

Assessment and management of sleep disorders in shift workers:

Challenges and considerations for general practice



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Background

Shift work is characterised by displaced sleep opportunities and associated sleep disturbance. Shift workers often report sleepiness and other wake time symptoms associated with poor sleep. However, clinical sleep disorders are also prevalent in shift workers. Although prevalence rates are similar or higher in shift workers compared with the general population, help seeking in shift workers with sleep disorders is low.

Objective

This article aims to provide general practitioners with a contemporary overview of the prevalence rates for sleep disorders in shift workers, to clarify the existing evidence relating to mental and physical health consequences of sleep disorders in shift workers and to highlight the need to consider undiagnosed sleep disorders before attributing sleep-related symptoms solely to work schedules.

Discussion

Symptoms of sleep loss associated with shift work overlap with symptoms experienced by individuals living with sleep disorders. Although >40% of middle-aged Australians live with a sleep disorder that requires investigation and management, symptoms in shift workers are often attributed to the work schedule and, as a result, might not be investigated for appropriate diagnosis and treatment. We argue that screening for sleep disorders in shift workers with sleep complaints should be a priority.

SHIFT WORK is generally defined as work that occurs outside 'typical' daytime hours (ie 8.00 am to 6.00 pm).¹ Shift schedules can include fixed early morning, evening or night shifts, rotating two or three panel shifts, and might also involve fly-in, fly-out or drive-in, drive-out arrangements. Broader definitions take into account work patterns that require on-call, overtime and early morning starts.² Shift work, particularly night work, displaces sleep from the biological night,³ forcing workers to attempt sleep during daytime hours and to be awake during some or all of the night. This requires individuals to remain awake, often consuming food and drink, and exposed to light at times when the circadian clock promotes sleep. Sleep is then attempted at times when the biological drive is for wakefulness. This mismatch can make achieving sufficient good-quality sleep challenging, even when workers have been awake for a long period overnight with accumulated sleep pressure.

Shift workers who experience regular challenges to their sleep report high levels of sleepiness and fatigue,³ impaired attention and memory,⁴ higher risk for workplace accidents and car accidents on the commute home from night shift, and increased risk of non-communicable chronic diseases and mood disorders.¹ The degree and frequency of impairments due to disturbed sleep can vary by industry sector, workplace and individual worker schedules, with elements of rotating schedules and night work associated with poorer sleep.¹ Identification and management of sleep problems is critical for managing occupational and road safety risks, as well as shift worker health and wellbeing.

Prevalence of sleep disorders in shift workers

Sleep disorders, including insomnia, obstructive sleep apnoea (OSA) and restless legs syndrome (RLS), are common in working-age adults. Prevalence rates of sleep disorders severe enough to warrant investigation in the general population are 20% in young adults⁵ and reach 43% by middle age.⁶ However, recent research shows that shift workers experience similar⁷ or higher⁸

rates of sleep disorders warranting clinical intervention when compared with day workers. In a community sample of young Australians, at least one clinically significant sleep disorder, including OSA, insomnia and RLS, was present in 18% of young shift workers.⁷ The prevalence of one or more sleep disorders in various shift working sectors is reported to be up to 40%,^{9,10} which is in line with broader Australian community prevalence estimates of common clinical sleep disorder rates by middle age.⁶

OSA is a sleep breathing disorder, with moderate to severe OSA affecting 29.3% of middle-aged Australians.⁶ Similar or higher rates of OSA have been demonstrated in numerous shift working groups, including firefighters (28.4%),⁹ police officers (33.6%),¹⁰ commercial truck drivers (34.8%)¹¹ and paramedics (41%).¹² There is also an indication that symptoms of OSA are more severe in shift workers during daytime sleep and might confer a greater burden than OSA experienced during night sleep opportunities.¹³

Insomnia refers to chronic (longer than three months) difficulties initiating and/or maintaining sleep in the context of adequate opportunity to sleep, together with negative experiences of fatigue, mood disturbance, reduced attention, performance and/or memory.¹⁴ Recent estimates of insomnia in the Australian population range from 13.1%⁶ to 23.2%.¹⁵ The prevalence of insomnia among shift workers is estimated to be much higher than in the general population globally, with a recent systematic review identifying prevalence rates in shift workers ranging from 12.8% to 76.4%.¹⁶

Shift workers are also vulnerable to shift work disorder, a circadian rhythm sleep-wake disorder with chronic (longer than three months) symptoms of insomnia and/or high levels of sleepiness during wake time, variability in sleep-wake patterns and shorter sleep durations, in the context of a shift work schedule.¹⁴ In individuals with shift work disorder, these symptoms typically improve when a more conventional sleep schedule is possible (ie when not working shifts due to annual leave or a shift to day schedules). Prevalence estimates of shift work disorder are between 10.5% and 32.1% in population and occupation samples,^{17,18} with the estimates varying by shift schedule.¹⁸

