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Nurse Practitioner Perspective

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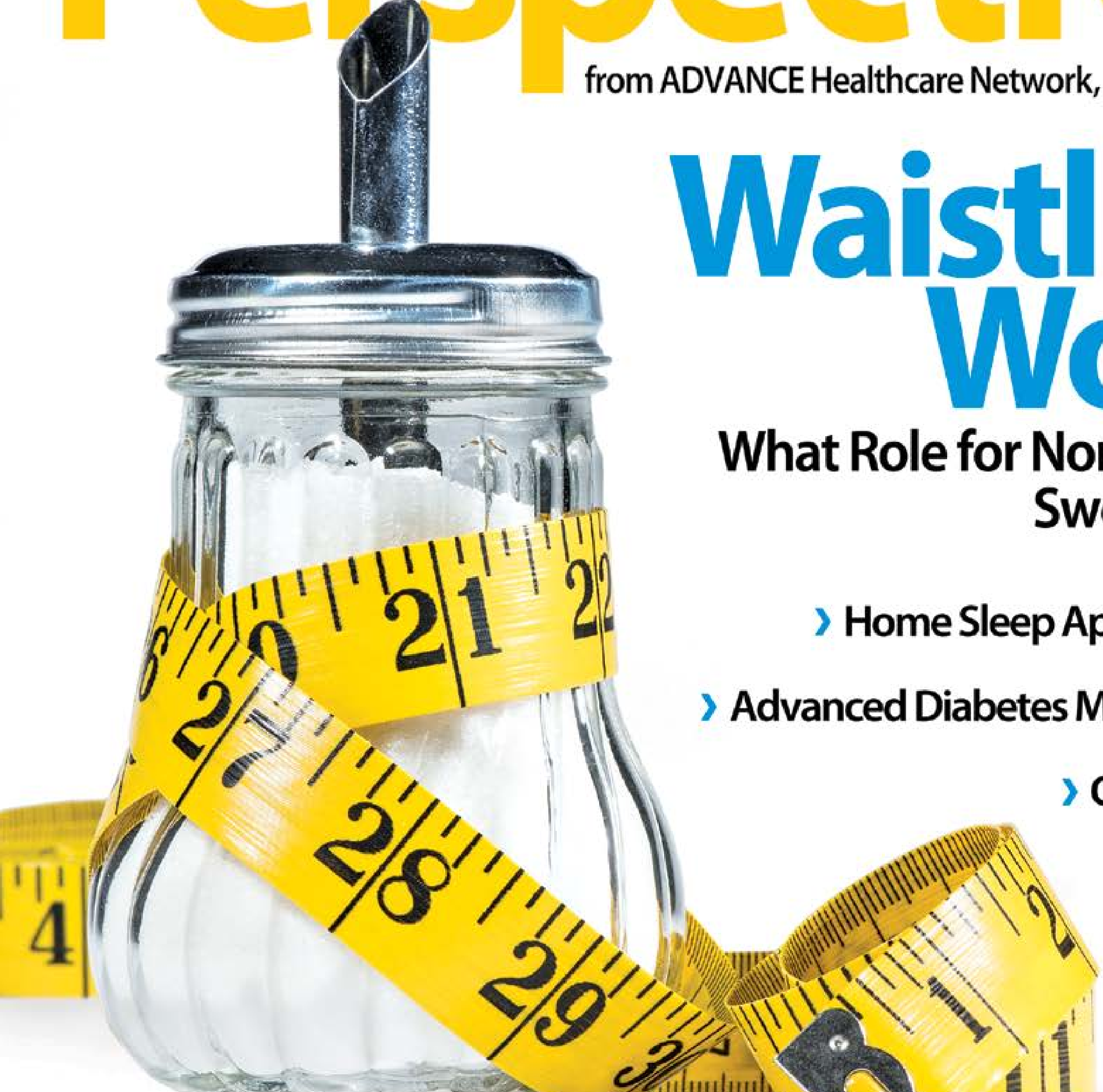

Waistline Woes

What Role for Nonnutritive Sweeteners?

