Polysomnography Performed in the Unattended Home Versus the Attended Laboratory Setting—Sleep Heart Health Study Methodology

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Study Objective: To compare polysomnographic recordings obtained in the home and laboratory setting.

Design and Setting: Multicenter study comparing unsupervised polysomnography performed in the participant's home with polysomnography supervised at an academic sleep disorders center, using a randomized sequence of study setting. Sleep Heart Health Study (SHHS) standardized polysomnographic recording and scoring techniques were used for both settings.

Participants: 64 of 76 non-SHHS participants recruited from 7 SHHS field sites who had both a laboratory and home polysomnogram meeting acceptable quality criteria.

Measurements and Results: Median sleep duration was greater in the home than in the laboratory (375 vs 318 minutes, respectively, P < .0001) as was sleep efficiency (86% vs 82%, respectively, P < .0024). Very small, but significant increases in percentage of rapid eye movement sleep and decreases in stage 1 sleep were noted in the laboratory. Employing multiple definitions of respiratory disturbance index (RDI), median RDI was similar in both settings (for example, RDI with 3% desaturation: home 12.4, range 0.6-67; laboratory 9.5, range 0.1-93.4, P = .41). Quartile analysis of laboratory RDI showed moderate agreement with home RDI measurements. Based on the mean of laboratory and home RDI and using a cutpoint of 20, there was a biphasic distribution, with the RDI 3% above 20 being more common in the recordings performed in the laboratory than in the home and below 20 being more common in the recordings performed in the home than in the laboratory. These differences could not be attributed to quality of recording, age, sex, or body mass index.

Conclusions: Using SHHS methodology, median RDI was similar in the unattended home and attended laboratory setting with differences of small magnitude in some sleep parameters. Differences in RDI between settings resulted in a rate of disease misclassification that is similar to repeated studies in the same setting.

Abbreviations: ArI, arousal index; BMI, body mass index; ICC, intraclass correlation coefficient; PSG, polysomnography; RDI, respiratory disturbance index; REM, rapid eye movement sleep; SHHS, Sleep Heart Health Study

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INTRODUCTION

THE SLEEP HEART HEALTH STUDY (SHHS) IS A LARGE MULTICENTER COHORT STUDY USING UNATTENDED HOME POLYSOMNOGRAPHY (PSG) TO ASSESS THE INTENSITY OF SLEEP-DISORDERED BREATHING IN RELATION TO CARDIOVASCULAR DISEASE. Implicit in the SHHS methodology is an assumption that a single overnight PSG performed in the home captures a representative image of sleep-disordered breathing encountered at times when home monitoring is not being performed: that an unsupervised home PSG acquires an accurate assessment of physiologic data and that a single study samples the exposure to sleep-disordered breathing. We have previously reported that SHHS standardized methodology for recording and interpretation of home PSG has high scorer agreement on PSG parameters.[1-5] Night-to-night variation in measurement of PSG parameters cited by others[6-9] has also been addressed in the SHHS. Repeated home PSG in the SHHS cohort revealed no evidence of a "first-night effect" and demonstrated high interclass correlation (ICC) for the respiratory disturbance index (RDI).[10] Physiologic measurements obtained from repeated home PSG studies in the SHHS are reproducible, but does this method of obtaining unsupervised recordings in the home reflect what is obtained by having the subjects undergo supervised PSG in a clinical sleep laboratory?

It is not clear that unattended PSG performed in the home is equivalent to attended laboratory monitoring using comparable methodology. The recording site (home vs laboratory) and the degree of supervision of these recordings may affect measurement of physiologic parameters of sleep and disordered breathing. Signal loss and study failures may be more common in the unattended setting. In 3 investigations,[11-13] poor quality necessitated exclusion of 5% to 20% of PSG recordings performed in the home. Portier[12] noted a 4-fold higher rate of failure in home versus laboratory PSG. In the attended setting, technicians are available to monitor signal quality, replace or reposition faulty sensors, and adjust the amplitude of declining signals. If resulting signal quality is poorer in the unattended home recording than in the laboratory setting, important diagnostic measurements may be altered or lost. Despite these theoretical concerns, 1 study[14] showed no improvement in study quality or accuracy comparing attended monitoring with correction of faulty sensors to monitoring with no technical intervention.

