Understanding OSA and its effect on brain health

Sleep plays a major role in our ability to learn, to think clearly and to protect from any future harm to your brain. For those suffering from a sleep disorder such as obstructive sleep apnoea (OSA) – one of the key focus areas of this year’s Sleep Awareness Week – the impact can be more significant.

We caught up with Adelaide Institute for Sleep Health researcher Amal Osman, an Alertness CRC PhD candidate who is investigating new clinical tests for people with OSA, to ask her about OSA symptoms and health impacts, and how current OSA therapies such as CPAP can improve cognition and other health issues.

What exactly is OSA? And, how can untreated OSA impact our health?
OSA is when someone experiences repetitive disruptions to their breathing during sleep. When this is left untreated it is associated with many adverse health consequences, including cognitive impairment. This can include executive functioning (problem solving, implementing tasks, cognitive flexibility, planning), attention, and memory.

What is the relationship between OSA and cognitive impairment?
The relationship between OSA and cognitive impairment is complicated. Some people with OSA have structural and functional brain abnormalities. This could be a complication from inadequate ventilation, causing low blood oxygen levels and frequent awakenings during sleep. Other common symptoms of OSA such as excessive daytime sleepiness, tiredness and fatigue are known to impair daytime functioning and performance. Another contributor could be conditions such as obesity, hypertension and metabolic disorders, all of which can be related to untreated OSA.

Can continuous positive airway pressure (CPAP) therapy help to improve cognition and memory? If so, how?
CPAP therapy is the first-line treatment for OSA. It prevents the frequent pauses in breathing during sleep, restoring adequate ventilation, sleep quality and blood oxygen levels. CPAP is a highly efficacious therapy when people adhere to it as directed by their sleep physicians. It doesn’t, however, improve all cognitive deficits, and the degree of improvement can vary. Recent studies have shown that CPAP can help improve some executive functions, memory, attention and depressive symptoms. Other studies have shown that CPAP may cause structural improvement to certain brain regions. While these findings are promising, more research is needed to understand the effects of OSA disease severity, the impact of age and how much CPAP usage is required for people with OSA to notice improvements.

Are there any other treatments/methods that can help improve symptoms of OSA and therefore cognition and memory?
Oral appliances and upper airway surgery to treat OSA have also been shown to improve cognitive function, similarly to CPAP therapy. These therapies are only appropriate for a select group of people with OSA and require physician recommendation.
Tell us about your own research in OSA – have you found anything novel that may assist with OSA treatment and thus cognitive repair?

My research involves the development of new clinical tests to measure how likely the upper airway is to narrow and close (degree of collapsibility) in people with OSA. Previously, this could only be measured reliably using complex, invasive and costly techniques assessed in research sleep laboratories. My work has simplified this to a ~10-minute assessment in awake people with OSA. The sleep medicine field is very interested in a more individualised OSA therapeutic approach and this work contributes to this goal by providing an individualised understanding of OSA to move away from the current trial and error approach of OSA management.

What general advice would you give to someone with OSA on how they can get help and what type of help they may need?

OSA is very common. If you have been diagnosed or suspect you may have OSA, you should discuss your condition with your GP or sleep physician to consider if therapy is appropriate and, if so, which treatment may be best for you. While the use of common therapies such as CPAP or oral appliances may initially disrupt your sleep habits/routine, this can often resolve over the first few weeks so it is recommended that you try to persevere through any initial discomfort. There are skilled health professionals willing to help you on this new journey to better sleep and health, and many resources are available from the Sleep Health Foundation and the Australasian Sleep Association to assist.