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Introduction to Obstructive Sleep Apnea for the Internist

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Abstract

Introduction: The prevalence of sleep-disordered breathing is increasing, and there are insufficient sleep medicine specialists to meet the clinical demand of caring for these patients. One way to meet this clinical need is to train primary care and internal medicine physicians to provide some of the care. However, trainees in these specialties often receive very little training on practical aspects of the management of obstructive sleep apnea (OSA). We developed an experiential workshop to address this need at our institution. **Methods:** For approximately 60 internal medicine residents, we ran a 2.5-hour workshop consisting of two 20-minute didactic presentations to the whole audience and two 40-minute breakout sessions, led by eight facilitators. During the breakout sessions, the residents interacted with equipment such as positive airway pressure (PAP) devices and interfaces, reviewed sleep testing and PAP download reports, and participated in guided small-group discussions. **Results:** We received 40 evaluation surveys with at least partial responses. Only 50% of respondents had received prior formal instruction on PAP devices. Both subjective and objective knowledge scores improved on the postworkshop questions compared to the preworkshop questions. Trainee comments were extremely positive, indicating that they enjoyed the format of the session. **Discussion:** This curriculum provides an interactive educational session focused on practical aspects of OSA management relevant to primary care physicians and internists. It was well received and could be adapted to suit other time frames and other groups of learners.

Keywords

Obstructive Sleep Apnea, Sleep-Disordered Breathing

Educational Objectives

By the end of this session, learners will be able to:

1. Define the Apnea-Hypopnea Index, obstructive apnea, central apnea, and rapid eye movement and non-rapid eye movement sleep.
2. List the diagnostic criteria for obstructive sleep apnea (OSA), as per the American Academy of Sleep Medicine/International Classification of Sleep Disorders, Third Edition.
3. Describe indications for and differences between home sleep apnea testing and polysomnography.
4. Explain the results of a sleep test to a patient based on the sleep physician's interpretation summary.
5. Describe the benefit of OSA treatment on patient outcomes.
6. Describe indications for and differences between continuous positive airway pressure (CPAP) and bilevel.
7. Describe the differences between positive airway pressure (PAP) interfaces (nasal pillows, nasal mask, and oronasal mask).
8. Identify adequate and inadequate PAP therapy based on PAP downloads.
9. List two alternative therapies to CPAP for the treatment of OSA.

Introduction

Most physicians, including trainees in internal medicine, receive little or no practical training in the evaluation and management of sleep-disordered breathing.^{1,2} This is problematic given that recent population-based studies show the prevalence of sleep-disordered breathing is increasing, while it is estimated that 13% of men and 6% of women in the U.S.A. have moderate or severe obstructive sleep

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Appendices

- A. Session 1 Didactic.pptx
- B. Session 1 Learner Guide.docx
- C. Session 1 Instructor Guide.docx
- D. Session 2 Didactic.pptx
- E. Session 2 Learner Guide.docx
- F. Session 2 Instructor Guide.docx
- G. Evaluation Survey.docx

All appendices are peer reviewed as integral parts of the Original Publication.

apnea (OSA).³ Moreover, many patients with sleep-disordered breathing remain undiagnosed.⁴ For individuals identified as having sleep apnea and initiated on positive airway pressure (PAP) therapy, long-term adherence is commonly suboptimal.⁵ These challenges are exacerbated by long wait times to receive sleep services,⁶ presumably driven by insufficient resources to meet clinical demand.

Given that the number of physicians passing the American Board of Medical Specialties sleep medicine board exam has been falling dramatically in the last decade, it is ever more pressing to disseminate knowledge and develop effective care models for the delivery of sleep care.⁷ A landmark Institute of Medicine report, *Sleep Disorders and Sleep Deprivation: An Unmet Public Health Problem*, called for an expanded awareness among health care professionals through education and training.⁸ One method is to empower primary care providers to assist with care delivery. By optimizing sleep apnea care and PAP adherence, this may translate into improvements in blood pressure control,⁹ cardiovascular mortality,¹⁰ and motor vehicle accidents,¹¹ among other beneficial effects.

Despite the ubiquity of sleep apnea in primary care, we know of no published curriculum specifically addressing OSA for the internist, although one *MedEdPORTAL* resource does address OSA syndrome guidelines in pediatrics.¹² Our group has described the potential impact of improving sleep education among Department of Veterans Affairs primary care providers via development of a sleep telementorship program.¹³ We have also had success in offering a pulmonary hands-on curriculum to our internal medicine training program.¹⁴ Here, we describe a similar program in sleep medicine for internal medicine residents utilizing a pedagogical method of case-based learning,¹⁵ with a special focus on the use of equipment and data reports that enable the learner to understand the diagnostic testing and therapies that treat OSA.

