Sleep disorders

Public health implications of sleep loss: the community burden

Sleep is a basic and necessary biological process that demands to be satisfied as much as our need for food and drink. Inadequate sleep can occur if insufficient time is allowed for it or if a disorder is present that disturbs sleep quality. It is only recently that we have begun to understand the scale of the health and social consequences of insufficient sleep and sleep disorders. Sleep loss from these problems is associated with disturbances in cognitive and psychomotor function including mood, thinking, concentration, memory, learning, vigilance and reaction times. These disturbances have adverse effects on wellbeing, productivity and safety. Insufficient sleep is a direct contributor to injury and death from motor vehicle and workplace accidents. Further, relationships have been demonstrated between shortened sleep and a range of health problems including hypertension, type 2 diabetes, obesity, cardiovascular disease and total mortality risk. Specific sleep disorders such as insomnia, obstructive sleep apnoea (OSA) and restless leg syndrome have also been associated with increased morbidity and mortality. These sleep-related problems incur financial costs relating to health and other expenditures and non-financial costs relating to loss of quality of life. This article considers the prevalence and economic impacts of sleep problems in Australia.

Prevalence of sleep problems

There have been very few studies of the prevalence of disturbed sleep in Australia. A small survey (n = 216) of sleeping difficulties, daytime sleepiness, and hypnotic medication use was conducted in Adelaide more than 20 years ago. A larger survey (n = 535) was conducted in Newcastle, New South Wales, in 1996 but was limited to a question about insomnia and hypnotic medications. Another small survey (n = 267) in rural Victoria among Australian day workers was heavily weighted to men. More recently, a large NSW mail survey (n = 3300) reported that 18.4% of participants slept less than 6.5 hours a night and 11.7% complained of chronic sleepiness. A recent study of the insomnia burden suggested a prevalence of 5.6%, with increased use of health care. To further characterise sleep quality in a large representative sample of Australians, in 2010, the Sleep Health Foundation commissioned a national survey of sleeping difficulties and negative daytime consequences of poor sleep. It was modelled on the Sleep in America surveys conducted by the National Sleep Foundation, in part to allow international comparisons. A national polling organisation (Roy Morgan Research) was commissioned to perform the work. It conducted a national landline telephone survey of adolescents and adults (14 to >70 years of age) across successive weekend evenings. The survey contained 14 questions about sleep: five about sleeping difficulty, two about snoring and OSA, one about restless legs, one about sleeping medication, three about daytime impairments usually associated with sleep disturbance, and two about nocturnal sleep duration (weekdays and weekends) (Box 1).

Box 1 shows the proportions of respondents reporting current sleep difficulties and daytime impairments at least a few times per week (indicative of significant problem), as well as average self-reported sleep duration for the population overall, for males and females, and for each age group. The results illustrate that a considerable proportion of Australians report frequent difficulty falling asleep, which was more prevalent among females and younger age groups. Frequent waking during the night was reported by 35% overall, again more commonly among females but increasing with age. Thirty-five per cent reported waking unfreshened and 24% reported inadequate sleep. Daytime sleepiness, fatigue/exhaustion and irritability were common issues (19%–24%).

Symptoms were examined to determine likely prevalence of insomnia by selecting those with specific self-
Supplement

1 Proportions of survey respondents experiencing sleep difficulties, sleep disorder symptoms and daytime impairments a few times a week or more (often), overall and by sex and age group

<table>
<thead>
<tr>
<th>Difficulty experienced often</th>
<th>Overall</th>
<th>Male</th>
<th>Female</th>
<th>14—17 years</th>
<th>18—24 years</th>
<th>25—34 years</th>
<th>25—49 years</th>
<th>50—64 years</th>
<th>&gt; 65 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weighted proportion of total</td>
<td>100%</td>
<td>6.4%</td>
<td>50.6%</td>
<td>6.4%</td>
<td>11.7%</td>
<td>17.4%</td>
<td>26.0%</td>
<td>21.9%</td>
<td>16.5%</td>
</tr>
</tbody>
</table>

Sleeping difficulty
- Difficulty falling asleep: 19.6% among females, 16.9% among males
- Waking a lot during night: 34.9% among females, 30.4% among males
- Waking up too early: 25.3% among females, 22.9% among males
- Waking feeling unrefreshed: 34.7% among females, 31.8% among males
- Did not get adequate sleep: 23.7% among females, 17.9% among males

