Sleep Medicine Research Review™

RESEARCH REVIEW 10 YEARS
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Issue 9 – 2016

In this issue:

Abbreviations used in this issue
AHI = apnoea-hypopnoea index
CBT = cognitive behavioural therapy
CPAP = continuous positive airway pressure
OSA = obstructive sleep apnoea
PSG = polysomnography

Welcome to the latest issue of Sleep Medicine Research Review.

Highlights include a study of the impact of smoking status on OSA severity, and a report of the risk of car accidents caused by falling asleep at the wheel in patients with OSA. Two important randomised trials examine the effect of lorsartan and CPAP in patients with OSA and hypertension, and the effect of CPAP on long-term adverse cardiovascular outcomes (the RICCADSA Trial). The use of media as a sleep aid in adults is evaluated, as is the effect of meditative movement on sleep quality. Findings of a study of cognitive performance in partially sleep-deprived adolescents should be a wake-up call for students and educationalists alike, and a well-designed study shows that transdermal rotigotine has benefits in patients with moderate Parkinson disease and sleep impairment. The drug is currently not funded in NZ however, as there are oral alternatives.

Research Review is ten!! The first ever issues of Research Review were delivered to inboxes in February 2006. Fast forward ten years and we now publish 48 regular reviews to which there are over 160,000 subscriptions. We're grateful to each and every one of you for your support and are looking forward to even bigger and better things over the coming years.

We hope you find these and the other selected studies interesting, and welcome your feedback.

Kind regards,

Associate Professor Alister Neill alisterneill@researchreview.co.nz
Dr Karen Falloon karenfalloon@researchreview.co.nz

The impact of active and former smoking on the severity of obstructive sleep apnea

Authors: Varol Y et al.

Summary: This study investigated the impact of active versus former smoking on disease severity in patients with OSA. 964 patients who underwent overnight PSG in a sleep clinic were included. 367 patients had never smoked. Active smokers had a mean age of 49.53 years while former smokers and never smokers had mean ages of 51.37 and 54.2 years, respectively ($p<0.0001$). Desaturation time during sleep was longer in former smokers than never smokers ($p=0.005$). As AHI increased, the mean pack × years also increased ($p=0.01$). Severe smokers had higher AHI than mild smokers.

Comment (KF): Despite smoking (former, current, and exposure to second-hand smoke) being associated with an increased risk of habitual snoring, the link between OSA and smoking is less clear. This study did not show a significant correlation between OSA severity and smoking habit. The study design (relying on what is reported and recorded in medical records) does however introduce the possible risk of bias (e.g. inaccurate reporting of smoking habit). However, the authors did report that cigarette smoking was associated with a younger age at diagnosis of OSA and that heavy smokers had more severe disease. Despite this, various studies have shown that active smokers have a higher prevalence of sleep disturbance, lower sleep efficiency and lighter sleep than non-smokers (possibly due to irritation and inflammatory changes that narrow the upper airway). Therefore, whilst we do not have evidence to say that smoking is a risk factor for OSA, patients who smoke will probably have poorer sleep and feel worse. Poorer sleep may increase drowsiness and the risk this entails so those with OSA should be strongly advised not to smoke.

Reference: Sleep Breath 2015;19(4):1279-84
Abstract

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Time spent reading this publication has been approved for CME for Royal New Zealand College of General Practitioners (RNZCGP) General Practice Educational Programme Stage 2 (GPEP2) and the Maintenance of Professional Standards (MOPS) purposes, provided that a Learning Reflection Form is completed. Please **CLICK HERE** to download your CPD MOPS Learning Reflection Form.

Time spent reading this publication has been approved for CNE by The College of Nurses Aotearoa (NZ) for RNs and NPs. For more information on how to claim CNE hours please **CLICK HERE**.

Risk factors for automobile accidents caused by falling asleep while driving in obstructive sleep apnea syndrome

Authors: Arita A et al.