Methods

This workshop was developed for internal medicine residents. We assumed that residents had general knowledge of OSA and PAP therapy but that most would not have received any formal teaching on this subject. The workshop was run during a weekly Academic Half Day seminar at our institution. These workshops are a standard part of the internal medicine residency program's ambulatory care rotations. The participants are internal medicine interns (from both the categorical and preliminary programs) and residents. Typically, about 60 residents attend this session, and so, we planned to accommodate this number of learners by enlisting eight facilitators plus a timekeeper. The facilitators, all having substantial expertise in sleep medicine, consisted of one pulmonary and critical care attending, one sleep medicine fellow, and six sleep attendings (one previously specialized in pediatric neurology, one in internal medicine, and four in pulmonary and critical care medicine). Potential facilitators for this workshop need to be comfortable with OSA diagnostic testing, therapies, and follow-up. In addition to sleep specialist physicians, facilitators could include any health care professionals who regularly see patients with OSA, such as otolaryngologists, respiratory therapists, and sleep technicians, or any health care professional who has reviewed the workshop material, including the instructor guides, in detail.

The workshop was 2.5 hours long and consisted of two large-group didactics delivered to the entire audience and two small-group breakout sessions. We arranged the room to facilitate the small-group sessions, with tables to accommodate equipment, four to six learners, and a facilitator. We had the learners rotate tables while the equipment (some requiring electrical plug-in) and facilitators remained at each station. Prior to the start of the session, we placed learner guides and an evaluation survey at each learner's seat. As the learners arrived, we asked them to complete the presession questions in the evaluation survey.

The workshop started with a 20-minute large-group didactic on OSA definitions and testing (Appendix A). At the end of this talk, the speaker explained the logistics of the first breakout session, which consisted of four unique stations, with 10 minutes at each station. The learners rotated through all four stations in their small groups. At each station, the learners either interacted with equipment or reviewed reports, and the

facilitator moderated a group discussion of the answers to the questions in the learner's guide (Appendix B) following the instructor guide (Appendix C):

- Station A: home sleep testing equipment. Equipment included ApneaLink devices plus optional WatchPAT devices.
- Station B: home sleep study reports. These reports were included in the learner and instructor guides (Appendices B & C).
- Station C: diagnostic polysomnography reports. These reports were included in the learner and instructor guides (Appendices B & C).
- Station D: PAP titration polysomnography reports. These reports were included in the learner and instructor guides (Appendices B & C).

After a 10-minute break, the workshop resumed with a 20-minute large-group didactic on the basics of PAP and alternative therapies (Appendix D). At the end of this talk, the speaker explained the logistics of the second breakout session, which consisted of four unique stations, with 10 minutes at each of the stations. The learners rotated through all four stations in their small groups. At each station, the learners either interacted with equipment or reviewed reports, and the facilitator moderated a group discussion of the answers to the questions in the learner's guide (Appendix E) following the instructor guide (Appendix F):

- Station A: continuous PAP (CPAP) experience. Equipment included CPAP devices, cloth mask liners, alcohol wipes, one oronasal mask, one nasal mask, one nasal pillow, PAP hoses, filters, and possibly extension cords.
- Station B: bilevel experience. Equipment included bilevel devices, cloth mask liners, alcohol wipes, one oronasal mask, one nasal mask, one nasal pillow, PAP hoses, filters, and extension cords, if needed.
- Station C: PAP downloads. These reports were included in the learner and instructor guides (Appendices E & F).
- Station D: alternative therapies. Equipment included one mandibular repositioning device.

After the second breakout session, we allotted 15 minutes for a large-group summary to answer questions and for the learners to complete the postsession questions of the evaluation survey (Appendix G).

The learner guides contained images and questions to guide the conversation at each of the stations during the breakout sessions. The instructor guides contained all the material in the learner guides, the answers to the questions, and additional talking points.

We evaluated the session using a survey with a pre- and postsession format. Prior to the start of the workshop, we asked learners:

- If they had received previous formal teaching about OSA and PAP therapy.
- About their career plans.
- What role they expected to have in caring for patients with sleep-disordered breathing in their future career.
- To rate their subjective knowledge of OSA and PAP therapy on a 5-point Likert scale (1 = *very poor knowledge/understanding*, 5 = *very good knowledge/understanding*).
- To answer four multiple-choice knowledge questions pertaining to the material addressed in the workshop across the following domains:
 - Home versus lab sleep testing.
 - OSA treatment indications and outcomes.
 - Evaluating CPAP efficacy and follow-up.
 - Basic interpretation of a data download (i.e., usage, Apnea-Hypopnea Index, and leak data).

After the workshop, we asked learners:

- To rate their subjective knowledge of OSA and PAP therapy on a Likert scale.
- To answer four multiple-choice knowledge questions covering the same knowledge domains as the preworkshop knowledge questions.
- For comments about the workshop.

The correct answers to the multiple-choice knowledge questions are indicated in bold in Appendix G.

