In-Office Communication About Excessive Daytime Sleepiness Associated with Treated Obstructive Sleep Apnea: Insights from an Ethnographic Study of Physician-Patient Visits

Christine Won (✉ christine.won@yale.edu)

Yale University School of Medicine <https://orcid.org/0000-0002-8568-8849>

Richard K Bogan

SleepMed Inc.

Karl Doghramji

Thomas Jefferson University

Joseph Ojile

Saint Louis University School of Medicine

Shay Bujanover

Jazz Pharmaceuticals PLC

Danielle L Hyman

Jazz Pharmaceuticals Plc

Kathleen A Hewett

Ogilvy Health: Ogilvy CommonHealth Worldwide LLC

Robert Thomas

Beth Israel Deaconess Medical Center

Research

Keywords: excessive daytime sleepiness, hypersomnolence, physician-patient communication, obstructive sleep apnea, qualitative research

Posted Date: May 26th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-542702/v1>

License: © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

Background: Excessive daytime sleepiness (EDS), a primary symptom of obstructive sleep apnea (OSA), negatively affects functioning and quality of life (QoL). EDS can persist despite primary airway therapy, and often remains unmanaged, potentially due to inadequate provider-patient communication. Ethnographic research was conducted to assess provider-patient communication about EDS.

Methods: Participating physicians (primary care n=5; pulmonologists n=5; sleep specialists n=3) identified adult patients (n=33) diagnosed with OSA who were prescribed positive airway pressure (PAP) therapy ≥ 6 months prior and previously reported EDS. Visits and post-visit interviews were video-recorded and analyzed using standardized, validated sociolinguistic techniques.

Results: Despite 55% of patients (18/33) reporting QoL impacts post-visit, this was discussed during 28% (5/18) of visits. Epworth Sleepiness Scale was administered during 27% (9/33) of visits. Many patients (58% [19/33]) attributed EDS to factors other than OSA. Physicians provided EDS education during 24% of visits (8/33). No pharmacotherapy for EDS was prescribed to patients not currently taking medications despite 78% (18/23) reporting EDS.

Conclusions: EDS was minimally discussed and rarely reassessed or treated after PAP therapy initiation in this study. Patients often attributed EDS to factors other than OSA. The findings suggest physicians and patients may benefit from dialogue tools, routine use of screening tools, and patient education.

Introduction

Obstructive sleep apnea (OSA), defined as an apnea-hypopnea index (AHI) ≥ 5 with associated signs/symptoms, or an AHI ≥ 15 with no associated signs/symptoms, occurs on average in 22% (range, 9%-37%) of men and 17% (range, 4%-50%) of women [1, 2]. Excessive daytime sleepiness (EDS) is a main symptom of OSA, and is often a primary complaint for patients seeking medical care [3, 4]. EDS linked to OSA is associated with a negative impact on patient and public safety [5, 6], daily functioning and work productivity [7, 8], and quality of life (QoL) [9]. It is also associated with impairments in motivation and mood, including depression and anxiety [10–13], and cognitive function including attention, memory, and higher-order executive functions [14–17].

Positive airway pressure (PAP) therapy is the standard of care to treat OSA [18, 19], but 9–22% of patients with OSA experience persistent EDS despite adherence to PAP treatment and AHI normalization [4, 11, 12, 20–24]. In these patients, the addition of pharmacologic therapy for persistent EDS has been shown to be effective after other etiologic factors of EDS have been either ruled out or effectively managed [25–28]. However, only approximately 6% of patients with OSA treated with PAP are prescribed stimulants and wake-promoting agents (WPA) [29–31]. Many possible reasons exist for undertreatment of EDS in OSA patients on PAP, including under-recognition of EDS by physicians due to lack of practical objective assessment tools [25, 32–34], provider concerns about the effect of pharmacologic therapy on PAP

adherence and the potential masking of unmanaged OSA symptoms [26, 27, 35], and patient under-recognition and minimization of EDS [21, 36].

Fostering more effective communication has been shown to improve health outcomes, physician-patient alignment, and patient understanding and satisfaction [37, 38]. To understand physician-patient communication regarding persistent EDS and its potential role in treatment decisions, we conducted an in-office ethnographic sociolinguistic study of visits.