Disclosure Statement

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Attended laboratory studies may generate data that would not be observed under "normal" sleeping circumstances. Laboratory studies are performed in a setting unfamiliar to subjects and may produce changes that are not observed in the home setting. If alcohol consumption, sleep duration, sleep-stage distribution, or body position are systematically different in the laboratory than in the home, recordings performed at home might better reflect the exposure to the accumulated physiologic stress of disordered breathing. Though initial exposure to the recording process may influence sleep quality, a first-night effect may be more common in laboratory studies than in home studies.[4] Given these potential effects of home or laboratory setting on data collection, are SHHS home PSGs comparable to supervised clinical laboratory PSGs? The present comparison study of home and laboratory PSG using SHHS methodology was developed to determine whether the commonly employed clinical method of collecting PSG data in a supervised laboratory would result in differences in physiologic measurements as compared to home recordings.

METHODS

Subject Selection and Protocol

Seventy-six volunteers without preexisting sleep-clinic evaluations, who were not SHHS participants, were recruited from the communities with existing cohorts in the SHHS (Baltimore, Framingham, Minneapolis-St. Paul, New York City, Pittsburgh, Sacramento, and Tucson). Subjects were screened by a verbally administered Sleep Habits Questionnaire to identify a subject pool that consisted of 50% women, 67% snorers (habitual: reporting snoring "always or almost always"), 50% aged 40 to 60 years, and 50% aged 60 years or greater.

All subjects underwent both attended laboratory PSG and unattended home PSG within a 2-week interval using the same sensors, technical application, and recording devices for each study. The order of the study was determined by random assignment, ensuring a comparable number of subjects at each site initially received the unattended study. A certified SHHS technician performed all sensor application for both studies. In the attended laboratory studies, a clinical laboratory technician provided continuous online monitoring of parameters to identify and correct any sensor loss. No instruction concerning sleep positioning was given to subjects at home or in the laboratory.

This study was approved by the Institutional Review Boards of the participating institutions. Appropriate informed consent was obtained, and procedures conformed to the Declaration of Helsinki on human research.

Polysomnography

Both home and laboratory PSG were performed with a portable PS-2 system (Compumedics, Abbotsford, Australia), and electrode attachments were made immediately before sleep at the site where the recording was performed. Respiratory monitoring included thoracic and abdominal movement by inductive plethysmography, airflow detection by nasal-oral thermocouple (Protec, Woodinville, Wash), and pulse oximetry (Nonin, Minneapolis, MN). Electroencephalographic (EEG) leads included C_3/A_1 and C_4/A_2, right and left electrooculograms, and a bipolar submental electromyogram. Additional sensors included a bipolar electrocardiogram and an ambient light sensor. In only the attended laboratory study, additional leg piezo electrodes were added. These electrodes were added to recreate the monitoring procedures used in most clinical sleep laboratories. Quality of each polysomnographic recording was graded from 1 to 7 based on the duration of recording time and the number of readable channels.[12] The duration of recording for bands and airflow was rounded to the lowest hourly integer for reporting. Only studies with a minimum of 4 hours of scorable data contiguously collected on at least 1 respiratory channel (airflow or band), oximetry, and 1 EEG channel were included in analysis.

Variables

Participants' weight was measured as part of the study visit, and height was obtained by interview or from the parent-study databases. The body mass index (BMI) was calculated from these measures (kg per meter squared).

