleep apnea is also more common in men than in women, with a prevalence of 34% and 17%, respectively.[4] Prevalence of OSA also increases as body mass index (BMI) increases. A study that assessed a morbidly obese patient population (average BMI of 52 kg/m^2) found that the prevalence of OSA was 71% in patients with a BMI of 35 to 39.9; 74% with BMI 40 to 49.9; 77% with BMI of 50 to 59.9; and 95% in those with a BMI of 60 kg/m^2 or greater.[7] Neck size greater than 17 inches for men and 16 inches for women increases a patient's risk for OSA,[8] and a family history of OSA or craniofacial abnormalities are also associated with increased OSA risk.[9,10] Pre-existing conditions such as type 2 diabetes and cardiovascular disease,[11] gastroesophageal reflux,[12] polycystic ovarian syndrome,[13] Parkinson disease,[14] and hypothyroidism[15] are also thought to be risk factors for OSA.

Patients with OSA are at greater risk for cardiovascular health challenges and decreased quality of life. OSA is the leading cause of secondary hypertension, with an estimated 50% of hypertensive patients also having an OSA diagnosis.[16] In 2003, the Joint National Committee formally named OSA as a secondary cause of hypertension.[17] A 2019 meta-analysis determined that severe OSA (apnea/hypopnea index ≥ 30) is associated with increased cardiovascular mortality, an almost 2-fold increased risk of incident stroke and recurrent stroke,[18] and other complications such as depression,[19] snoring,[20] increased traffic accidents,[21] hypertension,[22,23] increased insulin resistance[24] and hormone disruption.[25,26] A study of 2,797 individuals diagnosed with OSA and 2,791 sex- and age-matched controls showed a significant association between low socioeconomic status and OSA.[11] There is also a striking economic burden of undiagnosed OSA in the United States. In 2015, the cost associated with untreated OSA was estimated at $150 billion, determined by loss of productivity, comorbid disease, motor vehicle accidents, and workplace accidents.[27]

The benefits and effectiveness of treating OSA are clear. A meta-analysis of 184 studies found that positive airway pressure significantly reduces OSA severity, sleepiness, blood pressure, motor vehicle accidents, and improves overall sleep quality in adults with OSA. Treatment with continuous positive airway pressure decreases the rates of arrhythmia and stroke and improves left ventricular ejection fraction in patients with heart failure. Continuous positive airway pressure therapy has also been shown to reduce stroke mortality by 6% to 8% and ischemic heart disease mortality by 4% to 5%.[28]

The STOP questionnaire, STOP BANG questionnaire (SBQ), Berlin questionnaire, and Epworth sleepiness scales are all used to screen for OSA. The SBQ has the highest sensitivity for the prediction of mild (97.6%) and severe (98.7%) OSA,[29] and it is the most widely used screening tool, although the screening practices and recommendations differ by specialty organization. The 8 criteria assessed by the SBQ are snoring, daytime fatigue, noted breathing patterns during sleep, diagnosis of hypertension, BMI, age, neck circumference, and male sex. It is estimated that 25% of patients with a STOP-BANG score of 3 have severe OSA, and with a step wise increase in prevalence with increasing STOP-BANG score.[30] While the American Academy of Sleep Medicine has clear guidelines regarding screening for sleep apnea, the U.S. Preventive Services Task Force (USPSTF) has made no clear recommendation on the subject, the American Academy of Sleep Medicine recommends annual OSA screening with a validated OSA questionnaire for all adult patients with heart failure, elevated blood pressure, atrial fibrillation, resistant hypertension, type 2 diabetes, and stroke. In addition, patients with a BMI ≥ 30 kg/m^2, nocturnal dysrhythmias, pulmonary hypertension, coronary artery disease, or who are preparing for bariatric surgery should also be screened.[31] A systematic review by the USPSTF analyzed 110 studies and concluded that there is uncertainty related to the accuracy and clinical use of OSA screening tools. In the analysis, treatments for OSA, such as continuous positive airway pressure, did not show an improvement in health outcomes, with the exception of improved quality of life related to sleep. However, it should be noted that the overwhelming majority of studies used in the analysis followed participants for 12 weeks or less. Thus, the USPSTF concluded that evidence is insufficient to determine the benefits of screening asymptomatic adults for OSA.[32] In addition, another study gave an evidence rating of "C" for OSA screening based on the USPSTF guidelines, and the lack of outcome studies that highlight the net benefit of screening was 1 reason for the low rating.[33]