Materials And Methods

Sample selection

Primary care physicians (PCPs), pulmonologists, and sleep specialists ($n = 5,073$) in community-based practices and nonacademic sleep centers across the United States were invited to participate in the study. Physicians who were board-certified or board-eligible in their specialty, in practice 2–35 years, and in practice full time, spent a minimum of 75% of time in direct patient care, conducted $\geq 75\%$ of patient discussions in English and, in a typical month, treated ≥ 30 patients with OSA who had been prescribed PAP therapy, either continuous positive airway pressure (CPAP) or bilevel positive airway pressure (BiPAP) for ≥ 6 months, were eligible to participate.

Participating physicians identified eligible adult patients who were previously diagnosed with OSA, fluent in English, not cognitively impaired, and prescribed PAP therapy for ≥ 6 months prior to the visit and had reported experiencing EDS symptoms to their physician prior to the visit. Patients eligible for enrollment had a significant discussion of OSA during the visit. Participating patients identified eligible care partners who were people with whom they discussed treatment and/or who assisted in making treatment decisions.

Study design

This study was approved by the New England Institutional Review Board (IRB Number: 120170306, Protocol Number: 1233110) and conducted in accordance with the amended Declaration of Helsinki. All recorded participants provided written informed consent. The study methodology is summarized in Fig. 1.

One to 2 days of research was conducted at each physician's practice by 1 member of a team of trained ethnographic researchers. Patients who met the criteria were invited by office staff to participate in this research upon arrival for their regularly scheduled appointments. Potential patient participants met with the researcher to receive information about the study and provide written informed consent. Participants were informed that they would be part of a communication study and their visits would be audio- and video-recorded. Specific research objectives were not shared with participating physicians, patients, care partners, or research coordinators.

Eligible care partners were invited to participate. Those who were interested in participating and present at the visit provided written informed consent. Patients with a care partner who was not at the visit were

provided materials about the research to share with them. These care partners were given the opportunity to participate in a telephone interview (see Additional file 1). Written informed consent was acquired prior to the interview.

Physician-patient interactions were audio- and video-recorded without the researcher present in the exam room. Immediately following each visit, the researcher conducted an interview with the patient (approximate duration, 20 minutes) (see Additional file 2) and administered a written questionnaire (see Additional file 3). At the end of the day, the researcher conducted an interview with the physician about each patient (approximately 20 minutes per patient) and his or her general attitudes and treatment practices (10–20 minutes) (see Additional file 4). The physician was administered written questionnaires about each patient (see Additional file 5). The physician was able to reference patient records; the researcher was not provided access. The physician interviews and questionnaires were completed at the end of the day to minimize disruption of the office environment and typical practices. The interviews and questionnaires were used to gather history, demographics, attitudes, experiences, perceptions about the interaction, and alignment. Participating physicians, patients, care partners, and research coordinators were financially compensated for their participation.

Data analysis

Audio recordings of visits and interviews were transcribed. Video recordings were used as quality control and to reveal nonverbal communication. Transcripts were analyzed using interactional sociolinguistic methods to understand the conversational dynamics of the physician-patient interaction [39, 40], including detailed analysis and categorization of language at the topic and word level and assessment of speaker roles and alignment. Adherence to PAP therapy was collected through patient and physician reports, rather than clinical measure, to assess alignment. A subset of transcripts was reviewed first to identify trends and develop hypotheses. An analytic plan was developed and executed on the full dataset.

Themes were assessed using descriptive statistics, including:

- The number of patients who reported EDS symptoms post-visit, reported EDS symptoms during the visit, related EDS symptoms to other factors, reported current QoL impacts of EDS, and/or had been prescribed medication for EDS prior to the visit
- The number of visits when the following were discussed: QoL impacts of EDS, PAP therapy adherence and usage data, and/or adherence to medication for EDS
- The number of visits at which physicians asked at least 1 open-ended question related to EDS, asked about QoL impacts of EDS, mentioned treatment options for EDS, and/or prescribed new treatment for EDS
- The number of visits at which physicians and/or their office staff provided education about EDS and/or used the Epworth Sleepiness Scale (ESS) questionnaire
- The percentage of the visit discussion focused on key topics, including EDS and PAP therapy

Results

Sample profile

A total of 19 (0.004%) physicians responded; 13 (0.003%) physicians located across the United States met the criteria and agreed to participate. PCPs (n = 5), pulmonologists (n = 5), and sleep specialists (n = 3) were enrolled.

