

# Development of the Snoring and Sleep Apnea Morbidity Handicap Inventory

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## Abstract:

Snoring and [sleep apnea](#) cause significant morbidity and affect quality of life. Loud snoring can be socially disruptive leading to sleepless nights for the patient and bed partner, an inability to share the same bedroom, and may cause marital discord. Snorers may be ridiculed and unable to share a hotel room with family or business associates. OSAS disrupts sleep architecture leading to morning fatigue, excessive daytime sleepiness, irritability, and impaired daytime performance and may cause morning headaches, a dry or sore throat and even impotence. While PSG data measure objective disease severity, there are no measures to assess self perceived morbidity.

## Materials and Methods

Using the Dizziness Handicap Inventory by Newman and Jacobson<sup>1</sup> as a model, we have developed the Snoring and Sleep Apnea Morbidity Handicap Inventory (SSAMHI). This questionnaire is an attempt to quantify the physical, functional and emotional morbidity caused by snoring and sleep apnea, so results of treatment and quality of life may be assessed.

### *Investigation 1:*

A battery of 34 questions was developed to include common complaints of patients with snoring and OSAS (sleepiness, headaches, workrelated difficulties, driving, relationships, emotions and sexual performance). Each question represented a physical, functional, or emotional morbidity. The inventory was presented to 105 consecutive new patients being evaluated for snoring or sleep apnea. For statistical analysis, the four answers (never, occasionally, frequently or continuously) were assigned a numerical value (0,1,2,or 3). The Cronbach alpha coefficient was calculated for each item as a measure of internal consistency or reliability. Item to scale correlations for each of the 34 items was calculated. Any item with a correlation of less than 0.4 was deleted. The overall [Cronbach's alpha](#) was then recalculated

along with the item to scale correlations. This process was repeated until all remaining items had correlations greater than 0.40. The final Cronbach's alpha for the 22 remaining items was 0.89.

*Investigation 2:*

The revised 22 item SSAMHI was administered to 50 consecutive new patients. A second copy of the questionnaire was sent to these patients two weeks later and thirtysix were returned. Numerical values for each question were added to obtain an overall score. The initial and repeat questionnaires were compared for test-retest reliability. A regression equation and correlation coefficient, relating initial test scores to retest scores was performed and an intraclass correlation and description of differences were performed. This assessment found a strong linear relationship between the initial and retest scores.

*Investigation 3:*

The 22 question SSAMHI was similarly administered to 97 consecutive new patients. The overall questionnaire scores were compared to the AI, RDI and lowest oxygen saturation (LSAT) on pretreatment PSG's available in 69 patients. Pearson's correlation with the total score was obtained for each of the three variables, as well as correlation analysis and receiver operating characteristic (ROC) curves. These evaluations found that the overall SSAMHI score has no predictive value for these objective measures of sleep apnea.

**Conclusions**

The SSAMHI is a measure of self perceived handicap in patients with snoring or OSAS. The final version has a high internal consistency and test-retest reliability. The overall SSAMHI score did not correlate with AI, RDI, or LSAT. We are investigating the SSAMHI further for correlations with sleepiness questionnaires, PSG measures of sleep architecture disruption, and objective measurements of snoring. The scale may be applicable to measure self perceived treatment outcome.

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1. Jacobson GP, Newman CW. (1990) The development of the dizziness handicap inventory. Arch Otol 116:4247.

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