



Patient Insights on Integrating Sleep Apnea Testing into Routine Stroke and TIA Care

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Abstract

AHA/ASA guidelines recommend patients with ischemic stroke or transient ischemic attack (TIA) be considered for obstructive sleep apnea (OSA) evaluation, given the high prevalence of OSA and improved outcomes for cerebrovascular disease when OSA is treated. However, OSA testing has not been incorporated into routine cerebrovascular management. We interviewed 30 patients hospitalized for acute stroke/TIA at six Veterans Affairs facilities participating in a stepped-wedge implementation trial to improve timely OSA testing after stroke/TIA. Thematic analysis of semi-structured interviews explored the experiences of care received, sleep testing, and education about the association between OSA and cerebrovascular disease. Patients perceived OSA testing as an integrated component of stroke/TIA care and reported few barriers to OSA testing. Patients had limited recall of details concerning sleep testing during hospitalization and education about OSA but expressed preferences about the timing, setting, and importance of caregiver participation. Patients expressed high levels of acceptance of sleep testing as a routine part of cerebrovascular care. Facilities could use these results to implement guideline-concordant screening for OSA, post-stroke/TIA.

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Keywords

qualitative, veterans, ischemic stroke, transient ischemic attack, cerebrovascular disease, obstructive sleep apnea, patient experience

Introduction

Obstructive sleep apnea (OSA) is recognized as a modifiable cerebrovascular risk factor that is present in half to two-thirds of ischemic stroke and transient ischemic attack (TIA) patients.^{1,2} The 2021 American Heart Association/American Stroke Association (AHA/ASA) guideline for the prevention of cerebrovascular disease among those with a prior ischemic stroke or TIA suggests that OSA testing be considered for patients with a cerebrovascular event, given the high prevalence of OSA within this patient population and evidence that treatment of OSA can improve outcomes for cerebrovascular disease patients.³ Despite these guideline recommendations and studies suggesting that recurrent stroke events are reduced with earlier identification and treatment for OSA among stroke and TIA patients,⁴ OSA testing rates are low. In one study conducted across the US Department of Veteran Affairs, 6% within one year of a cerebrovascular event.⁵

Potential explanations for low rates of OSA testing post-stroke/TIA have largely focused on the healthcare provider and system levels,^{6,7} including decreased awareness of the importance of OSA among physicians and patients with stroke/TIA, lack of access to acute sleep testing (especially formal, sleep laboratory-based polysomnography), uncertainties around the timing of sleep testing following acute stroke/TIA or the benefits from OSA treatment, and concerns about patient acceptability of OSA testing treatment.⁸ Most quality improvement (QI) initiatives in cerebrovascular care target providers and healthcare systems, rather than the patients who stand to benefit most from improved care delivery. In comparison, little is known about potential patient-level barriers to AHA/ASA guideline implementation. Given that qualitative investigations on stroke care delivery have the potential to shed light on how patients experience new treatment approaches, we conducted an interview-based study. Recognizing this gap in the literature, we sought to understand whether patient-level barriers exist among stroke/TIA patients admitted to medical centers that were actively implementing acute sleep testing services to improve the timeliness of OSA testing following an index cerebrovascular event. The purpose of the study is to describe patient experiences of receiving care and testing for sleep apnea following a stroke/TIA.

Methods

Semi-structured interviews were conducted in the context of the “Addressing Sleep Apnea Post-Stroke/TIA” (ASAP) facility-level, hybrid Type I, stepped-wedge implementation trial, where six diverse Veteran Affairs Medical Centers (VAMCs) conducted QI initiatives to improve the timeliness and rates of OSA testing and treatment for patients admitted

with acute ischemic stroke or TIA (<https://www.clinicaltrials.gov; NCT04322162>).⁹ The QI initiatives involved providing acute inpatient sleep services, enhancing care coordination across services (eg, hospital medicine, neurology, sleep), and providing education to providers, patients, and care partners. This qualitative study contributes a set of patient perspectives to the broader study goal of improving inpatient sleep care. Human subjects approval was obtained through the VA Central Institutional Review Board (IRB). Reporting was guided by the COREQ¹⁰ (see Supplementary Appendix A).