A total of 39 patients were approached, consented, and recorded. Some of these patients did not meet the eligibility requirements because they were not prescribed PAP therapy for ≥ 6 months prior to the visit (n = 3), or there was minimal discussion of OSA during the visit (n = 3). A total of 33 patients were enrolled in the study. Forty-two percent of enrolled patients were seen by their pulmonologist, 33% by their PCP, and 24% by their sleep specialist.

Twelve care partners were also enrolled, of whom 7 participated in follow-up telephone interviews, 4 were present during the visit and interviewed at the office, and 1 was not present during the visit, but was interviewed at the office. The characteristics of the physicians and patients are summarized in Tables 1 and 2.

Table 1
Characteristics of participating physicians

Physician/Clinic Characteristics	
No. of participants	13
Male, No. (%)	10 (76.9)
Years in practice, mean (SD; range)	21 (10.3; 2–35)
Type of practice, No. (%)	
Group	9 (69.2)
Solo	4 (30.8)
Specialty, No. (%)	
Primary care	5 (38.4)
Pulmonology	5 (38.4)
Sleep	3 (23.1)
Location, No. (%)	
California	3 (23.1)
Florida	3 (23.1)
Alabama	1 (7.7)
Arizona	1 (7.7)
Illinois	1 (7.7)
New Jersey	1 (7.7)
North Carolina	1 (7.7)
Ohio	1 (7.7)
West Virginia	1 (7.7)

Table 2
Characteristics of participating patients

Patient Characteristics	
No. of participants	33
Age, mean (range), y	62 (35–80)
Male, No. (%)	25 (75.8)
Length of physician-patient relationship, No. (%) [*]	
< 1 y	4 (12.1)
1–3 y	10 (30.3)
3–5 y	4 (12.1)
> 5 y	15 (45.5)
Duration on PAP therapy, No. (%) [*]	
6–12 mo	1 (3.0)
1–2 y	8 (24.2)
3–4 y	10 (30.3)
5 + y	14 (42.4)
Current medication for EDS (at start of visit), No. (%) [*]	
Wake-promoting agent	7 (21.2)
Stimulant	3 (9.1)
None	23 (69.7)

Dialogue characteristics

The average visit length was 14.05 minutes (SD, $\pm$ 5.85). The average percentage of the visit discussion dedicated to key topics is illustrated in Fig. 2. Thirteen percent of the visit dialogue (mean [SD] 1.83 minutes [$\pm$ 1.77]) was related to EDS, including discussion within and outside the context of PAP therapy. EDS was discussed exclusively within the context of PAP therapy during 18% of visits, of which 67% were with PCPs and 33% were with pulmonologists. Examples of this and other key characteristics of physician and patient visit dialogue are shown in Table 3.

Table 3
Examples of physician and patient visit dialogue characteristics

Dialogue Characteristic	Dialogue Example
Physician discussing EDS within the context of PAP therapy	Physician: Did the use of the [CPAP] machine make you feel better during the day? Did you have more energy? Were you less sleepy? —visit with a PCP and a 47-year-old male
Physician providing education related to EDS	Physician: In terms of the daytime, there are medications to help during the daytime if you're really sleepy. —visit with a sleep specialist and a 44-year-old female
Physician asking an open-ended question related to EDS	Physician: How sleepy are you these days? —visit with a sleep specialist and a 55-year-old male
Physician asking about potential impacts of EDS on QoL	Physician: How about drowsy driving? Has that been an issue at all? —visit with a sleep specialist and a 65-year-old male
Patient reporting EDS symptoms during the visit	Physician: And during the day you're not tired or sleepy? Patient: Umm, around 2:00 I do. I get sleepy. —visit with a pulmonologist and a 54-year-old female
Patient reporting EDS symptoms during the visit	Physician: Then, do you end up taking a nap in the daytime, or no? Patient: Yes. Almost... Physician: Every day? Patient: Not every day, but probably 70%. —visit with a PCP and a 73-year-old male
Patient relating EDS symptoms to another factor	Physician: But you peter out during the day sometimes? Patient: But I think people my age [do]. —visit with a pulmonologist and a 79-year-old male

During 24% of visits, physicians provided some education related to EDS, including information about symptoms, ESS scoring, potential impacts, and/or treatment. During visits with 33% of patients, physicians asked at least 1 open-ended question related to EDS. Of these patients, 45% were attending visits with their sleep specialist (n = 5/11), 36% with their pulmonologist (n = 4/11), and 18% with their PCP (n = 2/11).