Snoring, obstructed breathing
- Frequent or loud snoring: 21.2% among females, 26.4% among males
- Pauses in breathing in sleep: 6.6% among females, 6.2% among males
- Restless legs: 9.4% among females, 8.6% among males
- Prescribed sleep medication use: 3.6% among females, 4.0% among males

Daytime symptoms
- Daytime sleepiness: 19.0% among females, 15.7% among males
- Fatigue or exhaustion: 23.5% among females, 20.0% among males
- Irritable or moody: 18.8% among females, 18.2% among males

Sleep duration
- Weeknights (Sunday–Thursday), h: 7.16 among females, 7.15 among males
- Weekend nights (Friday–Saturday), h: 7.37 among females, 7.37 among males
- Overall, h: 7.22 among females, 7.21 among males

Sleep disorder estimates
- Severe clinical insomnia: 6.9% among females, 5.0% among males
- Sleep apnoea: 4.9% among females, 6.3% among males

* P < 0.05. † P < 0.001. ¶ Adjusted for the 10%–11% who “can’t say”. § Estimated Insomnia Severity Index > 14, derived from data for sleeping difficulty and daytime symptoms.

† Estimates derived from data for frequent breathing pauses and loud snoring.

Reported sleep difficulties plus daytime impairment to derive a score that very closely simulates the Insomnia Severity Index, a highly reliable and valid tool to identify clinical insomnia. This suggested an overall presence of severe insomnia (Insomnia Severity Index, > 14) of 6.9%, 8.7% in women and 5% in men (Box 1). Prevalence of sleep apnoea was determined by deriving the proportion of respondents who snored loudly at least a few times a week and had observed breathing pauses during sleep at least a few times a month. An overall prevalence of 4.9% was noted, but in this case, prevalence was higher among males (6.4%) than females (3.6%).

While these prevalences of specific sleep disorders were derived from combinations of questionnaire responses, they are similar to the prevalences determined from other population-based studies. These findings suggest that specific sleep disorders may account for about half of the complaints of daytime sleepiness and fatigue and exhaustion noted in our survey. While other health problems can disturb sleep, particularly in older patients, much of the balance may be due to insufficient sleep duration by choice or through circumstances that result in sleep being given a lower priority than work, social or family activities. Sleep duration estimates are significantly below the putative average adolescent sleep requirement of 9 hours a night and adult sleep requirement of 7.5–8 hours a night for both men and women, particularly among those between the ages of 35 and 65 years. Insufficient sleep at a few times a week was reported by 23.7% of the sample, more frequently by females, and more commonly in the younger to middle-aged groups. Perhaps relevant to this, a study of young adults has shown that those with shorter habitual sleep patterns carried the highest sleep debt, suggesting self-selected sleep restriction.

The general point that emerges from these data is that inadequate sleep (duration or quality) and its daytime consequences are widely prevalent in Australians, either because of a specific sleep-related disorder or from voluntarily shortened sleep through choice or circumstance. Although there are limitations with telephone surveys (eg, low response rates to landline phone calls), the results are very comparable with those observed in similar surveys conducted elsewhere, such as the 2008 Centers for Disease Control and Prevention study, which reported that 28% of United States adults had insufficient sleep or rest (< 7 h/night) on most nights over a 30-day survey period.

Economic impact
Poor sleep and its consequences result in significant costs to the community. Although there have been no detailed economic evaluations of the costs associated with insufficient sleep in otherwise healthy individuals, analyses have been undertaken for those with sleep disorders. OSA provides an example of a widely prevalent sleep disorder with significant comorbidities, including impaired daytime alertness, increased accident risk, hypertension, vascular
Poor or inadequate sleep is very common among Australian adolescents and adults, affecting over 20% on a daily or near-daily basis. Epidemiological studies suggest about
half of this problem can be attributable to common sleep disorders such as OSA and insomnia, as together they affect about 10% of the community. The balance appears likely to be the result of inadequate sleep arising from other health problems or issues such as poor sleep habits or sleep loss because of competing demands on time from work, social or family activities. Economic estimates demonstrate that sleep disorders are associated with large financial and non-financial costs. Given that the greatest financial costs appear to be non-medical costs related to loss of productivity and accident risk, it is likely that inclusion of the effects of sleep restriction from poor sleep habits or choice could add considerably to these already substantial amounts.

Competing interests: No relevant disclosures.

Provenance: Commissioned by supplement editors; externally peer reviewed.

7 Sabansayagam C, Shankar A. Sleep duration and cardiovascular disease: results from the National Health Interview Survey. Sleep 2010; 33: 1037-1042.