Veterans admitted to ASAP facilities were identified by local site investigators. For the purposes of this evaluation, we defined participants as those eligible for an OSA diagnostic test ($N=358$). Letters were sent to each of these Veterans, followed consecutively by 180 phone call invitations. Of those, 134 could not be reached; 12 declined. We stopped recruitment once we obtained a purposeful sample of five interviews from each of the six sites ($n=30$). Purposeful sampling is appropriate where individuals are selected for their experience with a given phenomenon as well as have specific interests and availability.¹¹

We conducted semi-structured interviews (Supplementary Appendix B) to ask Veterans about their healthcare experiences during the hospitalization and post-discharge periods. A semi-structured interview guide included questions to explore the Veterans’ understanding of the association between OSA and ischemic stroke/TIA; experience getting a sleep test (if offered), including testing itself, education about OSA, barriers and facilitators to getting tested; and where applicable, being treated for OSA. Interviews were conducted via Microsoft Teams and recorded with the subjects’ permission. A subset of participants had caregivers present during interviews and relied on these caregivers to help recall details regarding their medical visit.

Analysis involved a codebook reliability approach to qualitative thematic analysis.^{12,13} We chose this approach to offer a structured way to detect and interpret cross-cutting themes and patterns. Thematic analysis occurred in two phases. In the first phase, we developed a codebook that served as a template for coding of the data.^{4,14} Four members of the research team independently coded two interviews and used an iterative consensus-building process to refine existing codes and generate additional codes. Once the codebook was finalized, four team members (KMS, AS, LB, JJS) independently coded the remaining transcripts. Each transcript was coded by two team members. For this analysis, we focused on two frequently used codes: sleep testing, and patient experience. Four team members annotated the coding output from the two codes (two members on each code). The research team met to discuss emergent themes. NVivo12 was used for the qualitative data coding and analysis.¹⁵ Chart review by research personnel was conducted to collect patient data, including whether and when sleep testing was performed, results of completed sleep testing, stroke severity, and

discharge disposition. Electronic health record data were obtained from the VA Corporate Data Warehouse to describe patient demographics, comorbidity, and hospital length of stay. Chart review was conducted to collect data not routinely available (eg, reasons why sleep testing was not performed, National Institutes of Health Stroke Scale (NIHSS) score). Descriptive statistics were used to characterize patient-level data.

Results

Patient Characteristics

Table 1 describes demographic and clinical information about the 30 interviewees. Most patients were male (86.7%), diagnosed with ischemic stroke (80%), and had a median hospital stay of 3.4 days. Seventy percent (21/30) of the patients completed OSA testing. When testing was completed, 57.1% (12/21) of patients were tested during the index hospitalization. Overall prevalence of sleep apnea was 81% (17/21) with moderate to severe OSA in 47.6% (10/19 completed studies).

Thematic Analysis

Analysis of interviews with Veteran patients revealed three cross-cutting themes and three subthemes. Taken together, these themes illustrate that although there are distinct patient pathways and experiences, sleep testing is generally accepted by patients as an integrated part of inpatient TIA/stroke care. Themes, subthemes, and exemplar quotes are provided in Table 2.

Theme 1: Patients perceived sleep testing as an integrated component of stroke/TIA care but expressed varying preferences about where sleep testing should occur.

Patient perceptions of sleep testing were shaped by whether they were tested inpatient or post-discharge. Patients tested in the hospital spoke about their experience being so integrated in their care management that some were not aware they had been tested until they were informed of the results of their sleep study. Lack of awareness stemmed from not recognizing when sleep testing was being done or confusing the sleep test with another test (eg, heart monitor). Many Veterans appreciated being tested while in the hospital and receiving a timely diagnosis of OSA. It should be noted that all 21 patients who underwent inpatient sleep testing had testing with an ambulatory sleep apnea monitor while sleeping in their hospital bed.

For patients who had difficulty sleeping in the hospital, inpatient testing was not successful. Reasons for not sleeping were related to hospital environment, including noisy roommates, frequent interruptions from hospital staff, and being uncomfortable from other attached wires and apparatus. For these patients, testing was either attempted but not successful, or patients chose to have the test completed post-discharge.

