Evaluating the feasibility of out-of-center sleep testing (OCST), level II polysomnography (PSG)

- The experience of a Canadian service provider

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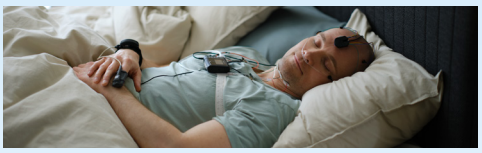
Introduction

In-lab or level I PSG is considered the gold standard for objective measurement of sleep, but it is time-consuming and resource-intensive. Unattended or level II PSGs essentially involve recording the same physiological signals as in-lab PSG but in the patient's home. As these tests are unattended and the patients spend, sometimes up to 16 hours with the sensors attached, the likelihood of possible failures is significant. With this in mind, as a part of the quality improvement initiative, we wanted to evaluate the feasibility of performing level II PSG and better understand level II PSG's capabilities for the diagnosis of sleep-disordered breathing (SDB) in a Canadian community-based sleep center (Somnocor, Gatineau Quebec).



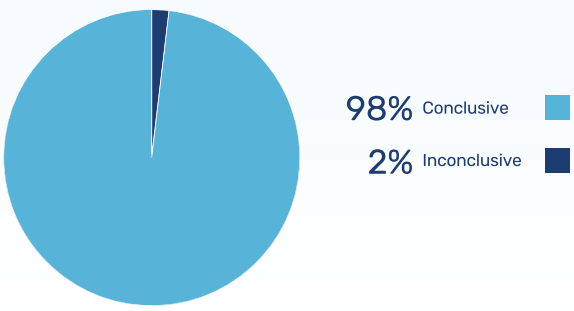
Results

Of the 317 patients (172 males [54%] with a median age of 50 [IQR 40-59] and a mean BMI of 30.2 [IQR 25.2-33.8]) with suspected SDB tested with level II PSG, 6 (2%) had inconclusive tests due to technical failure.

The reasons for failure included: data accidentally erased in 1 (0.31%), equipment didn't start the programmed study in 4 (1.2%), and sleep was not recorded in 1 (0.31%). All 6 participants, who had inconclusive test results, underwent a second study, each producing a valid recording.

From the valid studies (311/317), we have obtained a mean total sleep time (TST) of 403 min (95%CI 395-411) with a mean sleep efficiency of 80.9% (95%CI 82.1-79.6), and a mean signal quality overall of 95.9% (95%CI 97.1-94.8).

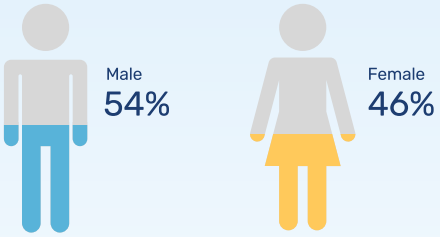
Type II Studies Performed



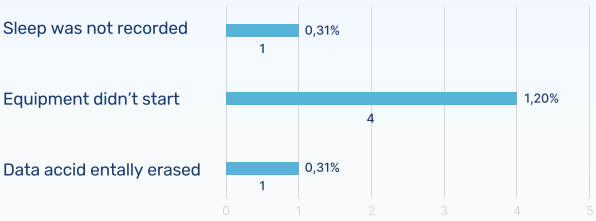
Methods

We included in the analysis all consecutive individuals 17 years and older, who were referred to the sleep center for SDB assessment, from February 2021 to May 2023, and underwent a level II PSG study using the Nox A1 and A1s equipment (Nox Medical, Reykjavik).

The PSG montage and electrodes were applied by a registered sleep technologist in the laboratory setting prior to releasing the patient home to sleep.
We retrospectively analyzed all the studies to assess the feasibility of utilizing level II PSG by collecting information on the number/proportion of test failures and the reason for failure. A valid study was defined as at least 4 hours of recorded interpretable data (electroencephalogram [EEG], oximetry, and flow).
Moreover, we analyzed the overall signal quality that was determined as the lowest quality value of the following signals: oximeter, airflow, abdominal or thoracic respiratory effort signals, from 0 to 100%.



Reasons for failure



Conclusions

This retrospective community-based single-center study on an adult population referred for sleep assessment with suspected SDB demonstrated a low failure rate, overall good signal quality, and prolonged TST for level II PSG. These encouraging results are aligned with previously published data, and give confidence towards making level II an appropriate OCST sleep test to diagnose SDB.