Sleep staging was performed by SHHS-certified scorers using the guidelines of Rechtschaffen and Kales,[15] and arousals were identified by scoring rules from the American Academy of Sleep Medicine.[16] The frequency of arousals was expressed as the average number of arousals per hour of sleep (ArI), and the frequency of respiratory events was assessed by the RDI, defined as the number of apneic plus hypopneic episodes per hour of sleep. Apnea was defined as a complete or an almost complete cessation of airflow for 10 or more seconds, and hypopnea was defined as a discrete decrease in airflow or excursion of the thorax or abdomen of at least 30% of baseline for 10 seconds or more. Data were analyzed using 3 definitions of RDI: RDI_{TOT} (apneas plus hypopneas per hour of sleep irrespective of any associated oxygen desaturation), RDI 3% (apneas plus hypopneas per hour, each accompanied by 3% desaturation), and RDI 4% (apneas plus hypopneas per hour, each accompanied by 4% desaturation). Each pair of PSGs was assigned to 1 of 3 SHHS-certified scorers. The studies were integrated into the regular scoring workload with the scorer "blinded" to the study identity. Because the standard SHHS scoring montage does not display the leg piezoelectrode signals, the recording of this signal in the laboratory did not lead to unblinding of the scorers. The reliability of the RDI using SHHS scoring techniques has been reported.[9]

Statistical Methods

Descriptive statistics of the data set included range and median age; mean and SD for BMI, the number of men and women; the mean, median, and range of sleep stage (in percentage); sleep time (in minutes); sleep efficiency; and quality grade. Since not all subjects entered in the study completed both an acceptable-quality laboratory and home study, *t* tests and χ^2 tests were performed to determine differences between the subjects who completed 1 study versus 2 studies. For paired data in the home and laboratory setting, *t* tests were used to test for differences between laboratory and home for sleep-related parameters. A Bland-Altman plot of the difference in RDI relative to mean RDI was used to assess the threshold for differences in RDI. Where difference scores are presented, they are computed as the home value minus the laboratory value.

Intraclass correlations (ICCs) were used to determine the reproducibility of measurements between the laboratory and home setting. The ICCs were calculated based on the original scale except for RDI 3%, RDI 4%, sleep efficiency, and percentage of stage 1 sleep, where inspection of the Bland-Altman plot indicated that the difference between home and laboratory was proportional to the mean of the variable. In those cases, a log transformation was used to make the within-person variance independent of the mean level in the log scale. For RDI 4% and percentage of stage 1 sleep, the log transformation was based on the original value plus 1, due to the presence of 0 values on the original scale.

For the purpose of determining the frequency of concordant classification according to severity of disordered breathing, the quartiles of the laboratory RDI_{TOT}, RDI 3%, and RDI 4% were used for home versus laboratory comparisons. A weighted κ with 95% confidence interval was used to assess the degree of classification agreement. The percentage of disagreement was assessed at arbitrary RDI cutpoints of < 5 and < 10. Percentage disagreements were calculated as the number of diagnostic disagreements divided by the total number of studies. Models were developed to determine the effects of age, sex, study-quality grade, and BMI on differences in RDI. Negative binomial, Poisson, and Gaussian models were fit using generalized estimating equations to the low and high RDI stratification groups and the whole dataset, respectively.

A power analysis conducted prior to the study predicted that a sample of 70 subjects would provide a 90% power for a 1-tailed test and an 80%

power for a 2-tailed test to detect a mean difference in (RDI 4%) of 0.4, assuming a SD of 1.13 and a moderate correlation of paired values of 0.5.

RESULTS

Subjects

There were a total of 76 subjects, but 12 participants had either a missed or a poor-quality PSG in either the laboratory or the home. No significant differences were found in terms of age, sex, and study order between the 64 subjects who had full PSG data from both laboratory and home studies and the 12 who had 1 PSG. All of the following analyses were based on the remaining 64 participants' data.