Despite the health challenges, decreased quality of life, and economic costs related to OSA, over the years, studies have found that primary care providers continue to underdiagnose OSA. In a large 2010 study of diabetic patients, only 18% recei-

ved an OSA diagnosis, with obese men with comorbidities more likely to be diagnosed; thus, the authors recommended an increased awareness of the association between OSA and diabetes.[34] A 2015 study concluded that current screening for OSA is ineffective and fragmented, and that primary care providers do not routinely screen for OSA or refer patients to sleep specialists.[35] Given that an SBQ score of 3 or higher is a positive risk score for OSA, a 2018 study found that out of 187 participants screened for sleep apnea, 61% were at risk. Of the at-risk participants, 45 participants underwent sleep studies, and of those, 67% were diagnosed with moderate to severe OSA, thus concluding that an early diagnosis of OSA in the primary care setting is crucial.[36]

The purpose of this study was to identify gaps in OSA screening and referral within a high-risk patient population. We analyzed patients in 4 primary care clinics, 2 in urban and 2 in suburban areas of metropolitan Detroit, Michigan. Our specific aims were to identify how often high-risk patients were screened for OSA within a large, multi-clinic health system and what were the prevalence of OSA risk factors. Using the SBQ criteria, we identified patients with 3 or more objective risk factors and examined the proportion of those patients who had never or had ever been offered an evaluation for OSA.

The risk factors considered were age > 50 years, BMI > 35, male sex, and a diagnosis of hypertension. Clinic location (urban vs suburban), sex, race, and age of participants were analyzed to determine whether the presence of specific patient characteristics and risk factors correlate with screening practices. The study also aimed to determine the most common reason primary care physicians screened patients for OSA.

Methods

This retrospective cohort study was presented to the health system Institutional Review Board and approved with a waiver of informed consent based on use of existing administrative data. We used this health system administrative databases and electronic medical records. This large metropolitan health system spans 3 counties in southeast Michigan and includes the city of Detroit. We chose 4 clinics, 2 located in suburban locations and 2 in urban locations. Patients age 18 years or older who visited one of the above family medicine clinics in 2018 were included in the study. Patients with the presence of at least 3 of the following risk factors for OSA were selected for analysis: (1) a hypertension diagnosis, (2) age over 50 years, (3) male sex, and (4) BMI greater than 35 (ratio measured as kg/m^2). Risk factors were identified as high risk based on the SBQ criteria (29). The administrative data and medical records accessed were from patient encounters that occurred between January 1, 2018 and December 30, 2018. The primary outcome was number of patients screened for OSA during the record extraction time frame. Risk factors were chosen based on their presence in the STOP-BANG questionnaire, and the previous finding that 3 positive STOP-BANG criteria was associated with a 25% prevalence of severe OSA.

Patients were considered as having been screened and assessed for OSA if 1 of the following was done: (1) referral was ordered for a portable sleep study or an ambulatory visit with sleep medicine, (2) patient was assessed in a sleep medicine clinic, (3) patient was assessed with polysomnography, or (4) an OSA diagnosis code was used at an encounter. In addition, to determine the most common reason primary care physicians assessed patients for OSA, a random sample of 200 patient records were selected and a manual chart review was completed.

Descriptive statistics with Chi Square analysis was used to investigate the association of patient characteristics with OSA screening. Binary logistic regression tests were conducted to identify possible independent predictors for OSA assessment in the high-risk group. All statistical analyses were performed using Epi Info 7 (Centers for Disease Control and Prevention, Atlanta, GA). A P value of 0.05 was considered statistically significant.

Results

The total study population comprised 30,022 patient records. The prevalence of risk factors in the total patient population was as follows: 7,026 (23.4%) had a BMI greater than 35 kg/m^2, 15,569 (51.9%) of the population was over 50 years of age, 10,191 (34%) of the population was male, and 9,802 (32.6%) of the population had hypertension.

Of the total patient population, 18,408 (61.3%) were seen in urban clinics and 11,614 (38.7%) were seen in suburban clinics. In the urban clinics, there was a greater prevalence of BMI > 35 (28.2% compared with 15.8% in suburban) and also higher rates of hypertension (34.0% in urban clinics compared with 29.4% in suburban ones).

Based on the inclusion criteria described in the Methods, 4,911 (16.0%) of the study population had 3 or more objective risk factors and were thus considered to be at high risk for OSA. Within this high-risk population, 3,252 (66.2%) were African American and 3,189 (64.9%) were seen in urban clinics. The prevalence of risk factors in these high-risk patients was as follows: 4,598 (93.6%) were older than 50 years, 3,397 (69.2%) were male, 4602 (93.7%) had hypertension, and 2,647 (53.9%) had a BMI greater than 35 kg/m^2 (Table 1). Confirmed diagnosis of OSA was 2,701 (9.0%) in the total study population and 982 (20%) in the high-risk population.