Theme 2: Limited recall of details of hospitalization, education of sleep testing, OSA, and connection to stroke/TIA.

Recall was poor for most patients interviewed. Details were only remembered if it was a standout positive or negative experience in their care management. Patients attributed poor recall to the amount of time between the hospitalization

Table 1. Characteristics of Ischemic Stroke and TIA Interview Subjects.

Characteristic ^a	
Age, years	
Mean (SD)	66.0 (11.7)
Median (IQR)	66 (38, 87)
Men, n (%)	26 (86.7)
Race, n (%)	
White	15 (50.0)
Black	11 (36.7)
Other	2 (6.7)
Unknown	2 (6.7)
Cerebrovascular event type	
Ischemic stroke	24 (80.0)
TIA	6 (20.0)
Stroke severity (NIHSS)	
Mean (SD)	3.1 (2.9)
Median (IQR)	2 (0, 9)
Charlson, median (IQR)	1 (0, 8)
OSA testing status (n, %)	
Test performed in the hospital	12 (40.0)
Test performed after discharge	9 (30.0)
Not tested	9 (30.0)
Reason(s) for patients not having a completed sleep study (n = 9) ^b	
Equipment failure	3
Patient became comfort care during Hospitalization	1
Other (88)	2
I Received a sleep study within a week prior to stroke hospitalization.	
I Inconclusive result after first home sleep test, patient scheduled for in-lab study after hospitalization.	
Unknown 99	6
Severity of OSA based on sleep study (n = 21), n (%)	
No OSA (AHI 0-4)	2 (9.5)
Mild (AHI 5-14)	7 (33.3)
Moderate (AHI 15-30)	5 (23.8)
Severe (AHI > 30)	5 (23.8)
Inconclusive study	2 (9.5)
Discharge disposition, n (%)	
Home	19 (63.3)
Rehabilitation	5 (16.7)
NH/LTC	3 (10.0)
Missing	3 (10.0)
Length of hospitalization, days (median, IQR)	3.4 (1, 46.6)
Days from discharge to interview (median)	374.5
Interviews which also involved a caregiver, n (%)	2 (6.7)

Abbreviations: TIA, transient ischemic attack; OSA, obstructive sleep apnea; NIHSS, National Institutes of Health Stroke Scale; NH/LTC, nursing home/long-term care.

^aData sources: Chart review was conducted to obtain NIHSS, sleep study testing status, reasons for patients not having a completed sleep study, severity of OSA based on sleep study, OSA treatment status, and discharge disposition, as these data elements are not routinely available in administrative data. All other data are from VA administrative data.

^bReasons for not completing a sleep test are not mutually exclusive.

Table 2. Themes, Subthemes, and Quotes Related to Sleep Testing for Ischemic Stroke and TIA Patients.

Theme 1: Patients perceive sleep testing as an integrated component of stroke/TIA care, though express preferences about where sleep testing occurs.