Out of 64 participants, there were 34 men and 30 women whose age ranged from 40 to 76 years, with a median age of 57 years. Fifty-three participants had both weight and height data. The average BMI of the 53 participants was 31.3 ± 10.5 (SD). The mean Epworth Sleepiness Scale score in the 64 subjects was 7.5 ± 4.8. Of the 128 studies in analysis, 42 were classified as "outstanding or excellent" (minimally > 5 hours of interpretable data on 1 EEG, electrooculogram, chin electromyogram, oximetry, airflow, and a respiratory effort channel); 64 were "good or very good" (minimally > 5 hours of interpretable airflow or respiratory effort, oximetry, and 1 EEG); and 22 were "fair" (minimally > 4 hours of scorable data contiguously collected on at least 1 respiratory channel (airflow or band), oximetry, and 1 EEG.) Often, multiple respiratory parameters with adequate signal were recorded for more than 4 hours. In the attended laboratory studies, the average duration of the recording was 4.5 ± 12.0 (SD) hours for thermistor, 5.3 ± 1.7 hours for chest, and 5.7 ± 1.4 hours for abdominal sensors. In the unattended home studies, average duration of recording was 4.7 ± 1.8 hours for thermistor, 4.9 ± 2.1 hours for chest, and 5.9 ± 1.5 hours for abdominal sensors. During laboratory studies, technicians made adjustments of the belts 60 times in 41 studies of the completed surveys for technical intervention of the inductance plethysmographic device. Despite technical interventions in the laboratory, no differences were observed in quality codes for the home versus laboratory studies. Because of technical problems with the light sensor, paired data for sleep efficiency are available in only 30 subjects. There was a 31 to 33 split in terms of whether the first study was done in the home or in the laboratory.

Effect of Monitoring Location on Sleep and Respiration

Table 1 shows the interquartile (25%-75%) range and median values for sleep and respiratory parameters in the home and laboratory setting. In the home, sleep duration and sleep efficiency were higher than in the laboratory, with small but significant increases in percentage of rapid eye movement (REM) sleep and decreases in percentage of stage 1 sleep. There were no differences in ArI, RDI_{TOT}, RDI 3%, RDI 4%, or percentages of stages 2 and 3/4 sleep between the laboratory and home setting.

RDI Variability and Threshold Effects

As measured by ICCs, reproducibility of measurements in the home versus laboratory was excellent for RDI_{TOT}, RDI 3%, and RDI 4% (ICC, .75-.83) but poor for sleep parameters (Table 2). As demonstrated in Figure 1, the variability in RDI 3% between laboratory and home increased as RDI increased. The Bland-Altman plot for RDI 3% in Figure 2 suggests a biphasic effect of monitoring location on the difference in RDI: the RDI was higher at home in the less severely affected subjects (RDI < 20) and higher in the laboratory in more severely affected subjects (RDI > 20). Using a generalized estimating equation approach, regression models with binomial, Poisson, and normal link functions, we found that these differences at RDI < 20 could not be explained based on quality of recording, age, BMI, or sex. At RDI > 20, there were an insufficient number of subjects (n = 17) for such an analysis, resulting in lack of convergence of the models.

Agreement Between Laboratory and Home RDI Classification

The effect of differences in RDI on the agreement between laboratory and home measurement is shown in Table 3. Using quartiles of RDI from the laboratory sleep study, the frequency (percentage in parentheses) is shown for home RDI range matched to the laboratory quartile. The weighted κ and 95% confidence interval were used to assess agreement between

Table 1—Sleep Parameters from Home- Versus Laboratory-based Polysomnography*

	No.	Home	Laboratory	Difference	*P* value
ArI	62	20.5 (13.6, 28.5)	20.7 (13.8, 29.1)	-1.3 (-5.7, 5.6)	.6
RDI 3%	64	12.4 (5.9, 20.5)	9.5 (4.2, 23.2)	0.27(-3.7, 5.3)	.41
Sleep time, min	64	375.0 (333.3, 402.5)	318.3 (290.8, 365.5)	38.5 (1.0, 92.0)	.0001
Sleep efficiency, %	30	86.3 (83.4, 91.3)	82.3 (69.3, 87.7)	7.8 (2.3, 18.1)	.0024
Sleep stage, percentage, %					
REM	62	21.2 (18.3, 26.5)	20.0 (14.3, 24.5)	2.6(-0.67, 7.6)	.019
Stage 1	62	4.5 (3.1, 6.4)	5.9 (3.6, 9.2)	-1.2 (-3.4, 1.0)	.0047
Stage 2	62	56.9 (47.9, 64.4)	55.5 (48.9, 64.3)	-2.0 (-6.6, 4.1)	.2
Stage 3/4	62	15.5 (9.1, 25.0)	17.3 (7.5, 24.2)	0.3 (-4.0, 7.8)	.31