Within the high-risk population, univariate Chi Square analysis revealed that female sex, age < 50 years, BMI > 35 kg/m^2, and patients with no diagnosis of hypertension were significantly associated with OSA assessment (all $P < .01$) (Table 2). However, using a logistic regression model, we found that BMI > 35 kg/m^2 (odds ratio [OR] 4.96; 95% CI, 4.04–6.09; $P < .001$) and male sex (OR, 1.84; 95% CI, 1.51–2.26; $P < .001$) were independent factors significantly affecting OSA screening in the high-risk group. In particular, people with BMI > 35 kg/m^2 were almost 5 times more likely to have been screened for OSA, controlling for other covariates (Table 3). Given the gender discrepancy between the univariate and multivariate analysis, we repeated our logistic regression analysis defining the high risk category as having all 3 other criteria (hypertension, BMI ≥ 35, age ≥50), and found that males were more often assessed for OSA with an odds ratio of 1.89 (95% CI, 1.54–2.31, $P \leq .001$). In the total study population (n = 30,022), logistic regression analysis showed that all 4 main risk factors (BMI, hypertension, age > 50 years old, and male sex) were associated with an increased rate of OSA screening, with BMI being the most significant factor with an OR of 4.9 (Table 3). Using both univariate and logistic regression models, we found that African American race and clinic location were not significant factors affecting OSA screening.

Of the 4,911 objectively high-risk patients, we found that 3,387 (69%) had never been screened for OSA. Of the 1,524 (31%) who had been screened for OSA, we performed a randomized chart review of 200

Table 1. Demographic Information of Patients in Primary Care Clinics Including Total Patients in the Sample and Those Who Were at High Risk of Obstructive Sleep Apnea

	All Patients N (%) (n = 30,022)	High-Risk Patients N (%) (n = 4,911)
Race/ethnicity		
African American	17,787 (59%)	3,252 (66.2)
Other	12,235 (41%)	1,659 (33.8)
Body mass index, kg/m^2		
18.5 to 24.9	394 (1.35%)	18 (0.37)
25.0 to 29.9	6,556 (22.5%)	478 (9.8)
30.0 to 39.9	10,059 (34.6%)	2,228 (45.7)
> 40	3,379 (11.6%)	1,186 (24.3)
Risk Factors		
Body mass index, kg/m^2		
35 and under	22,996 (76.6%)	2,264 (46.1)
> 35	7,026 (23.4%)	2,647 (53.9)
Age		
≤ 50 years	14,453 (48.1%)	313 (6.4)
> 50 years	15,569 (51.9%)	4,598 (93.6)
Sex		
Male	10,191 (34%)	3,397 (69.2)
Female	19,831 (66.1%)	1,514 (30.8)
Hypertension		
Yes	9,802 (32.6%)	4,602 (93.7)
No	20,220 (67.4%)	309 (6.3)
Urban clinic	18,408 (61.3%)	3,189 (64.9)
Suburban clinic	11,614 (38.7%)	1,722 (35.1)

Table 2. Chi-Square Analysis of Association between Characteristics of Patients at High Risk for Obstructive Sleep Apnea and Clinical Assessment for Obstructive Sleep Apnea

	OSA not assessed N (%)*	OSA assessed N (%)*	*P* value†
Total (n = 4,911)	3,387 (69.0)	1,524 (31.0)	
Sex			< 0.01
Female	962 (63.4)	552 (36.6)	
Male	2,425 (71.4)	972 (28.6)	
Age			< 0.01
≤ 50 years	151 (48.2)	162 (51.8)	
> 50 years	3,236 (70.4)	1,362 (29.6)	
Clinic location‡			0.49
Urban	2,169 (68.0)	1,020 (32.0)	
Suburban	1,218 (70.7)	504 (29.3)	
Body mass index, kg/m^2			< 0.01
≤ 35	1,865 (82.4)	399 (17.6)	
> 35	1,522 (57.5)	1,125 (42.5)	
Race/Ethnicity			0.05
African American	2,213 (68.1)	1,039 (31.9)	
Not African American§	1,174 (70.8)	485 (29.2)	
Hypertension			< 0.01
No	161 (52.1)	148 (47.9)	
Yes	3,226 (70.1)	1,376 (29.9)	