Summary: This study examined the risk of motor vehicle accidents caused by falling asleep while driving in patients with OSA. Drivers with a history of snoring and excessive daytime sleepiness who had undergone PSG were asked to complete a questionnaire on accidents caused by falling asleep while driving. The Epworth Sleepiness Scale (ESS) was used as a subjective measure of sleepiness. Based on PSG results, 2387 subjects diagnosed with OSA were divided into 3 groups according to AHI: mild-to-moderate ($5 \leq$ AHI < 30), severe ($30 \leq$ AHI < 60), and very severe (AHI ≥ 60). Compared with simple snorers, the group with very severe OSA (but not mild-to-moderate or severe OSA) reported significantly higher rates of driving when drowsy and having accidents in the past 5 years due to falling asleep.

Comment (KF): It is important to always be alert to the potential safety risk involved with OSA and daytime drowsiness. This study gives some evidence to support which features of a patient presenting or being diagnosed with OSA cause particular concern regarding driving. An ESS score of ≥16 and the frequency of feeling drowsy (more than 'sometimes') during regular driving and working have been identified as particular risk factors for motor vehicle accidents by falling asleep while driving in this study. Patients need to be counselled about the important safety concerns of having these risk factors. These symptoms in a patient (among others) would be described as a "high risk driver profile" and driving should cease until correct evaluation and symptom improvement. Further guidance as to when driving should cease can be found in the New Zealand Transport Authority publication "Medical Aspects of Fitness to Drive".

Reference: Sleep Breath 2015;19(4):1229-34
Abstract

The use of media as a sleep aid in adults

Authors: Exelmans L & Van den Bulck J

Summary: This study investigated the use of media as a sleep aid in adults. 844 adults (18–94 years) were asked about media habits and sleep behaviour in face-to-face interviews using standardised questionnaires. Participants reported using books (39.8%), television (31.2%), music (26.0%), Internet (23.2%), and video games (10.3%) as a sleep aid. Use of media as a sleep aid was associated with increased fatigue and poorer sleep quality, but not with sleep duration. Media use was also associated with "time shifting" (later bed times and later rise times).

Comment (KF): Much research has been reported looking at the correlation between use of media and the effect on sleep in the child and adolescent population but less is known about the effect on sleep in the adult population. This study shows that (perhaps despite what your patient will tell you about their relaxing effect) the use of media (including books) as a sleep aid is associated with poorer sleep quality, increased fatigue and a process termed "time shifting" where media use leads to later bed times and later rise times. This provides evidence to support our recommendations of using the bed/bedroom only for sleep and intimacy and to restrict media use to outside the bedroom to support good sleep habits.

Reference: Behav Sleep Med 2016;14(2):121-33
Abstract

Independent commentary by Dr Karen Falloon

Dr Karen Falloon completed her medical training at the University of Auckland Medical School in 2001. She became a fellow of the Royal New Zealand College of General Practitioners in 2009. In 2014 Karen completed her PhD in General Practice for which she investigated the effectiveness of a behavioural treatment for insomnia. She is now working part time as a general practitioner and part time as a senior lecturer in the Department of General Practice and Primary Health Care at the University of Auckland. Karen is a member of the Australasian Sleep Association and serves on the GP education subcommittee.

The effect of meditative movement on sleep quality

Authors: Wang F et al.

Summary: This systematic review examined the effects of meditative movement (MM) on sleep quality. A comprehensive review of relevant studies drawn from English and Chinese databases identified 27 randomised controlled trials that reported the effects of MM (tai chi, qi gong, and yoga) on sleep quality. 17 studies were considered to be high-quality. Findings of these 17 studies showed that MM had beneficial effects on a range of sleep measures in various populations. The majority of studies reported an improvement in sleep quality that was often accompanied by improvements in quality of life, physical performance, and depression. Meta-analysis was not performed because of significant clinical heterogeneity.

Comment (KF): Overall, this review gives a positive impression of the potential benefit of MM on sleep quality. However, the studies were so heterogenous, and only 5 studies involved a population with insomnia, that further research is required looking at the benefits of specific types of MM e.g. yoga type versus control in a population with insomnia. It would be useful to have a guide as to the dose and frequency required to derive benefit. One study showed benefit with a frequency of three times per week but intuitively a daily practice may give the greatest benefit. Long-term follow-up would also be important given the persistent and recurrent nature of insomnia.