*Data are presented as median and interquartile ranges (25%-75%).
ArI refers to arousal index, the number of arousals per hour of sleep; REM, rapid eye movement

Table 2—Intraclass correlation coefficients between polysomnography studies performed in the home and laboratory*

	No.	ICC	95% CI
ArI	62	0.74	0.60-0.83
RDI_{TOT}, %	64	0.80	0.69-0.87
Sleep time, min	64	0.14	0-0.37
Sleep stage, percentage, %			
REM	62	0.31	0.07-0.51
Stage 2	62	0.55	0.36-0.7
Stage 3/4	62	0.71	0.56-0.81
Log RDI 3%	64	0.77	0.64-0.85
Log RDI 4% + 1	64	0.75	0.63-0.84
Log sleep efficiency	30	0.07	0-0.31
Log percentage of stage 1 sleep + 1	62	0.33	0.1-0.53

Data are presented as the intraclass correlation coefficients (ICC), including upper and lower boundaries of the 95% confidence intervals (CI) of the ICCs.
ArI refers to arousal index, the number of arousals per hour of sleep; RDI_{TOT}, total respiratory disturbance index (RDI), the number of apneas and hypopneas per hour of sleep; REM, rapid eye movement; RDI 3%, the RDI associated with a 3% desaturation; RDI 4%, the RDI associated with a 4% desaturation.

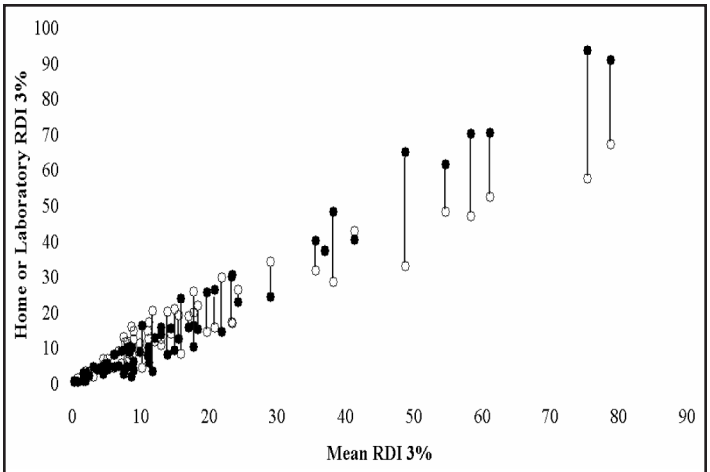

Figure 1—Variability of respiratory disturbance index (RDI) 3% as measured by the difference between home (open circles) and laboratory (closed circles) as a function of mean RDI 3%.

laboratory and home study classification. For RDI 4%, the κ was lowest (0.46), while concordance for RDI 3% and RDI $_{TOT}$ were similar (0.57-0.59).

The percentage of disagreement between laboratory and home at cutpoints of < 5 and < 10, respectively, for RDI 3% was 21.9% and 25%, and for RDI 4%, was 23.5% and 15.7%.

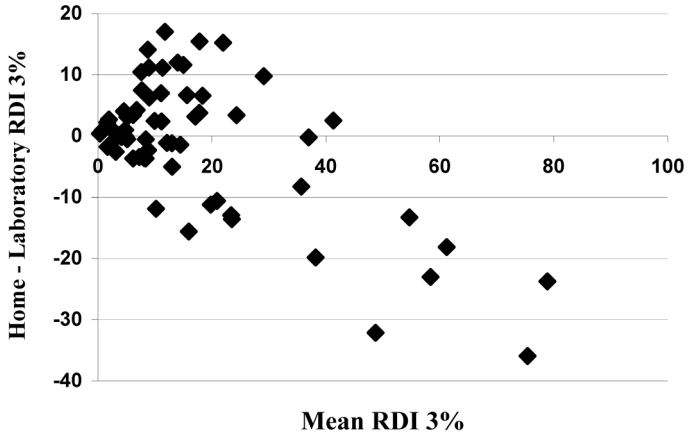

Figure 2—Bland-Altman plot of the difference in respiratory disturbance index (RDI) 3% as a function of the mean RDI 3% in the laboratory minus the home setting.

