

ARIC Manuscript Proposal # 884  
SHHS Manuscript Proposal # 36

Full Title: Measures of Cognitive Function in Persons with Varying Degrees of Sleep-Disordered Breathing: The Sleep Heart Health Study

Abbreviated Title: Cognitive Function and Sleep-Disordered Breathing

Lead Author: Lori Boland

Timeline: Analysis to begin after final closure of the data base

Rationale:

Epidemiological literature suggests that persons with sleep apnea often have impaired cognitive function. Both the cumulative effect of chronic nocturnal hypoxemia and the decreased vigilance which accompanies excessive daytime somnolence have been implicated in the cognitive dysfunction of persons with sleep-disordered breathing. In 1986, a study of 26 patients with sleep apnea revealed that those with more severe nocturnal hypoxemia had poorer cognitive functioning than apneics with lesser degrees of hypoxemia (2). In a more recent study, breathing and hypoxia parameters were associated with reaction times and components of information processing in 34 subjects presenting with symptoms of sleep apnea (3). Two other studies evaluated neuropsychological functioning in sleep apneics before and after they were treated, but one study reported the improvement was seen only in nonhypoxemic patients<sup>4</sup> and the other reported CPAP treatment failed to improve short-term memory (5). Only a handful of studies have employed control groups to contrast the cognitive function of apneics with that of subjects unaffected by sleep disordered breathing (6, 7, 8), and most studies to date have had small sample sizez (less than 60) and predominantly included male subjects. Approximately 1,000 SHHS participants (500 females) who participated in the Atherosclerosis Risk in Communities (ARIC) Study had measures of cognitive function taken within 1-2 years of their overnight polysomnography. A large-scale, population based, cross-sectional report of the distribution of cognitive function across varying degrees of sleep disordered breathing would make a substantial contribution to the existing literature.

Hypotheses:

The degree of sleep-disordered breathing, as measured by overnight polysomnography and indicated by the apnea-hypopnea index (AHI), is inversely correlated with measures of cognitive function.

Data:

Baseline demographic data and available Visit 4 cognitive function data.

Type of Study:

Cross-sectional analysis of data from SHHS sites participating in the Atherosclerosis Risk in Communities (ARIC) Study. (Minnesota and Hagerstown)

Type of Publication:  
Journal Article

Target journal: *Sleep or Gerontology*

Analysis Responsibility: Local; University of Minnesota, Division of Epidemiology

Brief Analysis Plan:

Independent variables: apnea-hypopnea index, hypopnea index

Dependent variables: Scores from 3 tests of cognitive function that were administered during the 4<sup>th</sup> ARIC clinic exam<sup>1</sup> (1996-1998, within 1-2 years of SHHS PSG): the Delayed Word Recall Test, the Digit Symbol Subtest of the Wechsler Adult Intelligence Scale-Revised (WAIS-R), and the Word Fluency Test

Covariates:

- SHHS: age, gender, Epworth Sleepiness Scale score, snoring status
- ARIC: years of education, body-mass index, alcohol drinking, smoking status

Stratification: by gender

Primary statistical method: multiple linear regression

Summary Section:

The results of this analysis will greatly enhance the existing literature on sleep disordered breathing and cognitive function, since no large, population based data have existed to date. This report will provide a first glimpse at the distribution of cognitive function across all levels of sleep disordered breathing.

References:

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