ISSUE 4 01/07/2015

sleepmatters

ASEAN SLEEP NEWSLETTER NEWS / OPINIONS / INSIGHTS

Interview with Dr Punjabi on the role of Somnolyzer, an easy and reliable method for sleep scoring

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What is Somnolyzer?

Somnolyzer is a computerised scoring platform that can be used to automatically determine the sleep stage and disordered breathing events. Typically a sleep study (full montage or limited montage) is visually scored by trained and certified technicians. Somnolyzer allows the "scoring" of the sleep study using automated algorithms that conform to the current recommendations.

Based on your own experience, what are the challenges in Sleep Medicine that a computerised scoring platform can help to resolve?

Since visual scoring of a sleep study can be time consuming and laborious, the Somnolyzer® System can help alleviate this burden by annotating the sleep study for sleep stages, disordered breathing events, and Electroencephalographic (EEG) arousals.

Can you describe your own study[1] with the Somnolyzer® System?

We have just completed a full validation study in which Somnolyzer was compared to the visual scoring from four independent and certified scorers.[1] The scope of this study was to examine how the Somnolyzer® System performs in staging sleep and annotation of disordered breathing events such as obstructive apneas and hypopneas.

Dr Punjabi highlighted the main findings from this recent study using Somnolyzer:[1]

- Study demonstrates a high degree of concordance between manual and automated scoring for several commonly used metrics including the Apnea-Hypopnea Index (AHI), total sleep time, sleep efficiency, arousal index and the percentage of REM sleep.
- Differences were observed between automated and manual scoring for the percentages of sleep stages N1, N2, and N3. Most importantly, agreement between manual scoring from the four distinct certified scorers was not substantively different from the agreement between human scorers and the automated scoring performed by the Somnolyzer® System.
- The study concluded that reliability of the automated scoring by the Somnolyzer® System is similar to that of human scorers and as such provides a viable alternative for manual scoring.
- The Somnolyzer® System relies on computerised algorithms to mathematically analyse various physiologic signals. This analysis provides a panel of rich signal features that allow for additional research to refine therapy approaches.

What is your opinion regarding the improvement in efficiency and patient satisfaction of a sleep lab using Somnolyzer?

In my opinion, the use of automated systems such as Somnolyzer allows the scoring time to be decreased to 10–15 minutes.[1] This therefore helps improve the efficiency of sleep laboratories and provides a faster turnaround of patients' results, hence improving patients' satisfaction.

Reference: 1. Punjabi NM et al. Sleep 2015;Mar 24:pii: sp-00224-14 [Epub ahead of print].

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Interview with Dr Bảo on sleep disorders in Vietnam

What is the prevalence of sleep disorders in Vietnam, particularly for Obstructive Sleep Apnea (OSA)?

A national study on the prevalence of sleep disorders in Vietnam is not available.

In your opinion, what are the challenges in diagnosing and treating OSA in Vietnam?

OSA awareness is still very low among the general population of Vietnam, and is also lacking among the medical community. These two factors represent the main two barriers to OSA screening. In addition, the lack of medical staff specialised in sleep medicine and the shortage of well-equipped sleep laboratories are the key challenges that are hindering the diagnosis and treatment of OSA in Vietnam.

What do you think should be done to diagnose and treat more OSA patients in Vietnam?

We should launch campaigns to raise general population awareness of the reality of OSA as a dangerous threat to health, the consequences of untreated OSA, as well as the effectiveness of available OSA treatment such as Continuous Positive Airway Pressure (CPAP). We should also provide the medical community with Continued Medical Education (CME) on the diagnosis of OSA and the modalities of OSA treatment.

What activities are promoted by the Vietnamese Respiratory Society (VNRS) to raise awareness about OSA among the general public and physicians in Vietnam?

VNRS has cooperated with televisions, radios, as well as newspapers to promote the danger of undiagnosed and untreated OSA. In addition VNRS has been organising courses to provide CME on sleep disorders to VNRS members and other interested physicians.

What is the role of Home Sleep Testing (HST) and Auto-titration Positive Airway Pressure (APAP) in managing OSA in Vietnam?

For the time being, HST is not well-known in Vietnam. Despite the high prevalence of OSA in the general population, the lack of OSA awareness leads to low demand in Polysomnography (PSG) prescription to diagnose OSA. The sleep labs now can address all PSG requirements with a short waiting list.

PAP auto-titration is useful for OSA treatment in Vietnam, though affordability is a challenge. The use of APAP is followed by the real treatment with fixed CPAP.

In your opinion, what factors affect OSA acceptance and adherence to PAP therapy in Vietnam?