Subtheme	Illustrative quotations
1.1 Patients perceive sleep testing as part of stroke/TIA evaluation protocol.	Well, the doctors must have determined to add that test based upon the fact that they determined that I had a small stroke. So, I was just following orders. (P24)
1.2 Patients appreciate timely testing and diagnosis.	It was very helpful, because like I said, it opened up my eyes to when I'm sleeping. I didn't know anything about me not breathing and stuff. (P21)
1.3 Sleep testing is not disruptive and is sometimes confused with cardiac monitoring.	They gave me some medicine to go to sleep that by the time that they came, I was so tired from so many other tests, that when they put it on, I was asleep... The test wasn't hard, but me myself, I had just had tests done, and he just came in and put it on. He didn't say anything. So I turned on over and went to sleep. (P11) [It] went over my heart. It was taped on, to wear for like five days or six days, or something and I brought that back, and that was to record my, my sleep, I think. (P28)
1.4 Some patients report that the hospital environment can be a barrier to inpatient sleep testing.	They put me in a four bedroom, and there were two guys in there. I was going crazy all night long. (P27) I knew I wouldn't feel comfortable with that, so I knew I wouldn't get to sleep with that. And I just—because I have trouble sleeping period; but I just knew I'd be more comfortable at home than away from home to try to sleep. I've never been in a hospital where they let you sleep. (P21)
Theme 2: Limited recall of details of hospitalization, education of sleep testing, OSA, and connection to stroke/TIA.	
2.1 Patients report difficulty with recall because of complexity of managing multiple conditions.	I'm not remembering it that well... Since then, I've had COVID and I was hospitalized at the VA, and it seemed that a lot of the things that happened to me with my stroke were very similar, replicated when I had COVID... I had a brain tumor, non-malignant. (P28)
2.2 Patients report limited recall as a symptom post-stroke.	My mind is not there. That's one thing that you do is that you lose a lot of your mind. You know. You're just thankful that you're still alive and talk about things. You know, but you don't quite remember anything at all. You know. Your mind is blank. (P20)
2.3 Patients report limited recall due to level of activity in hospital environment.	I probably did. To be honest with you, there were so many people. They were checking me for my throat. You know. The way that I chew. The way that I swallow. My hearing. So I saw a lot of different doctors, and one of them could have been a neurologist. I don't know. (P23)
2.4 Patients report limited recall and/or retention of education received in the hospital.	Somebody came by at 2:00 or 3:00 in the morning with the machine, and you know ... quickly taught me how to use it, but you know. You can't be taught in one little visit like that. (P24) Well, I think the only thing when I was in the hospital they talked to me about the stroke. No one said anything about sleep apnea at that time. (P3)
Theme 3: importance of caregiver support and education from healthcare providers.	
3.1 Patients rely on 1-2 care partners to recall details of hospital stay and follow-up	I don't remember... Did I get that CPAP machine before I left the hospital? Yeah. [My wife] says that she thinks that they gave it to me to bring home with me. [My son] will be here and he might remember some of these things. (P4)
3.2 Patients explicitly defer responsibility for communication to care partners	You should be asking my daughter these questions. She's the one that paid attention to everything ... My [daughter] was always there. She had questions for them. (P8)

Abbreviations: TIA, transient ischemic attack; OSA, obstructive sleep apnea.

and the interview, complexity of managing several medical conditions, the level of activity in the hospital environment, or a post-stroke symptom. Although they did not recall that education had been offered, it did not appear to influence their decision to be tested if they thought it was important to their physician/health care provider.

Theme 3: Importance of caregiver support and education from healthcare providers.

Most patients' understanding of details of experiencing a cerebrovascular event, hospitalization, and follow-up were dependent on recall from their caregivers. Several interviews included caregivers, which patients explained played a role in transport to hospital and in sharing key details about medical history with health providers during their inpatient stay. Patients explicitly suggested that information about testing and follow-up be shared with caregivers due to their active role in providing direct care during discharge and recovery periods.

Discussion

Ischemic stroke and TIA patients reported few barriers to being tested for OSA, either during the hospitalization for their cerebrovascular event or soon thereafter. An overwhelming majority of patients completed a sleep study. The most common reason for not completing a sleep study was related to equipment failure. Patients largely viewed testing as well-integrated into their overall care experience. While some noted incomplete recall of specific processes and educational content and would defer to care partners regarding details of the hospitalization and post-discharge periods, they recognized that they received testing because of their cerebrovascular event. Patients expressed varying preferences regarding being tested during the hospitalization period or after discharge, typically based on whether they were having trouble sleeping as an inpatient.

Our findings contribute to understanding cerebrovascular disease patients' experiences receiving OSA evaluation and management. Specifically, given overall patient acceptance of sleep testing, timely screening of OSA among stroke and TIA patients appears to be feasible without placing undue burden on patients. Patients stressed the importance of caregiver participation in education and treatment by explicitly describing how caregivers record medical history and participate in in-home adherence using medical devices like CPAP machines.

Although sleep medicine has historically been an outpatient service, these results support the implementation of acute sleep services to diagnose and treat sleep apnea in the inpatient setting. Care teams in the ASAP trial principally used home sleep testing equipment; the ongoing Sleep SMART (NCT03812653) study is similarly using the home testing equipment to assess for OSA during the first night of admission for stroke and high-risk TIA patients.¹⁶ Dependent on the results of these two randomized controlled trials, sleep testing performed during the index hospitalization may become a standard part of acute cerebrovascular event evaluation and treatment.

