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Home Sleep Testing Continues its Momentum

Helen Driver, PhD, RPSGT, believed home sleep testing was probably a viable mechanism to discover sleep apnea, but she needed to find out for herself.

Relinquishing control of crucial diagnostics has never been a favored practice of clinicians. Instead, dedicated sleep technologists prefer to monitor physiological variables while administering a gold standard polysomnography.

Helen Driver, PhD, RPSGT, DABSM, shares the same instinct, but the veteran of more than two decades in the sleep world knows that labs are not right for everyone. Demand is increasing, and some patients simply have no interest in spending the night in a laboratory—whether it's comfortable or not.

As coordinator of the Sleep Disorders Laboratory at Kingston General Hospital and Queen's University, Ontario, Canada, Driver sees patients young and old in an environment where little is left to chance. "There is no doubt that some people do better with the additional care they get in the lab," says Driver, who works under the Queen's University Department of Medicine umbrella. "In the lab, patients get the one-on-one attention that ensures everything is being properly recorded. Physicians know what their patients need and want, and being in a lab patients get that additional education."

With so many patients out there, Driver and her colleagues believed that home sleep testing could be a valuable screening modality. After doing their own studies, that belief now has data to back it up. Researchers followed up an in-laboratory validation study of a level III portable monitoring device called the MediByte®, from Canada-based Braebon Medical Corp (Driver et al 2011), with at-home studies (Pereira et al 2011).

Specifically, 150 patients recruited from the Kingston General Hospital completed validated questionnaires after wearing the MediByte level III portable monitor. The study compared findings from the home study with in-laboratory polysomnography for screening of obstructive sleep apnea (OSA).

Downloaded Medibyte data included oximetry, nasal pressure airflow, and respiratory inductance plethysmography manually scored by an experienced scorer who was blind to in-lab PSG results. At a diagnostic threshold AHI of 10 (based on in-lab polysomnography), compared with any of the questionnaires, the portable monitor had a slightly lower sensitivity (79%) indicating a true-positive result for OSA. There was greater specificity (88%) referring to the proportion of patients without OSA who had a negative test result (true-negative) on the portable monitor. High specificity is important because of the potential costs associated with following-up false-positive cases.

The sensitivity and specificity for each of the questionnaires for an AHI of 10 was as follows: Sleep Apnea Clinical Score 89%, 52%; Stop-Bang 89%, 24%; Berlin 89%, 28%.

For a diagnostic threshold AHI of 15, the sensitivity and specificity were as follows: MediByte 79%, 94%; Sleep Apnea Clinical Score 91%, 50%; Stop-Bang 91%, 28%; Berlin 91%, 28%.

The understanding is that the device is used in the home setting for a certain clinical population. As such, Driver and her fellow researchers were open to seeing how it went. "My own instinct, being lab based, is that you can't get any measure that is as good as somebody actually watching," says Driver. "More data is optimal. But this is a surrogate, and we were hopeful it would be accurate, and it turned out to be that way given the caveats of no additional measures that improve the reliability."

Fundamental Changes

Driver is hopeful that home sleep testing will continue to be used in a setting where there is access to good clinical consultation, and an in-lab assessment if needed. "Home sleep testing can be a useful adjunct for follow-up as part of comprehensive care," she says. "We must change the way we have been practicing, and our lab is included in that. We must change the way we practice sleep medicine to improve efficiencies in diagnosis of sleep disorders, and specifically OSA."

Part of that new way of thinking includes a level of trust that goes beyond the lab walls. For example, if a patient's livelihood is at stake (such as trucking), will he actually wear the device? Or could the device be used on a family member with no sleep problems?

The public safety concerns are real, and Driver concedes that the issues must be confronted. One thing is certain; education will remain crucial for compliance. "If people take home testing devices, someone should still show patients how to use and set them up, and review the raw data," she says. "Ultimately, home sleep testing can shorten wait times and increasing availability of testing, which can lead to a huge improvement for sleep laboratories."

Acceptance a Done Deal?

Acceptance of home sleep testing depends on whom you ask. "Confidence levels are still very mixed when it comes to home sleep testing," admits Driver. "It depends on the background from which you come. If you are very familiar with the way we do studies in the lab, you have a good understanding of the gold standard. Those who come from a dental background are familiar and open to using home sleep screening devices. These devices should be used in conjunction with good clinical practice and follow-up. This is a good technology that is practical and useful for patients, and that is our overriding concern."

Not surprisingly, if the test is not properly interpreted, and the therapy is not appropriately implemented, there are problems. In the context of Driver's study, gender was also a consideration. "Women are more likely to have upper airway resistance, so it's a more subtle flow limitation," says Driver. "It might cause an arousal or an awakening, rather than a desaturation greater than 3%. So that is one limitation of a home testing study—it relies on oxygen desaturation. In the lab with some of the more subtle types, we see it manifested in the EEG."

1. Driver, H.S. Bjerring, K.A., Toop F., Pereira E., Stewart, S.C., Munt, P. & Fitzpatrick, M.F. (2011) Validation of the MediByte® Type 3 Portable Monitor compared with Polysomnography for Screening of Obstructive Sleep Apnea. *Canadian Respiratory Journal*, 18 (3): 137–143.

2. Pereira E, Driver H, Stewart S, Fitzpatrick M. Validated questionnaires and an ambulatory monitor in the diagnosis of obstructive sleep apnea. *Sleep Medicine* 2011;12, Suppl. 1: S12.