Table 3—Agreement in respiratory disturbance index between polysomnography performed in the home and laboratory*

	Home RDI 3%			
	0-4.23	4.23-9.53	9.53-23.17	23.17+
Laboratory RDI 3%				
0-4.23				
(0-25th percentile)	**9 (14.06)**	2 (3.13)	5 (7.81)	0
4.23-9.53				
(25th - 50th percentile)	1 (1.56)	**8 (12.50)**	7 (10.94)	0
9.53-23.17				
(50th - 75th percentile)	0	4 (6.25)	**9 (14.06)**	3 (4.69)
23.17+				
(75th - 100th percentile)	0	1 (1.56)	4 (6.25)	**11 (17.19)**
		weighted κ : 0.57 (0.42-0.71)		
	Home RDI 4%			
	0-1.13	1.13-4.43	4.43-13.81	13.81+
Lab RDI 4%				
0-1.13				
(0-25th percentile)	**5 (7.81)**	6 (9.38)	5 (7.81)	0
1.13-4.43				
(0-25th percentile)	2 (3.13)	**8 (12.50)**	5 (7.81)	1 (1.56)
4.43-13.81				
(0-25th percentile)	0	6 (9.38)	**6 (9.38)**	4 (6.25)
13.81+				
(0-25th percentile)	0	1 (1.56)	4 (6.25)	**11 (17.19)**
		weighted κ : 0.46 (0.31-0.61)		
	Home RDI$_{TOT}$			
	0-26.74	26.74-37.93	37.93-51.23	51.23+
Laboratory RDITOT				
0-26.74				
(0-25th percentile)	**10 (15.63)**	4 (6.25)	2 (3.13)	0
26.74-37.93				
(0-25th percentile)	3 (4.69)	**7 (10.94)**	4 (6.25)	2 (3.13)
37.93-51.23				
(0-25th percentile)	2 (3.13)	3 (4.69)	**7 (10.94)**	4 (6.25)
51.23+				
(0-25th percentile)	0	0	3 (4.69)	**13 (20.31)**
		weighted κ : 0.59 (0.45-0.73)		

*Data are presented using quartiles of respiratory disturbance index (RDI) from the laboratory study. The frequency (percentage in parenthesis) is shown for home RDI range matched to the laboratory quartile. RDI$_{TOT}$ refers to total RDI, the number of apneas and hypopneas per hour of sleep; RDI 3%, RDI associated with a 3% desaturation; RDI 4%, RDI associated with a 4% desaturation.

DISCUSSION

Comparison of the RDI acquired during PSG recordings performed in the unattended home versus attended laboratory setting demonstrated no difference in the median values in 64 individuals using SHHS standardized methodology for monitoring and interpretation of respiratory events and sleep. Across the range of RDIs in this study, however, there was a small biphasic effect on the difference between the laboratory and home setting: unattended home studies captured a higher RDI in subjects with less-severe sleep-disordered breathing (as identified by the mean RDI of the 2 recordings) and a lower RDI in subjects with more-severe disease. At mean RDIs of > 20, the laboratory RDI was consistently greater and at mean RDIs of < 20, the home RDI was greater. At a lower RDI, these differences could not be explained based on quality of recording, age, BMI, or sex; however, the number of participants with high mean RDIs was too small to reliably model these effects.

Based on ICCs, there was good reproducibility of all RDI measurements, as well as stage 3/4 sleep, between settings. Using the quartiles of RDI in the laboratory as a reference, there was a moderate concordance of classification of all measures of RDI between the laboratory and home setting based on κ. Using arbitrary cutpoints, disagreement of 6% to 25% was noted in classification of RDI 3% and RDI 4%. In a previous study of unattended PSG in the home using SHHS methodology,[10] disagreement occurred in 20.9% of subjects, as compared to 21.9% in the current study using an RDI cutpoint of < 5. Using a cut point of < 5, reclassification rates of 6% to 43% of subjects have been reported in prior studies employing a diverse range of methodologies and participants.[17-21] Calculations of the ICC for log RDI 3% in the SHHS study comparing 2 recordings on separate nights in the home[10] yielded values similar to those observed here (2 home studies, ICC = 0.81; laboratory vs home study, ICC = 0.77). This suggests that the overall difference observed between unattended home and attended laboratory PSG is similar to that expected based on night-to-night variation in RDI.

