Survey-Based Assessment of Therapy Use Among Patients Lost to Follow-Up After Hypoglossal Nerve Stimulation

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Introduction

- Obstructive sleep apnea (OSA) affects roughly 17% of women and 34% of men in the U.S. Untreated OSA drives cardiovascular, metabolic and neurocognitive morbidity[1]
- Hypoglossal nerve stimulation (HGNS) is an established treatment option in patients who cannot tolerate CPAP[2]
- HGNS requires longitudinal follow up for activation, titration, and troubleshooting
- Patients that disengage from follow-up, leave their OSA management status unknown, potentially masking satisfied autonomous users or silent therapy discontinuation

OBJECTIVE

Characterize **current use status, adherence, satisfaction, objective efficacy and reason for disengagement** from care among HGNS recipients lost to follow up

Methods

- **Study design:** single-institution, retrospective cohort with a prospective telephone survey
- **Population:** Adults (>18 yr) undergoing HGNS implantation 2014-2024; excluded documented death, explantation, or known relocation (n=30).
- **LTFU Definition:** ≥548 days (1.5 yr) since last HGNS-related encounter
- **Sampling**: stratified random sampling by implant era (2014-2019, 2020-2021, 2022-2024) to account for device technology and COVID-19 effects
- Out of 608 implants completed during this time, 288 were considered lost to follow up; 110 LTFU patients selected for outreach.
- **Survey** (Dec 2025-Jan 2026): assessed current use, adherence (hrs/week), device satisfaction (0-10), alternative OSA therapy, and reasons for discontinuation / LTFU

Results

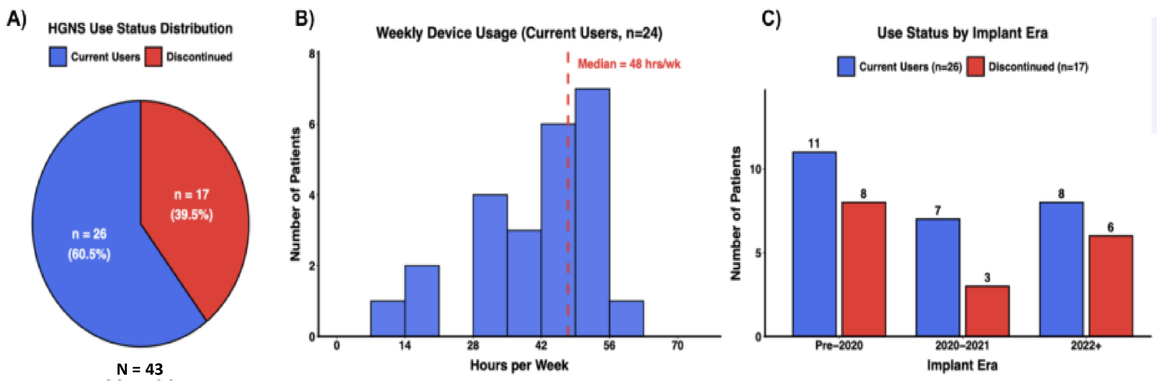


Figure 1: Self-reported HGNS usage among survey respondents. A) Distribution of current HGNS use status among all survey respondents (N=43). (B) Histogram of self-reported weekly device usage among current users with available data (n=24); dashed line indicates median. (C) Number of current users and discontinued patients by implant era.

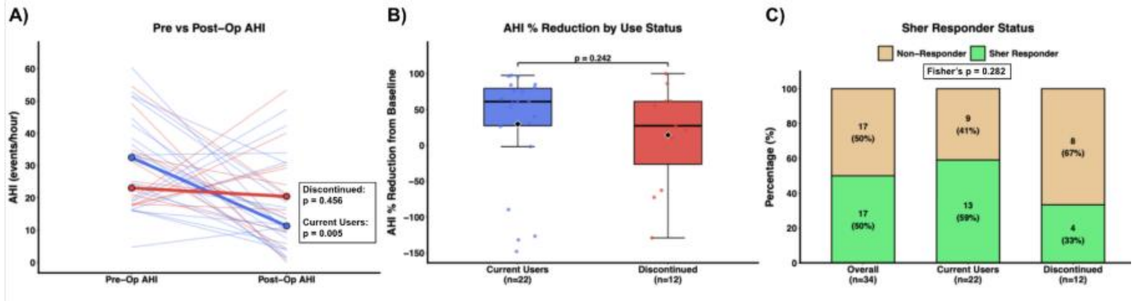


Figure 2: Pre- vs. Post-operative AHI Change and Sher Responder Analysis by HGNS Use Status . (A) Individual and median pre- and post-operative AHI by use status; (B) AHI percent reduction by use status. (C) Sher responder status by use status. Only respondents with paired AHI data were included (n=34).