Abbreviation: OSA, obstructive sleep apnea.
*Percentages are row percentages (number/[OSA not assessed + OSA assessed]).
†Calculated per χ^2 test.
‡Urban clinic is Detroit Northwest and Harbortown; Suburban clinic in Troy and Commerce Township.
§Not African American includes Asian, Hispanic, and White ethnicity reported in medical record.

patients from all clinics and found that the most common reasons for a sleep study referral were the following: snoring (29.0%), follow-up of existing diagnosis (19.0%), and report of sleep disturbance (16.0%). Other documented reasons included elevated BMI (7.0%), fatigue (8.0%), and hypertension (7.0%), with the remaining 14% as other or for undocumented reasons (Table 4). In addition, a manual review of 200 random charts of patients who were not assessed for OSA found that 5.5% of patients were offered an OSA assessment but had declined.

Discussion

In this study, we looked at the prevalence of medical record diagnosis of OSA among patients located in urban and suburban areas of Detroit, Michigan and

Table 3. Logistic Regression Analysis of Variables Associated with Screening for OSA in the Total Patient Population and in High-Risk Patients

	OSA High-Risk Patients *N* = 4,911		
	Odds Ratio	95% CI	*P* value
African American ethnicity	1.00	0.83–1.20	0.970
Suburban medical center	0.98	0.82–1.18	0.860
Age > 50 years	0.99	0.74–1.31	0.926
Body mass index > 35 kg/m^2	4.96	4.04–6.09	<0.001
Hypertension	1.15	0.87–1.53	0.324
Male sex	1.84	1.51–2.26	<0.001

Abbreviations: OSA, obstructive sleep apnea; CI, confidence interval.

Table 4. Reasons for Referrals to Sleep Study Based on a Random Chart Review of the 1,524 Patients Who Were Screened for Obstructive Sleep Apnea

Reason for Referral	N (%) of Patients (n = 200)*
Snoring	58 (29%)
Existing obstructive sleep apnea diagnosis follow-up	38 (19%)
Daytime sleepiness	32 (16%)
Elevated body mass index	14 (7%)
Fatigue	16 (8%)
Hypertension	14 (7%)
Other/unknown	28 (14%)

*Random assessment of 200 medical records is 13% of the 1,524 patients who were screened for obstructive sleep apnea.

whether there was a correlation between risk factors for OSA and a referral rate for a sleep study. Known high risk factors, such as age > 50 years, BMI > 35 kg/m^2, male sex, and a diagnosis of hypertension, were used to extrapolate patients as high-risk for OSA.

OSA is a prevalent and serious medical disorder that leads to frequent nocturnal awakenings, disturbed sleep cycle, nonrefreshed sleep, and daytime sleepiness. The incidence of OSA has increased substantially in the past 2 decades, leading to an increase in the associated economic burden.[4] The annual estimated cost related to workplace accidents, motor vehicle accidents, comorbid diseases, and loss in productivity associated with OSA is about $150 billion.[27] Finally, untreated OSA can lead to memory problems, hormone disruption, depression, resistant hypertension, and an increased risk of stroke and cardiovascular mortality.[11,29]

The risk of sleep apnea increases with age and BMI and is associated with male gender. It is estimated that about half of the population of older adults have OSA.[37] One meta-analysis of 184 studies demonstrated that treatment of OSA led to a clinically significant reduction in hypertension, sleepiness, blood pressure, and improved sleep-related quality of life. Furthermore, a systematic review found that bariatric surgery improved OSA, regardless of the type of surgery.[38] The American Academy of Sleep Medicine recommends annual screening for OSA using a validated STOP-BANG or Berlin questionnaire.[31]

Studies have shown a benefit in assessing patients for OSA. Showalter and O'Keefe screened 32 patients over 3 months for OSA, and their results showed that all the men in the study had intermediate or high risk for OSA. Of the study population, 40% were at high risk for OSA, and 33% of those high-risk patients were referred for polysomnography. Of that 33%, 3 participants underwent polysomnography testing and were diagnosed with sleep apnea.[39] Finally, several studies have reported that current screening in primary care is fragmented and inadequate; yet they all stress that early identification of OSA risks through routine screening in the primary care setting is imperative.[29,34–36,39]

Our study found that the majority of patients with 3 or more objective risk factors for OSA were not screened for OSA, which is in congruence with previous studies. Only 31% of the high-risk patient population was screened for OSA in our study, and in the high-risk population, patients under 50 years were referred more frequently than older adults. This may likely be due to younger patients having additional risk factors such as uncontrolled hypertension and obesity, therefore increasing their likelihood of being screened for OSA. Of the high-risk population, 54% had a BMI greater than 35 kg/m^2, and of these patients, only 42.5% were referred for a sleep study. We also observed that women were referred more often than men for a sleep study, but this trend may have been due to the study inclusion criteria, which required women to have all 3 of the remaining risk factors to be included in the high-risk population. When controlling for confounding factors using a logistic regression analysis, it was found that men were more likely to be assessed for OSA, with an OR of 1.84. In addition, on repeat logistic regression analysis removing gender from the high risk criteria, we found that men were still more likely to be referred for OSA evaluation. It is unknown whether this is due to a gender bias, or simply because male gender is included as a high risk criteria the commonly used STOP-BANG screening tool.