There are some limitations to the design of this study. Though the highly standardized methodology for recording and scoring PSGs in the SHHS ensure the reproducibility of techniques, the findings in our multicenter study may not be generalizable to clinical laboratories using substantially different scoring or recording techniques. Furthermore, 2 additional potential limitations need to be recognized: body position was not reliably measured, and 12 of 76 subjects were excluded from the study because of a failure to achieve adequate quality on 1 of the matched studies (a procedure failure rate of only 8%). There were no differences in study order, age, or sex between the excluded subjects and the remainder of the study group, making selection bias due to exclusion of the 12 subjects unlikely. Body position may have a substantial effect on disordered breathing.[22] Subjects were given no instruction about their sleeping position, but if they spent more time in the supine position in the laboratory in the current study, the frequency of disordered breathing would be expected to be higher.[22] Indeed, higher RDI in the laboratory at RDI > 30 has been previously noted in comparison of home and laboratory studies by Whittle[23]; however, body position was not measured in that study and sleep stage and sleep time could not be compared because only laboratory studies included EEG. Finally, it is possible that obese subjects with higher RDIs might be more consistently restrained by the laboratory or bed to the supine position in the present study, thus causing a higher RDI in the laboratory.

An alternative explanation for the higher RDI in the laboratory in subjects with RDI > 20 is that the unfamiliarity of laboratory setting and personnel may have promoted more-frequent arousals and sleep transitions resulting in arousal-associated respiratory events that were counted as hypopneas. This is supported by the observed differences in sleep parameters: shorter sleep time, more stage 1 sleep, and less REM sleep in the laboratory setting. First-night effects of a similar nature have been noted in repeated laboratory studies.[24] Because of the normal link between arousal frequency and the RDI,[2] it is not possible to exclude this mechanism. The cause for a higher RDI in the unattended home setting at RDI < 20 is not clear, though it could again relate to differences

in body position, alcohol use, subtle differences in sleep architecture, or other factors not defined in the current protocol.

In our study comparing sleep and respiratory parameters during unattended home and attended laboratory settings, median values for ArI and RDI were similar. The laboratory setting was associated with a shorter sleep time, poorer sleep efficiency, and a very small but significant increase in stage 1 sleep and decrease in REM sleep. Variability of RDI was similar in magnitude to normal biologic variability as measured by night-to-night comparisons of similar methodology.[10] Agreement in classification of RDI categories was similar to published series of multiple measurements of RDI. On the other hand, there was a biphasic difference across the range of RDI that cannot be adequately explained by the design of our current study.

The cause of biologic variability in PSG parameters has been elusive, with persisting variability after correction for age, sex, and BMI[24] and no clear explanation for night-to-night variability in RDI in the same setting. The frequency of respiratory events and the prevalence of disordered breathing in a population are also exquisitely sensitive to the criteria of arousal, desaturation, and hypopnea that are used,[13] as well as to differences in body position.[22] Despite this natural variability and its sensitivity to changing methodology, it is not surprising that setting has only modest effects on the frequency of respiratory events during sleep. Acknowledging our current lack of understanding of the cause of these modest effects of setting of the recording on sleep and disordered breathing in the present study, it is not possible to champion laboratory recordings over unattended home recordings of respiratory and sleep parameters based on our results. It is also important to acknowledge that the magnitude of differences in sleep and respiratory parameters between settings in our study is small and results in a rate of disease misclassification that is similar to repeated studies in the same setting. In the context of epidemiologic studies, our comparison of home and laboratory PSG suggests that the variability in repeated measurements and rate of misclassification of disease are similar whether comparing repeated unsupervised home studies or comparing home versus clinical laboratory studies. A study of a larger cohort would be necessary to confirm the biases across the range of RDI suggested by our data.

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