Lack of awareness of the dangers of OSA and doubts in the effectiveness of CPAP for the treatment of OSA are key factors which affect disease compliance and adherence to Positive Air Pressure (PAP) therapy. The poor variety of PAP options, such as suitable masks and appropriate machines further limit personalisation of PAP treatment for patients. This is further exacerbated by the absence of reimbursement of PAP which presents a challenge to many OSA patients who have low financial resources.

Which sleep disorders other than OSA are prevalent in Vietnam?

Based on my own clinical experience, insomnia caused by psychiatric disorders, restless leg syndrome, and periodic limb movement disorders are also common in Vietnam.

PAP auto-titration is useful for OSA treatment in Vietnam. The use of APAP is followed by the real treatment with fixed CPAP.
– Dr Bảo Lê Khắc

Dr Teofilo L. Lee-Chiong Jr.
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Dr Teofilo's summary on studies relating to HST and auto-titration

Ambulatory management OSA, HST and APAP

In many countries, the increasing prevalence and/or recognition of OSA is outpacing the availability of laboratory-based sleep services to manage patients with this disorder. Limited or more restricted access to PSG has led to a growing interest in newer clinical models for OSA diagnosis and treatment, such as expanded roles for alternative healthcare professionals and telemetric medicine. Several studies that have compared an integrated HST-APAP protocol with conventional PSG-based management are summarised below.

As care delivery models continue to evolve to address both the rising medical needs of patients as well as the ever more limited healthcare resources, sleep professionals in different countries have to assume greater responsibilities in creating novel strategies to deal with the unique sleep-related healthcare needs of their patients.

> In many countries, the increasing prevalence and/or recognition of OSA is outpacing the availability of laboratory-based sleep services to manage patients with this disorder.
> – Dr Teofilo L. Lee-Chiong Jr.

1 In an early trial, 106 persons with a high likelihood of having OSA and with complaints of daytime sleepiness were randomised to one of two clinical pathways for the diagnosis and treatment of OSA, namely (a) HST and unattended APAP to select an effective CPAP therapy and (b) PSG. Subjects with an Apnea Hypopnea Index (AHI) of equal or greater than 5 events per hour were offered CPAP treatment. The two groups did not differ significantly in clinical outcomes, CPAP adherence and CPAP satisfaction.

The following data is adapted from the 2008 study conducted by Berry RB et al.

	HST-APAP	PSG
Initial AHI	29.2 ± 2.3/hr	36.8 ± 4.8
Mean CPAP settings	11.2 ± 0.4 cmH_2O	10.9 ± 0.5 cmH_2O
Device use at 6 weeks	88.8%	90.6%
Mean nightly adherence	5.20 ± 0.28 hr/night	5.25 ± 0.38 hr/night
Decrease in Epworth Sleepiness Scale (ESS) score	-6.50 ± 0.71	-6.97 ± 0.73
Improvement in the global Functional Outcome of Sleep Questionnaire (FOSQ) score	3.10 ± 0.05	3.31 ± 0.52

Berry RB et al. *Sleep* 2008 Oct;31(10):1423-31.

2 Three hundred and seventy three adult participants with high probability of moderate to severe OSA (i.e., AHI ≥ 15) and ESS score ≥ 12 underwent either CPAP titration during PSG or APAP titration following level 3 HST in this seven-centre randomised, parallel group study. Among the latter group, a fixed CPAP setting was then identified using the 90% effective pressure from 1 week of APAP use. Compared to the PSG group, subjects in the HST-APAP arm had higher PAP device use at 3 months as well as higher adherence to therapy. The two groups did not differ significantly in titration pressure, acceptance of therapy or ESS scores.

The following data is adapted from the 2012 study conducted by Rosen CL et al.

	HST-APAP	PSG
PAP use at 3 months (nightly time at pressure)	4.7 ± 2.1 hr	3.7 ± 2.4 hr
Adherence (percentage of night used ≥ 4 hr)	62.8 ± 29.2%	49.4 ± 36.1%

Rosen CL et al. *Sleep* 2012 Jun; 35(6):757-67.

3 In a prospective randomised study, 156 patients diagnosed with OSA (AHI ≥ 10/hr) by HST were assigned to treatment with a CPAP device after PAP titration during PSG or with an APAP device. Therapy using CPAP and APAP resulted in equivalent treatment adherence and changes in ESS and FOSQ scores.

The following data is adapted from the 2014 study conducted by Berry RB et al.