› Home Sleep Apnea Testing

› Advanced Diabetes Management

› CE: Basal Cell Carcinoma

Home Testing for Obstructive Sleep Apnea

Study finds NP-led testing efficient and effective

By Wendy L. Wright, MS, APRN, FNP, FAANP, Becky Dupont, MA, Becky Manter, MA, Naim Aoun, MD, Darla Lahham, RPSGT, and Matthew Tarler, PhD

OBSTRUCTIVE SLEEP APNEA (OSA) occurs when the soft tissues of the upper airway collapse during sleep and cause a partial or total cessation of airflow. Many factors can be involved in causing this airway collapse, including enlarged tonsils, loss of tone in the oropharynx and palate, enlarged or posteriorly positioned tongue, fat in the pharyngeal tissue planes, and nasal obstruction causing turbulent flow through the upper airway. A report by the National Commission on Sleep Disorders Research[1] found that between 12 million and 20 million Americans experience OSA, leading to more than 200,000 car crashes and one-third of fatigue-related fatal trucking accidents per year. The financial impact is also staggering — and estimated $16 billion annually.[2,3]

Home Sleep Testing

A task force appointed by the American Academy of Sleep Medicine (AASM) concluded that OSA diagnosis for patients without serious comorbidities can be achieved in the home rather than a sleep laboratory. Home sleep testing (HST) can facilitate and improve patient care provided it follows AASM guidelines that include the recording of appropriate physiologic signals, scoring by a sleep technologist and interpretation by a sleep physician. The signals recommended by the task force are pulse oximetry, heart rate, airflow (cannula) and respiratory effort documented by respiratory inductive plethysmography (RIP).

Additionally, the AASM strongly recommends the use of another airflow sensor (thermistor) for oral breathing and apnea confirmation. These parameters are used to determine the apnea hypopnea index (AHI), a measure of disease severity. AHI is defined as the average number of apnea and hypopnea episodes per hour based on a minimum of 2 hours of recorded sleep.

The AASM guidelines for home testing form the basis for HST reimbursement by the Centers for Medicare and Medicaid Services and other insurance carriers.

HST by Nurse Practitioners

The adoption of HST by clinicians who are not sleep specialists is growing, especially among primary care providers such as nurse practitioners. OSA is prevalent in the general population and is associated with multiple chronic conditions.[4] In patients with diabetes, for example, the prevalence of OSA is 23%,[5] and the prevalence of any sleep-disordered breathing may be as high as 58%.[6] One study found that leep apnea was five times as frequent in patients who had experienced ischemic or hemorrhagic strokes.[7]

To be successfully incorporated into the workloads of NPs today, HST equipment and protocols must be easy to use in the practice and in the home. They also must offer high-quality diagnostic reports and be integrated within the

practice workflow. We recently conducted a study of NP-led HST. Our goal was not necessarily to validate that primary care providers are as effective as sleep specialists in diagnosing sleep apnea, because significant research has demonstrated this.[8,9] Our objective was more practical in nature: to investigate and quantify the *implementation* of sleep apnea care in the primary care setting. As noted by Collop and McEvoy,[10] the success of sleep apnea care by primary care providers lies not only in the clinical understanding of sleep medicine, but also in the ability to successfully add this care to a busy practice.

Methods

An HST program was developed and tested in an NP-owned family practice with two locations in New Hampshire (Wright & Associates Family Healthcare in Amherst and Concord). The NPs were trained in sleep medicine principles by a sleep physician and on system operation by a registered polysomnographic technologist (RPSGT). RPSGTs were available for support throughout the program.

The NPs screened patients using the Epworth Sleepiness Scale questionnaire, body mass index and clinical evaluation. Patients suspected of having OSA were then trained on sensor hookup during the visit and received a monitor (SleepView by CleveMed) for self-administration at home. The NPs also provided written instructions about sensor hookup.

Once each home study was completed and the monitor was returned to the practice, data was uploaded to a secure password-protected webportal and run through an automated algorithm to detect respiratory events and sleep time. Medical history and self-reporting of sleep quality were also collected from the patient and uploaded to the webportal. The studies were then manually scored by an RPSGT and interpreted by a sleep physician.

The electronically signed sleep specialist report was then communicated back to the ordering NP via the portal. The NP reviewed the results with each patient and referred him or her to a sleep specialist or implemented treatment planning as recommended in the diagnostic report.

Home Operation

The photo (page 40) shows a patient wearing the SleepView. A patient connects to the system with the following external sensors: a finger pulse oximeter, a nasal/oral cannula and a respiratory inductance plethysmography effort belt (belt is connected to the monitor).

The other signals do not require external sensors; snore is derived from the cannula signal, heart rate is measured from the pulse oximeter and body position, and sleep–wake cycle is estimated from an internal accelerometer. To facilitate self-hookup, indicators on the monitor illuminate if the sensor is not placed properly. The same light indicators are used in the morning to confirm data quality. Signs of incomplete data prompt the patient to repeat the study before returning the device to the practice.