Screening and QoL impact

The ESS was administered during 27% of visits. It was administered during 50% of pulmonology visits and 25% of sleep specialist visits. Among the visits that obtained an ESS, physicians discussed the

results with their patients 67% of the time, and during a third of these discussions, physicians segued from dialogue about ESS scores to dialogue about medication for EDS.

Physicians asked 18% of patients about the potential impact of EDS on QoL, despite 55% of patients reporting current QoL impacts of EDS during their post-visit.

Symptoms and treatment

PAP therapy adherence was discussed during all visits. It was augmented by discussion of PAP usage data during 42% of visits (57% with pulmonologists and 43% with sleep specialists).

Prior to the visit, 30% of patients had already been prescribed medication for EDS (4 of whom attended visits with sleep specialists, 4 with pulmonologists, and 2 with PCPs). Adherence to medication was discussed during all of these patients' visits. Seventy percent of the patients prescribed medication were asked open-ended questions related to EDS versus 17% of patients who were not prescribed medication ($P = 0.0016$). During visits, 70% of the patients prescribed medication ($n = 7/10$) reported currently experiencing EDS symptoms.

Among patients not prescribed medication, 78% were currently experiencing symptoms of daytime sleepiness and/or the need to nap during the day, as reported by the patient during the visit and/or post-visit interview. The vast majority (83%) of these patients reported these EDS symptoms during the visit. However, treatment options for EDS were discussed in only 27% of cases and led to only one intervention from a sleep specialist for an oral appliance to specifically address EDS symptoms.

Fifty-eight percent of patients associated their EDS symptoms to factors other than OSA, such as comorbidities, other treatments and medications, work, retirement, age, weight, and sleep habits.

Discussion

Although EDS is a core symptom of OSA and often the impetus for sleep evaluation [3, 4], EDS was minimally discussed and rarely reassessed or treated after PAP therapy initiation, even when patients were still experiencing EDS symptoms and related QoL impacts. The focus of the visit discussion was on the use of PAP therapy, rather than clinical effectiveness and persistent symptoms. Although ongoing assessment of EDS at regular intervals is recommended [20], the ESS was not universally administered and patients were rarely asked about the impact EDS may have on their QoL. From a patient perspective, despite reporting persistent EDS, many patients attributed it to factors other than OSA, and did not bring up the QoL impacts with their physicians.

Prior to this study, very little was known about communication between patients and treating physicians regarding EDS associated with OSA. This study was the first to explore the nature of this dialogue and identify areas for improvement. Studies of physician-patient communication in other disease categories have found that more effective communication, such as the increased use of open-ended questions, has led to improvement in health outcomes, physician-patient alignment, and patient understanding and

satisfaction [38,Gumperz, 1999 #2329]. EDS is an important target for intervention in patients with OSA because it is associated with significant negative impact on patient and public safety [5, 6] and patient daily functioning, work productivity, and QoL [7–11].

There are parallels between these findings and research in other fields in which routine screening for specific behavioral and mental health issues, such as diet, exercise, smoking, alcohol use, drug use, stress, depression, and anxiety have been shown to improve patient care and satisfaction [41, 42]. Although no standard guidelines exist, other areas have seen substantial research and interest in developing screening guidelines, including pain, domestic abuse, social neglect, and elder abuse [43–47]. Thus, an approach may be to include screening for EDS during routine medical evaluation for all patients, even those not diagnosed with OSA. This approach may identify other causes of EDS, including narcolepsy, idiopathic hypersomnia, severe social jet lag, and chronic partial sleep deprivation [3, 48]. The ESS is a useful tool in clinical practice to evaluate EDS, however, it may not be representative of how patients universally describe and experience their EDS. Using this tool with effective questioning, or developing a new screening and monitoring tool for EDS in OSA that is more representative of the way current patients speak to their sleepiness, could help optimize the treatment of EDS in OSA [49].