	HST-APAP	PSG
Diagnostic AHI	28.6 ± 18.5/hr	28.3 ± 16.0/hr
PAP use at 6 weeks	84.6%	84.3%
Effective PAP setting	10.8 ± 3.1 cmH_2O (90% APAP)	11.7 ± 2.5 cmH_2O
Average nightly PAP use	4.45 ± 2.3 hr	4.0 ± 2.3 hr
Change in ESS score	-4.2 ± 4.7	-3.7 ± 4.8
Change in FOSQ	2.6 ± 3.5	2.2 ± 3.7

Berry RB et al. *J Clin Sleep Med* 2014 Dec;10(12):1269-75.

4 One hundred and two subjects were enrolled in a randomised trial comparing CPAP titration during PSG with level 3 HST followed by 1 week of APAP and CPAP derived from the 95% pressure from the APAP device. There were no significant differences between study groups in subjective daytime sleepiness, sleep quality, Quality of Life (QoL), blood pressure and CPAP adherence after 4 weeks of CPAP therapy for OSA.

The following data is adapted from the 2010 study conducted by Skomro RP et al.

	HST-APAP	PSG
ESS score	6.5 ± 3.8	6.4 ± 3.8
Pittsburgh Sleep Quality Index (PSQI) score	6.2 ± 3.4	5.4 ± 3.1
Calgary Sleep Apnea Quality of Life Index (SAQLI) score	4.6 ± 1.1	4.5 ± 1.1
36-Item Short-Form Health Survey (SF-36) vitality	64.1 ± 18.4	62.2 ± 23.3
Blood pressure (BP)	125/81 ± 13/9	129/84 ± 11/0
CPAP adherence	5.4 ± 1.0 hr/night	5.6 ± 1.7 hr/night

Skomro RP et al. *Chest* 2010 Aug;138(2):257-63.

Dr Toh Song Tar
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Interview with Dr Toh on the relationship between OSA and diabetes

What is the prevalence of Type 2 Diabetes Mellitus (T2DM) in OSA patients and the *vice versa*?

Based on certain studies, the prevalence of T2DM in OSA could be as high as 23%,[1] however, the prevalence of OSA in Diabetes Mellitus (DM) is estimated to be at a much higher 40%.[2]

Is there a causal relationship between OSA and DM?

The causal relationship between OSA and DM is currently not firmly established, and the incidence of DM in untreated OSA is not yet known. Nonetheless, research studies have shown that OSA patients are at a higher risk of impaired glucose tolerance and diabetes than those who do not suffer from OSA.[3,4] Studies have also shown there is an association between OSA and insulin resistance.[5] In patients with T2DM, REM sleep related OSA may influence long-term glycemic control using HBA1C as an outcome measure.

> CPAP therapy of 4 hr per night may not be sufficient to achieve glycemic control and full adherence of CPAP treatment may be necessary.[6]
> – Dr Toh Song Tar

What is the effect of CPAP treatment on glucose metabolism alterations in OSA?

Meta-analyses of CPAP treatment on insulin resistance showed that CPAP treatment in OSA patients has a favourable response on insulin resistance.[5] Full adherence to CPAP treatment during sleep time may be necessary for the beneficial metabolic effect.

What are the recommendations of the International Diabetes Federation (IDF) about screening of OSA in T2DM patients?

The IDF recommends that health professionals consider the effects of the co-existing illnesses while screening for OSA screening, particularly with patients suffering from OSA and with pre-existing T2DM.

What is your advice for diabetic patients regarding screening and treatment for OSA?

I would advise DM patients who snore to be screened for OSA, and in the case of OSA diagnosis, these patients should undergo CPAP treatment.

> Research studies have shown that OSA patients are at a higher risk of impaired glucose tolerance and diabetes than those who do not suffer from OSA.[3,4] – Dr Toh Song Tar

What steps are being taken in Singapore and in the region to increase awareness regarding the relationship between OSA and DM?

Currently, in Singapore, we are reaching out to endocrinologists who are treating patients with DM to raise their awareness of the potential link between OSA and T2DM. With more definitive research studies being published, the awareness will increase and patients will potentially benefit.

The ASEAN Sleep Congress aims to raise awareness about sleep disorders among Doctors and the general public in Singapore

- Will bring together specialists from different disciplines, in the ASEAN region and internationally, who are actively treating sleep disorders, as well as specialists who are seeing patients who could potentially be affected by sleep disorders.
- Will provide the opportunity for these specialists to share their knowledge and expertise, so that more doctors are better equipped to recognise patients with sleep disorders and therefore recommend the appropriate treatment.
- Look out for a public forum and radio and TV talk shows to educate the general public about sleep hygiene and sleep disorders. To find out more please visit the website at: www.aseansleepcongress2015.com.