The findings of incomplete recall are similar to other studies in the stroke literature.^{17,18} For example, Sørensen and colleagues found that stroke patients' experience of acute hospitalization is an "overwhelming and blurred experience" where there is often a clear memory of the stroke onset but details during hospitalization of management are absent or limited.¹⁹ We did not set out to explore patient recall of their care or retention of education, but this unanticipated finding highlights a limitation to the study as well as considerations for future patient education efforts. Limited recall led to interviews with less detail in some cases and may have been an inaccurate account of their care management. The implications of poor recall led to questions for future research such as: how much education is needed during hospitalization for patients to understand the provided information enough to make informed decisions and does retention of information affect compliance with follow-up post-hospitalization?

Some study limitations to note include predominantly male sample and the amount of time between hospitalization and interview may have contributed to poor recall. More than two-thirds of patients interviewed received sleep testing which leads to underrepresentation of patients who did not receive testing and likely represents a bias in respondent rates between those who did and did not get tested. Patients in the study had mild stroke events, which leaves open the possibility that testing is less feasible in patients with more significant deficits (ie, with higher NIHSS scores). Also, patients were admitted to facilities actively engaging in quality improvement initiatives to improve the timeliness of OSA testing. We focused on patients' perspectives on OSA testing rather than treatment. During the course of the ASAP project, sleep testing became more challenging because of both the COVID-19 pandemic²⁰ and the global recall of Philips Respironics continuous positive airway pressure (CPAP) devices. While the public health emergency has ended and the CPAP supply chain has been restored, we were unable to meaningfully investigate OSA treatment. Finally, follow-up phone calls invitations were offered to subjects based on consecutive, rather than random sampling; this may possibly have introduced bias into the results.

Based on patient feedback and research team reflection, the following recommendations are provided that may improve patient retention of education and increase shared decision-making among patients, caregivers, and providers. First, healthcare providers should be aware of the evidence base related to OSA and cerebrovascular disease and consider including OSA testing as part of a bundle of testing offered to patients (eg, stroke order sets and clinical pathways). Second, sleep testing can feasibly be accomplished, both during the hospitalization period or soon after discharge, and should consider patient and caregiver preference for timing of study. Third, caregivers should be deliberately involved in education and medical decision making.^{21,22}

Conclusion

In conclusion, the high degree of patient acceptance of OSA testing supports the implementation of acute sleep services for the guideline-concordant testing for sleep apnea among patients with acute ischemic stroke and TIA. Future work should include tailoring educational delivery to patients and caregivers regarding the results of studies, including sleep studies, conducted during the hospitalization period related to one's cerebrovascular event.

Abbreviations

TIA	transient ischemic attack
OSA	obstructive sleep apnea
AHA/ASA	American Heart Association/American Stroke Association
QI	quality improvement
ASAP	addressing sleep apnea post-stroke/TIA

VAMCs	Veteran Affairs Medical Centers
IRB	institutional review board
NIHSS	National Institutes of Health Stroke Scale
CPAP	continuous positive airway pressure
NH/LTC	nursing home/long-term care

Declaration of Conflicting Interests

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Ethical Approval

This study received human subjects (institutional review board [IRB]) through the VA Central IRB. The study is registered under the VA Central IRB with identifier 19-12. VA research and development (R&D) committee approvals were received by that of both coordinating centers (VA Connecticut Healthcare System and Richard L. Roudebush VAMC) and all six participating sites (Minneapolis VA Medical Center, South Texas Veterans Health Care System, VA North Texas Health Care System, Birmingham VA Medical Center, VA Atlanta Health Care, and VA Tennessee Valley Healthcare).



Informed Consent

Qualitative interviews were completed with 30 Veteran participants. Verbal consent was obtained for each participant.

Statement of Human and Animal Rights

Verbal informed consent was obtained from the patients for their anonymized information to be published in this article.

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Supplemental Material

Supplemental material for this article is available online.