This study had some limitations. The participation fraction was small, which was expected due to the observational nature of the research, thus generalization was limited, and the study was not powered to compare specialists and generalists. The rate of response and sample size, including the study of specialty cohorts, were typical of ethnographic sociolinguistic research [37, 39, 40, 50]. Participants in this research knew they were being recorded, which may have affected their behavior. However, the likely impact is that they may have attempted to communicate more effectively than would be typical. There was no apparent reason why those who participated would have been unlikely to address EDS. However, since the majority of patients had been visiting these physicians for years, EDS may have been discussed more comprehensively during previous visits. If this was the case, it could also suggest the need to reevaluate EDS symptoms in patients who may have initially reported resolution of EDS, since many of these patients described EDS symptoms at the time of this study.

This study did not explore possible reasons why EDS is inadequately addressed after PAP therapy initiation (“attitudes to EDS”), including deprioritization of EDS, concerns regarding the negative impact of medications on PAP therapy adherence, and assumption that patients would raise the topic if it is of concern. This research also did not assess why patients attribute persistent EDS to factors other than OSA. However, this research may inform the design of future studies to explore potential areas for intervention.

Conclusions

In this ethnographic sociolinguistic study, during visits between physicians and sleepy patients with OSA treated with PAP therapy, EDS had a minimal role in the dialogue. Symptoms and QoL impacts were often overlooked, and treatment options were rarely discussed or prescribed. Physicians and patients may

benefit from improved use of existing screening and monitoring tools for EDS (eg, ESS) and access to dialogue tools (eg, discussion guides) and communication training (eg, to ask open-ended questions). One approach to improved communication about EDS would be to include standardized assessment and research-guided questioning during routine medical evaluation. Education on treatment and management of EDS to physicians and on the severity and symptoms of EDS to patients may be required to change practice and shift expectations.

Abbreviations

AHI, Apnea-Hypopnea Index

BiPAP, Bilevel Positive Airway Pressure

CPAP, Continuous Positive Airway Pressure

ESS, Epworth Sleepiness Scale

EDS, Excessive Daytime Sleepiness

IRB, Institutional Review Board

PAP, Positive Airway Pressure

PCP, Primary Care Physicians

OSA, Obstructive Sleep Apnea

QoL, Quality of Life

Declarations

Ethics approval and consent to participate

This study was approved by the New England Institutional Review Board (IRB Number: 120170306, Protocol Number: 1233110) and conducted in accordance with the amended Declaration of Helsinki. All recorded participants provided written informed consent.

Consent for publication

Not applicable.

Availability of data and materials

All data generated or analyzed during this study are included in this published article and its supplementary information files.

Competing interests

CW and KD are consultants for, and participate in research that is supported by, Jazz Pharmaceuticals. RKB is on the speakers' bureau for Jazz Pharmaceuticals, advisory board and has participated in industry-sponsored research. JO is an employee of the Caduceus Corporation and the Clayton Sleep Institute, LLC; has received research funding from Fisher-Paykel, Jazz Pharmaceuticals, Respironics, and Teva; has served on the speakers' bureaus for AstraZeneca, Boehringer Ingelheim, Merck, and Teva; and serves as a board member for the National Sleep Foundation. SB and DLH are employees of Jazz Pharmaceuticals who, in the course of their employment, have received stock options exercisable for, and other stock awards of, ordinary shares of Jazz Pharmaceuticals PLC. KAH is an employee of Ogilvy Health and was a paid consultant to Jazz Pharmaceuticals in connection with performing this research and with the development of this publication. RT receives royalty payments from MyCardio, LLC for CG-based sleep and sleep apnea phenotyping software, has consulted for DeVilbiss-Drive for CPAP software development, and is a consultant for GLG Councils and Jazz Pharmaceuticals. He has a patent for a device regulating CO₂ for central/complex apnea treatment.

Funding

This research was sponsored by Jazz Pharmaceuticals. **Role of the sponsor:** The sponsor authors had a role in the design of the study and had no role in the acquisition and analysis of the data. Jazz Pharmaceuticals also reviewed and edited the manuscript for scientific accuracy.

Authors' contributions

KAH was the principal investigator for the study and takes responsibility for the integrity and content of the manuscript, including the data and analysis. CW, RKB, KD, JO, SB, DLH, KAH, and RT contributed to the conception and design of the study, data interpretation, drafting of the submitted article, and critical revision of the manuscript for important intellectual content. KAH contributed to data acquisition and analysis. CW, RKB, KD, JO, SB, DLH, KAH, and RT provided final approval of the version to be published and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All authors have reviewed and approved this manuscript.