Help seeking for sleep disorders in shift workers

A developing body of evidence in shift workers suggests that help seeking for sleep problems is extremely limited in shift workers. Concerningly, the majority of shift workers screening positive for at least one sleep disorder have not received a sleep disorder diagnosis. This is found both in studies from samples in specific occupations with shift workers^{9,10} and in studies of shift workers as part of representative, community cohorts.⁷ The extent of under-reporting of sleep problems by shift workers in the primary care environment is unknown, but low self-reported help-seeking rates for sleep problems in Australian shift workers suggest that engaging with primary care to discuss sleep is uncommon.¹⁹ For example, less than one-third of Australian shift workers with symptomatic shift work disorder reported that they had spoken to a general practitioner about sleep problems in the past 12 months.¹⁹ The most common 'strategy' for managing sleepiness was to 'accept it and keep going' (>90%).¹⁹ Even when shift workers are screened for sleep disorders and made aware of their results, few engage with treatment and the most common response is to take no action.²⁰

Reasons for low engagement with healthcare providers need to be understood to support timely access to diagnosis and management for shift workers with sleep disorders. In some sectors, fatigue and sleepiness are perceived as synonymous with shift work, which might affect help seeking. For example, although early-career paramedics could readily connect shift schedules and work demands with their experience of fatigue and sleepiness, knowledge and awareness of sleep disorders as potentially addressable risk factors for these symptoms was poor.²¹ Without adequate knowledge of sleep disorders, there is a risk that potentially treatable causes of fatigue and sleepiness persist.

Research from safety-critical industries with mandated screening also suggests that one reason for not reporting symptoms or not seeking treatment might be concern about effects on employment. If there is a perception that a sleep disorder diagnosis might affect employment, there is potential for under-reporting of wake time symptoms

associated with sleep disorders.²² This has been attributed, in part, to fear or uncertainty about employment status or a perceived (or actual) risk of being removed from enjoyable duties within a job role.

The high prevalence of sleep disorders in shift workers coupled with low diagnosis rates point to an unmet need for assessment and management of sleep disorders in shift workers, including limited help seeking in primary care. The reasons for low diagnosis rates require further consideration to better inform engagement and screening strategies in general practice.

Considering sleep disorders in shift workers in the general practice setting

Identifying sleep disorders in shift workers requires a high index of suspicion. Shift work is associated with non-communicable chronic diseases,¹ and sleep disorders are commonly comorbid with cardiovascular disease (particularly atrial fibrillation and stroke), hypertension and diabetes.²³⁻²⁵ It is plausible that unmanaged sleep disorders are an under-recognised factor in the pathway between shift work and chronic disease. Further, common clinical sleep disorders, including insomnia,²⁶ OSA²⁷ and RLS,²⁸ are associated with poor mental health. Together, these associations highlight the potential importance of early detection of sleep disorders in shift workers for physical and mental health.

Many shift workers experience fatigue, sleepiness and poor sleep,¹ which could be attributable to the work schedule, an undiagnosed sleep disorder or both. However, anecdotal reports suggest that both patients and clinicians often attribute these symptoms to being employed as a shift worker, and assessments for sleep disorders might be overlooked. This might be due, in part, to time pressures in general practice, but further investigation of the barriers and enablers to sleep disorder diagnosis is required to identify causes of missed diagnosis of sleep disorders in this worker group. An active case finding approach, with the clinician inquiring into sleep symptoms, is clinically indicated for shift workers to identify potential for co-existing, and prevalent, sleep conditions.^{7,10,16} Consideration of validated

sleep screening questionnaires in routine primary care visits with shift workers is likely to be beneficial given the high rates of sleep disorders in this group, with a particular focus on workers at risk of comorbid health outcomes, including cardiometabolic and mental health presentations. Examples of existing screening questionnaires that have been used in shift working populations are provided in Table 1. It is important to note that many of these screening tools have been developed in non-shift working populations, and future efforts should consider whether terminology and questions need to be tailored to shift workers for more effective screening processes.

Unique challenges with diagnosing and managing sleep disorders in shift workers

Existing treatment approaches for sleep disorders can improve symptoms and quality of life.^{35,36} However, it is important to note that personalised approaches to diagnosis and management are important for shift workers, including consideration of sociodemographic differences. Given that many shift workers experience a degree of circadian misalignment due to working at night and sleeping into the day, identifying and referring to health services with expertise in shift work and sleep disorder management

is important. Existing pathways for Medicare-rebateable psychology services exist in the Australian healthcare system. Insomnia is an established, but underutilised, primary referral diagnosis with the Better Access to Mental Health Care program and should be considered for shift workers presenting with sleep complaints.³⁷ Preference for a psychologist specialising in sleep disorders is likely to benefit shift workers. There are several sleep research institutes and clinical services in Australia with specialist sleep psychologists who can manage patients remotely via telehealth if local services are limited or under higher demand.