References: **1.** West SD et al. Thorax 2006 Nov;61(11):945-950. **2.** Meslier N et al. Eur Respir J 2006 Jul;22(1):156-160. **3.** Punjabi NM et al. AM J Epid 2004 Sep;160(6):521-530. **4.** Reichmuth Kj et al. Am J Resp Crit Care Med 2005 Dec;172(2):1590-1595. **5.** Iftikhar IH et al. J Clin Sleep Med 2015;11(4):475–485. **6.** Grimaldi D et al. Diabetes Care 2014;37:355–363.

Dr Rimawati Tedjasukmana
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Interview with Dr Tedjasukmana on home sleep testing

Dr Tedjasukmana sheds light on HST for diagnosing OSA which is very useful for the patient because:

- The patient can sleep better in familiar surroundings, thus reducing the first night side effects.
- The elderly patient or very busy patient can schedule the test at their own convenience.
- The cost is cheaper than the in-lab PSG.
- The waiting time is less than the in-lab PSG.

According to the American Academy of Sleep Medicine's (AASM) clinical guidelines, the proper OSA evaluation requires portable monitoring that record at least the following parameters:

- Airflow (pressure-based).
- Pulse oximetry.
- Heart rate.
- Respiration effort measured via Respiratory Inductive Plethysmography (Type III monitor).

Additional parameters that are strongly recommended are snore, temperature-based airflow (thermistor) for apnea confirmation and body position for positional apnea estimation.

Type of patients referred for HST:

- Moderate to severe OSA, or when they have no significant medical conditions other than the suspected OSA.

> CPAP acceptance and adherence are higher in the HST group with auto-titration with no significant differences in QoL and daytime sleepiness between the two groups.[1]
> – Dr Rimawati Tedjasukmana

Is there any difference if CPAP treatment is initiated in an OSA patient on the basis of HST *versus* in-lab testing?

In this instance, the initiation of CPAP treatment could potentially affect CPAP acceptance, adherence or pressure, QoL, daytime sleepiness, and reduction in AHI.

A study by Rosen CL et al. in 2012 compared portable sleep studies and APAP *versus* laboratory-based PSG for the diagnosis and treatment of OSA. The study found that CPAP acceptance and adherence are higher in the HST group with auto-titration with no significant differences in QoL and daytime sleepiness between the two groups.[1]

> When purchasing a HST device, it is important to consider its ease of use and the visualisation of raw data.
> – Dr Rimawati Tedjasukmana

Is HST more cost effective than in-lab testing for OSA patients?

Yes, HST costs only a small fraction compared to in-lab testing.[1] Though this is generally effective, but it is important to note that HST has limitations. Many portable tests underestimate the severity of OSA because of the differences in methods to detect obstructive events as well as the amount of sleep.[1]

Considering the article by Kim et al about the economic differences between home based and lab based sleep testing and CPAP titration, the authors were in favour of home based testing. Home based testing is less expensive for the patient and the provider, though it does incur minimal loss to the provider.[2]

> A simplified management strategy for OSA based in primary care was clinically comparable to a specialist sleep centre care in improving symptoms of daytime sleepiness.[4]
> – Dr Rimawati Tedjasukmana

What role can GPs play in managing OSA patients using HST?

GPs can screen their patients for sleep disorders in order to determine candidates for HST. Following OSA diagnosis, the patients' case can be managed by both the GP and the sleep specialist. GPs can also conduct out-of-centre sleep testing and other testing either through their office or the sleep centre. They also work closely with sleep specialists, sleep medicine-trained nurses, and sleep technologists for optimal patient care.[3]

Is there any clinical evidence of the role of GP's in managing OSA patients using HST?

In adults with at least mild symptoms of daytime sleepiness, moderate to severe oxygen desaturation index, and no significant pulmonary, cardiac or cognitive co-morbidities, a simplified management strategy for OSA based in primary care was clinically comparable to a specialist sleep centre care in improving symptoms of daytime sleepiness.[4]

What is your experience with regards to HST and auto-titration in Indonesia and the ASEAN region?

In Indonesia most sleep centres use HST and only a handful of centres have in-lab PSG. However, HST is utilised without supervision by trained sleep technologists and is mostly machine scored.

Features that should be taken into consideration when purchasing a HST device:

- Ability to record proper physiological data as indicated earlier for the AASM clinical guidelines.
- Ease of use*.
- Visualisation of raw data.