Acknowledgements

Work for this study was performed at Ogilvy Health, Parsippany, New Jersey. The authors thank the research team at Ogilvy Health for research support, including significant contributions from Ashli Sherman, BA, Tara Shannon, BS, and Lauren Johnson, MA. The authors thank Ashli Sherman, BA, and Tabytha Gil, MA, of Ogilvy Health for providing medical writing and editorial support, which was funded by Jazz Pharmaceuticals in accordance with Good Publication Practice (GPP3) guidelines (<http://www.ismpp.org/gpp3>). The authors also thank all participating physicians, patients, and care partners for their participation in this research.

References

1. Sateia MJ. International classification of sleep disorders-third edition: highlights and modifications. *Chest*. 2014;146(5):1387–94.
2. Franklin KA, Lindberg E. Obstructive sleep apnea is a common disorder in the population-a review on the epidemiology of sleep apnea. *J Thorac Dis*. 2015;7(8):1311–22.
3. Pagel JF. Excessive daytime sleepiness. *Am Fam Physician*. 2009;79(5):391–6.
4. Dongol EM, Williams AJ. Residual excessive sleepiness in patients with obstructive sleep apnea on treatment with continuous positive airway pressure. *Curr Opin Pulm Med*. 2016;22(6):589–94.
5. Ward KL, Hillman DR, James A, Bremner AP, Simpson L, Cooper MN, et al. Excessive daytime sleepiness increases the risk of motor vehicle crash in obstructive sleep apnea. *J Clin Sleep Med*. 2013;9(10):1013–21.
6. Lloberes P, Levy G, Descals C, Sampol G, Roca A, Sagales T, et al. Self-reported sleepiness while driving as a risk factor for traffic accidents in patients with obstructive sleep apnoea syndrome and in non-apnoeic snorers. *Respir Med*. 2000;94(10):971–6.
7. Mulgrew AT, Ryan CF, Fleetham JA, Cheema R, Fox N, Koehoorn M, et al. The impact of obstructive sleep apnea and daytime sleepiness on work limitation. *Sleep Med*. 2007;9(1):42–53.
8. Omachi TA, Claman DM, Blanc PD, Eisner MD. Obstructive sleep apnea: a risk factor for work disability. *Sleep*. 2009;32(6):791–8.
9. Silva GE, An MW, Goodwin JL, Shahar E, Redline S, Resnick H, et al. Longitudinal evaluation of sleep-disordered breathing and sleep symptoms with change in quality of life: the Sleep Heart Health Study (SHHS). *Sleep*. 2009;32(8):1049–57.
10. Bixler EO, Vgontzas AN, Lin HM, Calhoun SL, Vela-Bueno A, Kales A. Excessive daytime sleepiness in a general population sample: the role of sleep apnea, age, obesity, diabetes, and depression. *J Clin Endocrinol Metab*. 2005;90(8):4510–5.
11. Gasa M, Tamisier R, Launois SH, Sapene M, Martin F, Stach B, et al. Residual sleepiness in sleep apnea patients treated by continuous positive airway pressure. *J Sleep Res*. 2013;22(4):389–97.
12. Pepin JL, Viot-Blanc V, Escourrou P, Racineux JL, Sapene M, Levy P, et al. Prevalence of residual excessive sleepiness in CPAP-treated sleep apnoea patients: the French multicentre study. *Eur Respir J*. 2009;33(5):1062–7.
13. Lee SA, Han SH, Ryu HU. Anxiety and its relationship to quality of life independent of depression in patients with obstructive sleep apnea. *J Psychosom Res*. 2015;79(1):32–6.
14. Dean B, Aguilar D, Shapiro C, Orr WC, Isserman JA, Calimlim B, et al. Impaired health status, daily functioning, and work productivity in adults with excessive sleepiness. *J Occup Environ Med*. 2010;52(2):144–9.
15. Zhou J, Camacho M, Tang X, Kushida CA. A review of neurocognitive function and obstructive sleep apnea with or without daytime sleepiness. *Sleep Med*. 2016;23:99–108.