Results

An estimated 60 learners joined the workshop. Thirty-four learners completed the preworkshop survey (response rate: 57%). Thirty-six learners completed the postworkshop survey (response rate: 60%). Both surveys were voluntary and anonymous.

On the preworkshop survey, 24 learners (71%) reported planning a career in primary care or as a hospitalist, and the other 10 were planning to enter a variety of specialties (see [Table](#)). Twenty-five learners (74%) commented that their future career involved at least some role in the screening, referral, and/or management of patients with OSA.

Table. Characteristics of Participants (*N* = 34)

Characteristic	No. (%)
Future specialty	
Primary care, internist or hospitalist	24 (71)
Internal medicine subspecialty	6 (18)
Pulmonary and critical care medicine	2 (6)
Gastroenterology	2 (6)
Cardiology	1 (3)
Hematology-oncology	1 (3)
Rehabilitation medicine	2 (6)
Neurology	1 (3)
Undecided	1 (3)
Received prior lecture on obstructive sleep apnea	21 (62)
Received prior lecture on positive airway pressure	17 (50)

We compared knowledge scores between the pre- and postworkshop surveys. Examining all surveys, subjective knowledge improved from a median value of 3 (neutral) to 4 (very good; Wilcoxon signed rank sum test, $p < .01$). Objective knowledge improved from a median score of 50% (interquartile range: 50%-75%) correct to median of 100% (interquartile range: 75%-100%) correct (Wilcoxon signed rank sum test, $p < .01$). These improvements remained statistically significant when we restricted the analysis to learners who completed both surveys (Wilcoxon signed rank sum test, $p < .01$).

Twenty-eight learners wrote comments about the workshop. Twenty-three were entirely positive, mentioning that they enjoyed manipulating the equipment, the small size of the breakout groups, and the mixture of didactics and interactive sessions and that they found the material practical. The constructive comments centered on the relative duration of the different sessions, mostly stating that the breakout sessions were too rushed, especially the first.

Discussion

The aim of this curriculum is to provide practical education in the basic assessment and treatment of sleep-disordered breathing that trainees will encounter in the daily management of primary care and hospitalized patients. The survey results showed a statistically significant improvement in trainees' perceived level of knowledge/understanding of OSA and PAP therapy as well as in objective scores on the knowledge questions. The comments indicated that the trainees appreciated this mix of traditional didactic lectures and small-group hands-on sessions. The comments also suggested that the trainees felt more empowered to engage with their patients regarding sleep-disordered breathing after attending this workshop.

While most of the learners had some prior knowledge of the impact and diagnosis of sleep-disordered breathing, we found that they were not generally familiar with the evaluation of actual sleep study reports or the adherence and efficacy data available from PAP devices. Moreover, the trainees had little to no experience with operation of the PAP equipment. Ironically, the use and management of PAP equipment are areas where patients are apt to know much more than their clinical care providers. This knowledge mismatch can pose a challenge to the clinician who is trying to counsel on PAP nonadherence. Although we do not have any long-term data, we are hopeful that this workshop will prompt attendees to engage more deeply with their patients on issues surrounding OSA diagnosis and therapy.

While the curriculum was developed by experienced instructors in sleep medicine at a tertiary care center, it is anticipated that this program will be easy to implement by nonspecialists and of considerable interest to many audiences, particularly given the dearth of training resources currently available on this topic. The material is readily applicable to training programs for primary care physicians, internists, and advanced care providers.

The biggest limitation of this workshop is that it is designed to fit a 2.5-hour time period. It may be difficult for other programs to find such a long time. However, the format could be adapted to fit a number of different schedules. Indeed, we have already adapted the material to create a more focused 1-hour teaching session with fewer learning objectives. Another limitation to reproducing this curriculum is that our approach uses a high faculty-to-learner ratio, which may be hard to replicate. We believe that facilitators could include other health care professionals with sleep expertise, such as otolaryngologists, respiratory therapists, and sleep technicians, after they have reviewed the instructor guides, but we do not know if the program will be as successful when run in this fashion.

In terms of the feedback from trainees, the most pervasive constructive comment was that the first breakout session was too short and the second a little too long. The faculty agreed with this. In future iterations, we intend to lengthen the first breakout session and shorten the second. In terms of the evaluation of this curriculum, it is also important to note that the survey response rate was approximately 56%-60%. This response rate may have caused a nonresponse bias, meaning that the effectiveness of our curriculum may not have been as good as our results suggest. Additionally, our survey addressed only learner knowledge and subjective understanding. We do not know if attending this curriculum results in behavior change.

In summary, we developed an OSA workshop for internal medicine trainees that was well received and appeared to improve attendees' short-term OSA diagnosis and management knowledge. Such knowledge will become increasingly important with the prevalence of OSA increasing and, consequently, testing and therapy for sleep-disordered breathing also increasing.

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Disclosures

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Informed Consent

All identifiable persons in this resource have granted their permission.

Ethical Approval

Reported as not applicable.

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