Results

In this study, HST data from 49 patients were analyzed retrospectively. Results (see table) were positive for OSA in 43 patients (88%): 23 mild, 12 moderate and eight severe. AHI and BMI show moderate disease severity and obesity. Total sleep time was nearly 6.6 hours. Sleep efficiency was high (90%), which shows the device was not obtrusive during sleep.

The average turnaround time for diagnosis, from initial office visit to receipt of sleep specialist report, was 5.8 business days. The majority of the patients returned the devices to the practice within 3 business days of the office visit date. The vast majority of the patients needed only a single night recording. Only 4% required a second night recording to reach diagnosis because the first night recording generated insufficient data.

Three additional patients with unscorable studies opted not to retake

Summary of Results

Number of patients with completed diagnosis	49
Number of patients with single night recordings	47
Number of patients with two night recordings	2
Age in years (mean ± SD)	49.8 ± 15.3
Body Mass Index in kg/m^2 (mean ± SD)	30.7 ± 7.3
Men (n)	19
Female (n)	30
AHI (mean ± SD)	18.5 ± 20.8
Number of OSA positive	43
Number of OSA negative (normal)	6
Overall diagnosis turnaround time in business days (time from NP office visit to specialist report)	5.8
% of patients who returned their monitors within 3 business days from office visit	71%
% of patients with single night recordings	96%
% of patients with 2 night recordings	4%
% of unscorable studies	5.8%

the study; thus, the failure rate was 5.8%.

Therapy data from 41 of 43 patients who tested positive for OSA were available at the time of publication: 20 were referred to an NP specializing in sleep medicine, 20 were referred to a sleep center, and one was referred to an otolaryngologist. Twenty patients started CPAP, five needed no treatment after a full-night in-lab evaluation, 11 did not keep their follow-up appointments, and five were waiting for their appointments.

Discussion

A new HST program that uses web-based data management and scoring services was successfully deployed at two sites of an NP-owned practice. This research found that NPs were able to incorporate an efficient intake and diagnostic process within their normal workflow and refer the patient for treatment within a few days of the initial visit. This is a significant advancement over traditional methods that involve referral to a sleep specialist and then to a laboratory-based test.

The results confirm that the sensor hookup, which typically compromises the fidelity of home recordings, was not an issue in this study. This demonstrates ease of use in the home and attests to the quality of patient training by the NP.

An extensive review by the Agency for Healthcare Research and Quality[11] found that research conducted mostly by sleep specialists had inadequate or missing data in 13% to 20% of the studies using Type III monitors (success rates 87% to 80%).[12,13] In other research, Golpe[14] and colleagues reported data loss that prevented interpretation in 7% of studies in which a technologist applied the sensors compared to a failure rate of 33% in which the patient applied the sensors at home.

By comparison, our low failure rate suggests that NPs, with RPSGT availability, are qualified to conduct HST.

We believe that a major contributing factor to the high rate of completed studies is the face-to-face education from the NP to the patient. We believe this concise on-site sensor hookup and monitor training in the office kept the information fresh in the patient's mind for the test. We

Home sleep monitor (Sleep View by CleveMed).

Photo courtesy CleveMed

also believe the strong patient–provider relationship helped ensure that the majority of patients returned their monitors shortly after the office visit, speeding the turnaround time for diagnosis.

Most patients diagnosed with OSA were treated with CPAP, which is the standard of care. Although this finding is not surprising, it highlights an important point: Care coordination between sleep specialty and general practitioners can be effective even when sleep diagnosis is performed outside the sleep center. The rate of no-shows at follow-up appointments with the sleep specialist was relatively high (27%). This is consistent with a recent survey that found 40% of patients suspected of having OSA never seek diagnosis or treatment at a sleep center.[15] The survey also showed that among those who said they would take action, the majority said they would rather see their family practitioners than go to a sleep lab (67% vs. 27%), suggesting a demand for primary care providers to add sleep apnea care to their practices.

Barriers that limit access to high-quality sleep apnea care may be reduced with the initiation of HST programs by NPs. Sleep apnea diagnosis and treatment can be a natural extension to other disease management programs. While OSA management requires commitment and responsibility, coordination with specialists can help reduce the workload and further solidify the NP's role in the delivery of care for chronic disease. ■

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