16. Redline S, Strauss ME, Adams N, Winters M, Roebuck T, Spry K, et al. Neuropsychological function in mild sleep-disordered breathing. *Sleep*. 1997;20(2):160–7.
17. Werli KS, Otuyama LJ, Bertolucci PH, Rizzi CF, Guilleminault C, Tufik S, et al. Neurocognitive function in patients with residual excessive sleepiness from obstructive sleep apnea: a prospective, controlled study. *Sleep Med*. 2016;26:6–11.
18. Epstein LJ, Kristo D, Strollo PJ Jr, Friedman N, Malhotra A, Patil SP, et al. Clinical guideline for the evaluation, management and long-term care of obstructive sleep apnea in adults. *J Clin Sleep Med*. 2009;5(3):263–76.
19. Calik MW. Treatments for obstructive sleep apnea. *J Clin Outcomes Manag*. 2016;23(4):181–92.
20. Weaver TE, Maislin G, Dinges DF, Bloxham T, George CF, Greenberg H, et al. Relationship between hours of CPAP use and achieving normal levels of sleepiness and daily functioning. *Sleep*. 2007;30(6):711–9.
21. Weaver EM, Kapur V, Yueh B. Polysomnography vs self-reported measures in patients with sleep apnea. *Arch Otolaryngol Head Neck Surg*. 2004;130(4):453–8.
22. Antic NA, Catcheside P, Buchan C, Hensley M, Naughton MT, Rowland S, et al. The effect of CPAP in normalizing daytime sleepiness, quality of life, and neurocognitive function in patients with moderate to severe OSA. *Sleep*. 2011;34(1):111–9.
23. Koutsourelakis I, Perraki E, Economou NT, Dimitrokalli P, Vagiakis E, Roussos C, et al. Predictors of residual sleepiness in adequately treated obstructive sleep apnoea patients. *Eur Respir J*. 2009;34(3):687–93.
24. Weaver EM, Woodson BT, Steward DL. Polysomnography indexes are discordant with quality of life, symptoms, and reaction times in sleep apnea patients. *Otolaryngol Head Neck Surg*. 2005;132(2):255–62.
25. Chapman JL, Serinel Y, Marshall NS, Grunstein RR. Residual daytime sleepiness in obstructive sleep apnea after continuous positive airway pressure optimization: causes and management. *Sleep Med Clin*. 2016;11(3):353–63.
26. Sukhal S, Khalid M, Tulaimat A. Effect of wakefulness-promoting agents on sleepiness in patients with sleep apnea treated with CPAP: A meta-analysis. *J Clin Sleep Med*. 2015;11(10):1179–86.
27. Pack AI, Black JE, Schwartz JR, Matheson JK. Modafinil as adjunct therapy for daytime sleepiness in obstructive sleep apnea. *Am J Respir Crit Care Med*. 2001;164(9):1675–81.
28. Rosenberg R, Doghramji P. Optimal treatment of obstructive sleep apnea and excessive sleepiness. *Adv Ther*. 2009;26(3):295–312.
29. Won C, Hess GP, Acquavella JF, Bron M, Bujanover S, Villa KF. Prevalence of diagnosed obstructive sleep apnea in the United States 2013–2016: results of a retrospective, epidemiological study of a large national claims database [poster]. Annual Meeting of the Academy of Managed Care Pharmacy (AMCP) Nexus; October 22–25, 2018; Orlando, FL.
30. Ohayon MM, Profant J, Gibson SP, Scheckner B, Milesi C. The use of stimulants, sedative-hypnotics, and antidepressants in patients with obstructive sleep apnea in the United States [poster]. Annual

Meeting of the American Neurological Association; October 21–23, 2018; Atlanta, GA.