* *A system that is small, light and allows for easy self-administration of the sleep test in the home is preferred, as it avoids a sleep technologist from having to go to the patient's house, and therefore saving time and money. Typically the hook-up of sensors in HST will require wrapping a Respiratory Inductance Plethysmography (RIP) belt around the chest, placing and securing a pulse oximetry monitor on the patient's index finger, and wearing a nasal cannula. This is only minimally invasive and painless. Sometimes a thermistor may be used along with the nasal cannula to confirm apneas.*

References: **1.** Rosen CL et al. Sleep 2012 Jun;35(6):757-767. **2.** Kim RD et al. In preparation. **3.** Kushida CA et al. Sleep 2015;38(2):315-326. **4.** Chai et al. JAMA 2013 Mar;309(10):997-1004.

Events in the region and world: Jul – Dec 2015

World Sleep Federation Exam India	27 Jul 2015	**NAPCON** Jaipur, India	4 – 7 Nov 2015
14th European Biological Rhythm Congress and 4th World Congress of Chronobiology Manchester, UK	2 – 6 Aug 2015	**8th Bi-Annual Conference on Pediatric Sleep Medicine** Florida, USA	12 – 15 Nov 2015
RESPINA Jakarta, Indonesia	2 – 5 Sep 2015	**3rd ASEAN Sleep Conference** Singapore	20 – 22 Nov 2015
ERS International Congress Amsterdam, Netherlands	26 – 30 Sep 2015	**APSR** Kuala Lumpur, Malaysia	3 – 6 Dec 2015
World Sleep 2015 Istanbul, Turkey	31 Oct – 3 Nov 2015	**National Sleep Medicine Course** Guwahati, Assam, India	5 – 6 Dec 2015
Sleep DownUnder 2015 *Melbourne, Australia*	22 – 24 Oct 2015	**4th National Sleep Technology Course** AIIMS, Delhi, India	9 – 10 Dec 2015

Mr Beomjoo Lee
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Sleep-watching – Personal opinion of a Chief Sleep Technologist

I started my career as a general technician in the Department of Physiology at Korea University, Ansan Hospital. Over the years I had the opportunity to be exposed to many different types of physiologic tests in cardiology, respiratory, and pulmonary function. In 1999, and following the opening of the first sleep laboratory at Korea University, I became a sleep technologist where I am currently still in charge.

What is the most challenging aspect of your profession?

In the early parts of my career, very few people knew about sleep disorders and it was very difficult to find a sleep laboratory in South Korea that had more than one bed to serve sleep studies. Despite this lack of existence, our lab persevered on increasing awareness of sleep disorders within the medical community and the general public. Over time, I have come to realise that awareness is the most challenging task for a sleep technologist as well as its significant impact if left untreated.

What is the biggest change you have seen in the profession since you began?

Many sleep technicians may agree that it is the rapid and tremendous change as well as technology advances for sleep diagnosis and treatment. I would say that the biggest change that I have noticed has been the huge improvement in the awareness of sleep disorders in South Korea.

Factors influencing patient adherence to CPAP from Mr Lee's perspective:

In my opinion, compliance is a joint effort between the sleep technicians and the patient. Some of the parameters that may influence adherence:

- Clinicians' accurate diagnosis.
- Sleep laboratory testing.
- Understanding the different features of PAP.
- Understanding the use of advanced masks.
- Understanding the clinicians' instructions.

Factors influencing a patient's choice of a mask from Mr Lee's perspective:

- The patients' profile (age, gender, mouth breathing).
- CPAP pressure range.
- The presence of concomitant disease (diabetes, allergy, rhinitis, sinus infection).
- Patient preference, it is important to let them choose what they feel most comfortable with. This is particularly critical with CPAP treatment as the patient has sole control.

What makes a sleep technician successful, and what are you seeking for the future of sleep management?

To be a successful sleep technician, it is essential to have extensive knowledge of other parameters and use them during diagnosis. The future of sleep diagnosis should identify the new parameters that are relevant to accurate sleep diagnosis in the academic field and in the clinical setting. As a sleep technician, I would like to contribute to this dynamic era of sleep disorder by extending my clinical knowledge through my daily interactions with my patients.

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In the next issue of Sleepmatters:

- COPD and Sleep Disorders
- Essential updates on OSA and PAP
- REM OSA, Hypertension and Diabetes Mellitus

Letters to the Editor:

Our readers are invited to write to the editor by volunteering content that they feel strongly about or feel needs coverage in a publication such as this. Your input is welcome and valued, particularly with case studies and hot topics currently debated in the field, as well as reviews of Asia Pacific congresses and conferences that you might like to share with the audience. Your letters will be featured in future issues of Sleepmatters allowing an open forum between the experts, to increase the level of engagement amongst the audience.

Email us on sleepmatters@philips.com with your content.

Sleepmatters is supported by