References

1. Bravata DM, Concato J, Fried T, et al. Continuous positive airway pressure: evaluation of a novel therapy for patients with acute ischemic stroke. *Sleep*. 2011;34(9):1271-7.
2. Kernan WN, Ovbiagele B, Black HR, et al. Guidelines for the prevention of stroke in patients with stroke and transient

ischemic attack: a guideline for healthcare professionals from the American Heart Association/American Stroke Association. *Stroke*. 2014;45(7):2160-236.

3. Kleindorfer DO, Towfighi A, Chaturvedi S, et al. 2021 Guideline for the prevention of stroke in patients with stroke and transient ischemic attack: a guideline from the American Heart Association/American Stroke Association. *Stroke*. 2021;52(7):e364-467. doi:10.1161/STR.0000000000000375
4. Bravata DM, Sico J, Vaz Fragoso CA, et al. Diagnosing and treating sleep apnea in patients with acute cerebrovascular disease. *J Am Heart Assoc*. 2018;7(16):e008841.
5. Koo BB, Sico JJ, Myers LJ, et al. Polysomnography utilization in veterans presenting acutely with ischemic stroke or transient ischemic attack. *Cerebrovasc Dis*. 2019;48(3-6):179-83.
6. Killkeny MF, Bravata DM. Quality improvement. *Stroke*. 2021;52(5):1866-70.
7. Lowther HJ, Harrison J, Hill JE, et al. The effectiveness of quality improvement collaboratives in improving stroke care and the facilitators and barriers to their implementation: a systematic review. *Implement Sci*. 2021;16(1):95.
8. Khot SP, Morgenstern LB. Sleep and stroke. *Stroke*. 2019;50(6):1612-7.
9. Sico JJB, Bravata DM. Addressing Sleep Apnea Post-Stroke/TIA (ASAP). 2023. https://www.hsrdr.research.va.gov/research/abstracts.cfm?Project_ID=2141707378
10. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *Int J Qual Health Care*. 2007;19(6):349-57.
11. Palinkas LA, Horwitz SM, Green CA, Wisdom JP, Duan N, Hoagwood K. Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. *Adm Policy Mental Health*. 2015;42(5):533-44.
12. Boyatzis RE. *Transforming qualitative information: thematic analysis and code development*. Sage Publications; 1998.
13. Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol*. 2006;3(2):77-101.
14. Braun V, Clarke V. Toward good practice in thematic analysis: avoiding common problems and becoming a knowing researcher. *Int J Transgender Health*. 2023;24(1):1-6.
15. QSR International. NVivo Qualitative Data Analysis Software. 12th ed. <https://qsrinternational.com/nvivo/nvivo-products/1999>
16. Brown DL, Durkalski V, Durmer JS, et al. Sleep for stroke management and recovery trial (sleep SMART): rationale and methods. *Int J Stroke*. 2020;15(8):923-9.
17. Kirkevold M. The unfolding illness trajectory of stroke. *Disabil Rehabil*. 2002;24(17):887-98.
18. McKeivitt C, Redfern J, Mold F, Wolfe C. Qualitative studies of stroke. *Stroke*. 2004;35(6):1499-505.
19. Sørensen KE, Dreyer P, Rasmussen M, Simonsen CZ, Andersen G. Experiences and needs of patients on the endovascular therapy pathway after acute ischaemic stroke: being helpless and next to yourself. *Nurs Open*. 2020;7(1):299-306.
20. Sico JJ, Koo BB, Perkins AJ, et al. Impact of the coronavirus disease-2019 pandemic on veterans health administration sleep services. *SAGE Open Med*. 2023;11:20503121231169388.

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21. Lin S, Wang C, Wang Q, et al. The experience of stroke survivors and caregivers during hospital-to-home transitional care: a qualitative longitudinal study. *Int J Nurs Stud.* 2022;130:104213.
 22. Muhrodji P, Wicaksono HDA, Satiti S, Trisnantoro L, Setyopranoto I, Vidyanti AN. Roles and problems of stroke caregivers: a qualitative study in Yogyakarta, Indonesia. *F1000Res.* 2021;10:380.