31. Ohayon MM, Profant J, Gibson SP, Scheckner B, Milesi C. US healthcare claims analysis of obstructive sleep apnea comorbidities and their association with stimulant drug use [poster]. Annual Meeting of the Associated Professional Sleep Societies; June 2–6, 2018; Baltimore, MD.
32. Roth T, Bogan RK, Culpepper L, Doghramji K, Doghramji P, Drake C, et al. Excessive sleepiness: under-recognized and essential marker for sleep/wake disorder management. *Curr Med Res Opin.* 2010;26(Suppl 2):3–24. quiz S5-7.
33. Reuveni H, Tarasiuk A, Wainstock T, Ziv A, Elhayany A, Tal A. Awareness level of obstructive sleep apnea syndrome during routine unstructured interviews of a standardized patient by primary care physicians. *Sleep.* 2004;27(8):1518–25.
34. Chervin RD, Aldrich MS, Pickett R, Guilleminault C. Comparison of the results of the Epworth Sleepiness Scale and the Multiple Sleep Latency Test. *J Psychosom Res.* 1997;42(2):145–55.
35. Pollak CP. Con: modafinil has no role in management of sleep apnea. *Am J Respir Crit Care Med.* 2003;167(2):106-7; discussion 7–8.
36. Engleman HM, Hirst WS, Douglas NJ. Under reporting of sleepiness and driving impairment in patients with sleep apnoea/hypopnoea syndrome. *J Sleep Res.* 1997;6(4):272–5.
37. Hahn SR, Lipton RB, Sheftell FD, Cady RK, Eagan CA, Simons SE, et al. Healthcare provider-patient communication and migraine assessment: results of the American Migraine Communication Study, phase II. *Curr Med Res Opin.* 2008;24(6):1711–8.
38. Ong LM, de Haes JC, Hoos AM, Lammes FB. Doctor-patient communication: a review of the literature. *Soc Sci Med.* 1995;40(7):903–18.
39. Gumperz JJ. On interactional sociolinguistic method. In: Sarangi S, Roberts C, editors. *Talk, Work and Institutional Order: Discourse in Medical, Mediation and Management Settings.* Berlin: Mouton de Gruyter; 1999. pp. 453–72.
40. Hamilton HE. Symptoms and signs in particular: the influence of the medical concern on the shape of physician-patient talk. *Commun Med.* 2004;1(1):59–70.
41. Krist AH, Glasgow RE, Heurtin-Roberts S, Sabo RT, Roby DH, Gorin SN, et al. The impact of behavioral and mental health risk assessments on goal setting in primary care. *Transl Behav Med.* 2016;6(2):212–9.
42. Sharp LK, Lipsky MS. Screening for depression across the lifespan: a review of measures for use in primary care settings. *Am Fam Physician.* 2002;66(6):1001–8.
43. Owen GT, Bruel BM, Schade CM, Eckmann MS, Hustak EC, Engle MP. Evidence-based pain medicine for primary care physicians. *Proc (Bayl Univ Med Cent).* 2018;31(1):37–47.
44. Shavers CA. Intimate partner violence: a guide for primary care providers. *Nurse Pract.* 2013;38(12):39–46.
45. Ferreira M, dos Santos CL, Vieira DN. Detection and intervention strategies by primary health care professionals in suspected elder abuse. *Acta Med Port.* 2015;28(6):687–94.

46. Sheehan OC, Ritchie CS, Fathi R, Garrigues SK, Saliba D, Leff B. Development of quality indicators to address abuse and neglect in home-based primary care and palliative care. *J Am Geriatr Soc.* 2016;64(12):2577–84.

47. Wagenaar DB, Rosenbaum R, Page C, Herman S. Primary care physicians and elder abuse: current attitudes and practices. *J Am Osteopath Assoc.* 2010;110(12):703–11.

48. Lunn RM, Blask DE, Coogan AN, Figueiro MG, Gorman MR, Hall JE, et al. Health consequences of electric lighting practices in the modern world: A report on the National Toxicology Program's workshop on shift work at night, artificial light at night, and circadian disruption. *Sci Total Environ.* 2017;607–608:1073–84.

49. Omobomi O, Quan SF. A requiem for the clinical use of the Epworth Sleepiness Scale. *J Clin Sleep Med.* 2018;14(5):711–2.

50. Rubin DT, Dubinsky MC, Martino S, Hewett KA, Panés J. Communication between physicians and patients with ulcerative colitis: reflections and insights from a qualitative study of in-office patient-physician visits. *Inflamm Bowel Dis.* 2017;23(4):494–501.

Figures

Figure 1

Study design. Abbreviations: EDS, excessive daytime sleepiness; OSA, obstructive sleep apnea.

Figure 2

Average percentage of visit discussion dedicated to key topics. Notes: *Eg, sleep hygiene, weight, and other symptoms. Abbreviations: EDS, excessive daytime sleepiness; OSA, obstructive sleep apnea; PAP, positive airway pressure.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [CarePartnerPostVisitInterviewDiscussionGuide.pdf](#)
- [PatientPostVisitInterviewDiscussionGuide.pdf](#)
- [PatientPostVisitInterviewQuestionnaire.pdf](#)
- [PhysicianPostVisitInterviewDiscussionGuide.pdf](#)

- [PhysicianPostVisitInterviewQuestionnaire.pdf](#)