Reference: Sleep Med Rev 2015;30:43-52
Abstract

Cognitive behavioral therapy as an adjunct treatment to light therapy for delayed sleep phase disorder in young adults

Authors: Danielsson K et al.

Summary: This study investigated the feasibility of CBT as an adjunct treatment to light therapy (LT) in patients with delayed sleep phase disorder (DSPD). Participants aged 16–26 years received LT for 2 weeks before being randomised to either 4 weeks of CBT or no treatment (NT). LT advanced sleep-wake rhythm in both groups. There were no significant between-group differences in sleep duration and quality. Anxiety and depression scores were low at baseline and decreased significantly in the LT+CBT group compared with the LT+NT group.

Comment (KF): Approximately 7–16% of young people have an extremely delayed sleep phase, known as DSPD. In DSPD there is a persistent inability to fall asleep at conventional times and great difficulties rising in the morning which causes social impairment or functional distress for the person. Light therapy is a safe treatment with only a few common side effects that are generally mild and short-lived, however, compliance is sometimes poor. The authors of this study hypothesised that adding CBT to LT could maintain or enhance the effect of LT. They found that sleep duration and quality improved in both groups at 6 months but that there was no significant differences between the groups. However, several methodological limitations of this small study may have impacted this finding. The study was unblinded and relied on self-reported use of LT. There was not objective measurement of sleep/light such as by using actigraphy. CBT was administered in groups after the 2 week LT protocol (rather than during) and not all participants attended all sessions. Practically, we know LT is useful. Whether CBT in addition is useful may relate to the individual factors. Certainly, if someone with DSPD also has a rather chaotic life and/or maladaptive sleep habits then these would require addressing in conjunction with LT using cognitive and/or behavioural methods.

Reference: Behav Sleep Med 2016;14(2):212-32
Abstract

Independent commentary by Associate Professor Alister Neill

Alister Neill is Associate Professor at the Department of Medicine, University of Otago, Wellington School of Medicine; and Respiratory and Sleep Physician at the Department of Respiratory Medicine, Capital and Coast Health. His research interests include the epidemiology and ethnic distribution of obstructive sleep apnoea in New Zealanders and its relationship to cardiovascular disease, new treatment technologies, sleep assessment pathways and the provision of home non-invasive ventilation for respiratory failure. He directs the University of Otago's WellSleep Laboratory and Research Group and is an Associated Investigator of the Australasian Sleep Trials Network.

Cognitive performance, sleepiness, and mood in partially sleep deprived adolescents: the Need for Sleep Study

Authors: Lo J et al.

Summary: This analysis of the Need for Sleep Study investigated the effects of sleep restriction on cognitive performance, subjective sleepiness, and mood in adolescents. 56 healthy male and female adolescents from top high schools were randomised to Sleep Restriction (SR) or a control group. Participants underwent a 2-week protocol consisting of 3 baseline nights (time in bed: 9h), 7 nights of sleep restriction (time in bed: 5h for SR and 9h for controls), and 3 nights of recovery sleep. The SR group showed gradual deterioration in sustained attention, working memory and executive function, an increase in subjective sleepiness, and a decrease in positive mood. Subjective sleepiness and sustained attention did not return to baseline levels even after 2 recovery nights. The control group maintained baseline levels of measured parameters throughout the study.

Comment (AN): Given that some of the world's most sleep deprived students live in East Asia this study is a wake-up call for students, educationalist and policy makers. Partial sleep deprivation of adolescent students (from top high schools) caused neurobehavioral deficits across a number of cognitive domains that in some cases remained despite 2 nights of recovery sleep. It makes no sense to sacrifice sleep in the pursuit of academic success.

Reference: Sleep 2016;39(3):687-98
Abstract

Effect of positive airway pressure on cardiovascular outcomes in coronary artery disease patients with non-sleepy obstructive sleep apnea

Authors: Peker Y et al.