A broader challenge for treating shift workers with sleep disorders is the current reliance on treatments that are predominantly developed in day workers.³⁸ A recent systematic review and meta-analysis suggests a blunted response to cognitive behavioural therapy for insomnia (CBT-i) for shift workers, whereby some benefit is observed for insomnia symptoms, but this does not meet minimal clinically important differences for endpoints of interest in insomnia patients.³⁸ This might be, in part, a consequence of the challenges shift work schedules pose for complying with behavioural aspects of CBT-i, and it is presently unclear whether techniques such as intensive sleep retraining for insomnia are appropriate for shift workers.³⁹

Bedtime restriction is a mainstay of CBT-i and might be challenging for shift workers to implement in the context of rosters, particularly because recent prior sleep history is important for waking function, and might be used by organisations in formal fatigue risk management systems. Some aspects of stimulus control therapy in CBT-i, particularly related to only being in bed when sleepy, might be more appropriate for shift workers than, for example, setting regular morning rise times (potentially impossible for rotating rosters). More trials of tailored CBT-i for shift workers are needed,³⁸ particularly with a focus on circadian-focused interventions given the effect of shift work on the circadian system.

Beyond the commonly recommended first-line treatment for insomnia (CBT-i), there is limited evidence of the benefits of pharmacological interventions for sleep disturbance in shift workers. A 2014 Cochrane review found that although alerting agents like modafinil can reduce sleepiness, these benefits are accompanied by adverse events, and the hypnotic zopiclone did not improve sleep following night shift.⁴⁰ More recent pilot evidence suggests that suvorexant, a dual hypocretin receptor antagonist, might support shift workers to achieve substantially longer daytime sleep opportunities,⁴¹ and a Phase IV trial is currently under way with the dual orexin antagonist lemborexant in shift workers to determine any benefits for daytime sleep (<https://classic.clinicaltrials.gov/ct2/show/NCT05344443>).

Diagnosis and management of a sleep disorder might also require multiple appointments with primary care and specialist providers. This can pose unique challenges for some workers, particularly when rosters are unpredictable or generally do not facilitate easy access to appointments during business hours. Further, affordable access to clinicians or upskilled general practitioners with sleep expertise is another barrier due to funding restrictions. In light of such barriers, clinical services that specialise in the diagnosis and management of sleep disorders in shift workers are likely needed and unique models of care to facilitate access should be considered.

Finally, our understanding of the experience of the diagnosis and management of sleep disorders from the perspective of

Table 1. Examples of existing screening questionnaires that could be used in the primary care setting for common sleep disorders experienced by shift workers

Obstructive sleep apnoea^A	
Nagappa et al (2015) ²⁹	STOP-Bang (8 items)
Chai-Coetzer et al (2011) ³⁰	OSA50 (4 items)
Netzer et al (1999) ³¹	Berlin questionnaire (11 items)
Insomnia	
Espie et al (2014) ³²	Sleep Condition Indicator (8 items)
Bastien et al (2001) ³³	Insomnia Severity Index (7 items)
Shift work disorder^B	
Barger et al (2012) ³⁴	Shift work disorder screening questionnaire (4 items)

^AThe citations provided are for studies that include meta-analysis and/or reliability and validity metrics for ease of reference and might not represent the first publication of the relevant scale(s).

^BConsider the additional use of an insomnia screening questionnaire as a severity indicator.

patients in the Australian healthcare system is lacking. Understanding the barriers and enablers to successful sleep disorder management in shift workers will be critical for improving the pathway to diagnosis and management.

Conclusion

Clinical sleep disorders are highly prevalent in Australian shift workers and are associated with adverse health outcomes, even in early adulthood, as well as adverse effects on safety and productivity. In general practice, a low threshold for screening and referrals for common sleep disorders in shift workers is warranted, with a particular focus on OSA, insomnia and shift work disorder. Once the presence of a sleep disorder is conclusively ruled out, general practitioners could consider additional sleep hygiene advice (eg shift work-specific recommendations that are available through the Sleep Health Foundation). There is also an urgent need for tailored approaches for detecting and managing sleep disorders appropriate to the specific occupational risks and contexts, as well as new models of care, including guidelines to support shift workers and address current barriers to healthcare access, and improved monitoring of treatment outcomes.

Key points

- By middle age, 43% of Australians are living with a clinical sleep disorder.
- These rates are similar, and potentially higher, in shift workers.
- The combination of shift work and a sleep disorder has significant implications for adverse health and safety outcomes.
- Help-seeking rates for sleep disorders are low in shift workers, meaning these health and safety risks are commonly unmanaged.
- Sleep disorder screening and investigations should be prioritised in shift workers.

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