There was no significant difference in referral rate based on race in the high-risk population, as analyzed by both c^2 and logistic regression analyses. Although we observed that patients assessed at urban clinics were referred for a sleep study more often than patients assessed in a suburban clinic, the correlation with clinic location was not significant. Overall, based on the entire study population, all 4 risk factors were associated with increased OSA screening (Table 3).

Based on the results of our randomized chart review, we found that the most common reasons for referring patients for a sleep study was a report

of snoring or a prior OSA diagnosis. This suggests that primary care providers are more likely to refer patients for sleep study based on symptoms, as opposed to objective factors that classify patients as high-risk for OSA. This could be based on USPSTF guidelines that report insufficient evidence for routinely screening of asymptomatic patients for OSA.[32]

In addition, we compared the prevalence of hypertension and obesity as known risk factors for OSA in our study population to the overall populations of Detroit, Wayne County, the state of Michigan, and the entire U.S. population. For example, in 2017 to 2018, the prevalence of hypertension in U.S. adults was 45.4%,[40] whereas in Michigan adults, it was 34.8%.[41] The prevalence of hypertension in 2013 to 2015 in Wayne County was 35.4% and among Detroit adults was 44.9%.[42] The prevalence of obesity among U.S. adults in 2017 to 2018 was 42.4%[43] while in Michigan adults it was 32.4%. In Wayne county in 2014 to 2016, obesity prevalence was 31.5% and in Detroit adults it was 37.2%.[44]

These numbers show that our population had similar prevalence of known risk factors for OSA to that of the U.S. population. This suggests that our study population closely reflects the general population, thus supporting the contention that there needs to be further research and updated guidance regarding OSA screening for high risk populations.

Limitations

This study was a retrospective cohort study, which carries a lower level of evidence compared with controlled experimental trials. The study was based in 4 specific clinics, and therefore the generalization of results may be limited. It was not determined why patients who were referred to a sleep clinic did not undergo a sleep study; however, this can be further investigated in future studies. The study did not assess for change in morbidity and mortality in the study population, whether the screening was fully implemented, or the cost burden on the health care system with increased OSA screening. Although there are clear benefits of treatment of OSA, it is unclear whether there is downstream benefit of screening for OSA. In addition, it is difficult to draw conclusions from this study based on the effect of gender on OSA screening given that male sex is commonly defined as a high risk criteria. Despite these limitations, our study included a large and diverse patient population, with data that spanned over 2 years, which brings strength to our study.

Our study supports an ongoing need in primary care clinics for routine OSA screening and referrals to sleep study for patients who are at risk of OSA. A sleep study is a noninvasive study that does not put a patient at any significant risk, as compared with some other routinely used surgical screening tests. We recommend increasing awareness of OSA risk factors for both patients and health care providers. This might be achieved with development of training sessions, which would increase screening for OSA in high-risk patients. In addition, we suggest that patients with 3 or more objective risk factors for OSA have a high-risk alert or notification within the electronic health record, which would remind primary care physicians that a formal screening should be administered. This is of increased importance in a population with a higher prevalence of obesity and hypertension, such as was seen in this study. Finally, our study opens the door for future studies to determine the social or health system barriers that patients experience when seeking care for OSA and to uncover the cost effectiveness of increased OSA screening.

Conclusion

This retrospective cohort study found that patients with 3 or more high-risk factors for OSA were not routinely referred for a sleep study within the primary care setting. Based on medical record review, we found that the report of symptoms by patients was the most common reason for a sleep study referral, as opposed to objective risk factors that were readily available in the patients' records. The results of this study suggest that patients with OSA are not being readily identified in the primary care setting, and this may be improved with increased awareness of the objective risk factors of OSA, as well as a stronger consensus in screening guidelines. Further studies should focus on assessing the cost burden and health outcomes of OSA screening and sleep studies on health systems and revealing the barriers to seeking care for OSA.

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