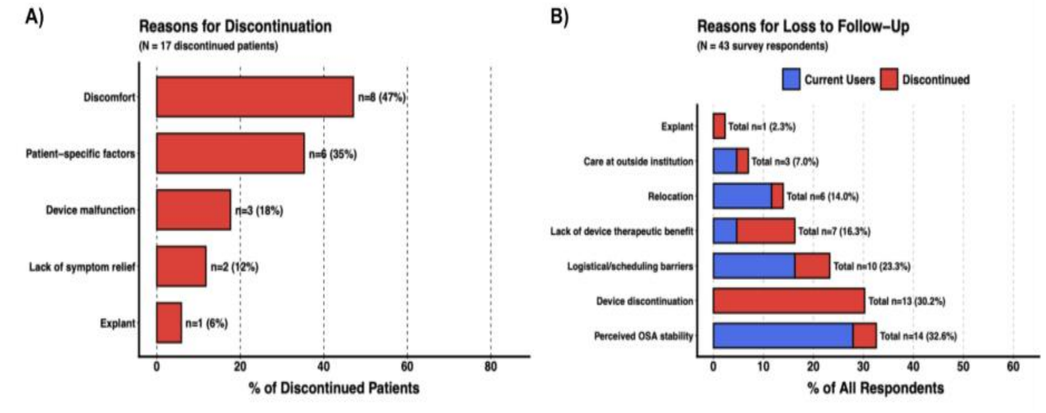


Figure 3: Reasons for HGNS Discontinuation and Loss to Follow-Up Among Survey Respondents. A) Patient-reported reasons for HGNS discontinuation among patients who discontinued therapy (n=17). (B) Patient-reported reasons for loss to follow-up among survey respondents (N=43), stratified by current use status. Multiple responses were permitted.

COHORT SNAPSHOT (n=43)

61.5 yr	62.8%	93.0%	27.7	27.2	5.8 yr
MEAN AGE	MALE	WHITE	MEAN BMI	MEDIAN PRE-OP AHI	MEAN TIME SINCE IMPLANT

ADHERENCE & SATISFACTION

60.5%

REPORTED CONTINUE HGNS USE at mean 5.8 years since implant

- 6.6 hours per night
- **Users more satisfied than discontinuers** (p=0.010)
- Greater use correlated with satisfaction (r=0.46, p=0.022).

- **Therapy status:** 26 (60.5%) continued HGNS; 17 (39.5%) discontinued.
- **Untreated gap**: Among 17 discontinuers, 13 (76.5%) received no alternative OSA therapy.
- **Reasons for Discontinuation:**
  - **Discomfort/hardware** (47.1%)
  - **Patient-specific factors** (35.3%)
  - **Malfunction** (17.6%).
- **Objective efficacy** (paired AHI, n=34): **Users reduced AHI** (32.5→11.3, p=0.003); discontinuers did not (23.1→20.5, p = 0.470). Sher responders 59.1% vs 33.3% (p=0.282, underpowered).

Discussion

- **LTFU is not uniformly treatment failure**: most remained active users with high satisfaction and sustained use
- However, about 40% discontinued and 76.5% of discontinuers had no alternative therapy, revealing **an unrecognized cohort of LTFU patients** remaining untreated
- **Implications**: Structured follow-up, risk-stratified surveillance, proactive outreach, and remote monitoring may re-engage at-risk patients

References

1. Gottlieb DJ, Punjabi NM. Diagnosis and Management of Obstructive Sleep Apnea: A Review. JAMA. 2020;323(14):1389–1400. doi:10.1001/jama.2020.3514
2. Olson MD, Junna MR. Hypoglossal Nerve Stimulation Therapy for the Treatment of Obstructive Sleep Apnea. *Neurotherapeutics*. Jan 2021;18(1):91–99. doi:10.1007/s13311-021-01012-x