Summary: The RICCADSA trial investigated the effects of CPAP on long-term adverse cardiovascular outcomes in patients with coronary artery disease and non-sleepy OSA. 244 consecutive patients with newly revascularised coronary artery disease and OSA (AHI ≥15/h) without daytime sleepiness were randomised 1:1 to auto-titrating CPAP airway pressure or no positive airway pressure. Median follow-up was 57 months. The incidence of the primary end-point (first event of repeat revascularisation, myocardial infarction, stroke or cardiovascular mortality) did not differ significantly between groups. After adjustment for baseline comorbidities and compliance with the treatment, there was a significant cardiovascular risk reduction in those who used CPAP for ≥4 vs <4 h/night.

Comment (AN): What I took from this single centre, relatively small study randomised trial was that patients with concomitant OSA who used CPAP for more than 4 hours per night had a reduction in cardiovascular events. RICCADSA looked to be underpowered for the components of the composite end-point used. An answer to this important issue shouldn't be too far off with SAVE (Sleep Apnea cardioVascular End-points) now being analysed.

Reference: Am J Respir Crit Care Med 2016; published online Feb 25
Abstract

Screening for sleep-disordered breathing in a bariatric population

Authors: Reed K et al.

Summary: This study assessed the prevalence of OSA in obese patients undergoing bariatric surgery. 141 patients who were referred for bariatric surgery were screened for OSA. Sleep-disordered breathing of any degree was evident in 73% of patients (9% patients had severe OSA, 13% had moderate OSA and 24% had mild OSA). 24% of patients were initiated on CPAP prior to surgery and 11% were admitted for further respiratory assessment (2 of them were given CPAP after an inpatient sleep study). 13 patients were advised to use a mandibular advancement device but 76 (54%) were advised that no treatment was required.

Comment (AN): It's not surprising that three-quarters of bariatric surgery patients have OSA. Our local practice is to screen for obesity hypoventilation syndrome (OHS) and presume that the majority will have OSA. The use of an oximetry derived desaturation index in morbidly obese patients is problematic and can lead to OSA over-diagnosis.

Reference: J Thorac Dis 2016;8(2):268-75
Abstract

Rotigotine may improve sleep architecture in Parkinson's disease

Authors: Pierantozzi M et al.

Summary: This study investigated the impact of transdermal rotigotine on PSG parameters in patients with Parkinson disease (PD). 42 patients with moderately advanced PD and sleep impairment were randomised in a double-blind design to apply a rotigotine or placebo patch daily (from 1800h to awakening). Rotigotine significantly increased sleep efficiency, reduced wakefulness after sleep onset, and reduced sleep latency compared with placebo. The mean change in REM sleep quantity was significantly higher in the rotigotine group than in the placebo group.

Comment (AN): Sleep disturbance can be an important problem in PD. This well-designed study of moderate PD patients taking levodopa therapy showed that rotigotine, a transdermally delivered dopaminergic agent, improved sleep efficiency and quality. It is currently not funded in NZ as there are oral alternatives (ropinirole).

Reference: Sleep Med 2016; published online Feb 17
Abstract

Blood pressure response to losartan and continuous positive airway pressure in hypertension and obstructive sleep apnea

Authors: Thunström E et al.

Summary: This study investigated whether the addition of CPAP to an antihypertensive regimen has an impact on blood pressure (BP) in patients with hypertension and OSA. 91 patients with untreated hypertension (55 with OSA and 36 without OSA) were treated with the angiotensin II receptor antagonist losartan 50 mg/day for 6 weeks. They were then randomised to either nightly CPAP as add-on therapy or no CPAP for a further 6 weeks. Losartan significantly reduced systolic, diastolic, and mean arterial BP in patients with and without OSA. Add-on CPAP treatment caused no further changes in 24-hour BP but reduced night-time systolic BP by 4.7mm Hg. All 24-hour BP values were significantly decreased in patients with OSA who used CPAP for ≥4 h/night.

Comment (AN): This is the first randomised trial assessing the effect of CPAP plus an antihypertensive agent (losartan) compared with the same agent alone. Interestingly, OSA patients were less responsive to losartan than those without OSA. Adding CPAP to losartan therapy in patients with OSA lead to a further fall in night-time and morning systolic BP, with 25% of the patients achieving optimal BP control. The effect was greatest in those using CPAP for more than 4 hours per night.

Reference: Am J Respir Crit Care Med 2016;193(3):310-20
Abstract