

Sleepiness in Adolescents

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KEYWORDS

• Adolescents • Sleepiness • Sleep deprivation • Clinical • Public health

KEY POINTS

- Sleepiness in the adolescent age group is an issue that is gaining increasing attention from researchers and clinicians as well as other stakeholders.
- Although clinical sleep disorders do affect some adolescents and warrant proper diagnosis and treatment, insufficient nighttime sleep is the main underlying cause of sleepiness in this age group.
- Points in medical history taking that may need to be explored for adolescent patients include personal habits, such as energy drink consumption and electronic media use, and environmental factors, such as parent-set bed times and school start times.
- Tackling the problem of sleepiness among adolescents may need collaboration from pediatricians and family physicians as well as public health agencies, parents, and school boards.

INTRODUCTION

Over the past decade, the issue of adolescent sleep has gained increasing attention from researchers, clinicians, parents, and the general public. Receiving sufficient and good quality sleep is integral to the optimal development, academic success, and overall well-being of adolescents. Although clinical sleep disorders affect some adolescents, sleepiness among this age group is increasingly being recognized as a public health concern, with many of its determinants lying beyond the biomedical scope of explanation. Chronic sleep loss, also termed insufficient sleep or inadequate sleep, is the main, albeit not only, cause of sleepiness during the daytime. In addition, the transition from childhood into adulthood is accompanied by many biological changes in the adolescent, and changes in the biological clock are no exception.

The consequences of sleepiness, in particular in this age group, have wide implications for mental, psychological, and physical health, as well as the academic achievement of adolescents. In this article, the authors walk the reader through an understanding of the physiologic changes in sleep-wake regulation and the circadian rhythm in the adolescent age group; the scope of the problem of sleep loss and sleepiness among adolescents; its etiologic factors, which encompass physiologic, lifestyle, and pathologic factors; its consequences; and the different approaches by which it can be addressed in clinical practice and beyond (for example, by policy changes in the educational sector). Because of the unique contributors to the epidemic of sleepiness in this age group, and because most sleepy adolescents will not present to sleep medicine physicians with their complaints, it is pertinent that the problem is presented from both a clinical and a public health perspective.

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THE BIOLOGY OF SLEEP IN ADOLESCENTS

Sleep in humans is a physiologic state that recurs on a regular basis.¹ The timing of sleep is determined by the biological clock, the sleep-wake physiologic equilibrium, as well as behavioral choice.^{2,3} The circadian rhythm is affected by puberty.⁴ Adolescents who reach puberty experience a delay in their circadian phase.⁴ Scientists have therefore argued that it is not a change in sleep requirements that occurs during the transition from childhood into adolescence, but rather a shift in melatonin peak levels to later in the evening.⁵ In general, adolescents and young adults seem to have the greatest delay in their circadian rhythm compared with other age groups,⁶ reaching the most extreme “lateness” of their circadian-induced sleep time at around the age of 20.⁶

It is recommended that teenagers get between 8.5 to 9.25 hours of sleep each night on a regular basis.⁷ Most recently, the amount of sleep needed by children and adolescents was published in a consensus recommendation that was developed by members of the American Academy of Sleep Medicine.⁸ In their recommendation, adolescents 13 to 18 years of age require 8 to 10 hours of sleep every 24 hours on a regular basis to entertain full daytime alertness and achieve optimal health.^{9,10} These recommendations are comparable to those of the National Sleep Foundation.¹¹

THE PREVALENCE AND CONSEQUENCES OF SLEEPINESS AMONG ADOLESCENTS

Prevalence of Sleepiness Among Adolescents

In most adolescents suffering from daytime sleepiness, chronic insufficient sleep is the underlying cause.¹² Furthermore, there seems to be a consensus that adolescents worldwide are not acquiring sufficient sleep. Hence, it is no surprise that daytime sleepiness is common among adolescents.^{13–17} Studies as early as 1981 have shown the effect of sleep deprivation on the daytime tendency to fall asleep.¹⁸ When individuals are restricted from acquiring the amount of hours required for sleep, they tend to doze off in quiet settings the following day.^{18,19} Such excessive sleepiness following sleep restriction has been measured both subjectively and objectively.^{18–20} The percentage of adolescents who complain from daytime sleepiness varies across surveys. This variation may be due, in part, to the measurements of “daytime sleepiness” using various questionnaires and tools, or to bona fide cross-cultural differences.²¹ The reported percentages of sleepy adolescents range from approximately 25% to 84% in countries worldwide.^{13–16,22} It is important to keep in mind that these figures likely

include both adolescents who are sleep simply deprived, in addition to those suffering from excessive daytime sleepiness due to other causes, such as sleep disorders, medication side effects, or other chronic conditions. Hence, sleepiness is a direct manifestation, but is not limited to sleep deprivation.

Reports from various countries have shown that adolescents sleep on average of 6.4 to 7.7 hours each night,^{13,22–31} with a tendency to oversleep during the weekend for more than 2 hours.²¹ Three recent reviews, two of which are systematic reviews with meta-analyses, have painted a global picture of adolescent sleep habits.^{21,32,33} Gradisar and colleagues²¹ reported findings from 41 worldwide surveys and found that the mean school-night bed time for adolescents aged 11 to 18 years was after 10:30 PM and that approximately half (53%) were obtaining less than 8 hours of sleep each night. The second review assessed differences in sleep patterns by age, sex, and day-type on a global scale.³² Findings suggest that as adolescents grow older, they sleep less, with a 14 minute per night decline in sleep per 1-year increase in age.³² In addition, girls acquire, on average, more sleep than boys.³² In the third review, secular trends in the sleep time of children and adolescents were analyzed.³³ Data from 20 countries dating from 1905 to 2008 were included. The results suggest that there has been a consistent decline in sleep duration over the years across age and sex. However, some variations across geographic regions were observed.³³ Some studies have found that adolescents with a lower socioeconomic status and from minority groups are more likely to have later bed times and fewer hours of sleep at night, compared with those from a higher socioeconomic status and from nonminority groups.^{34,35}

Consequences of Sleepiness Among Adolescents

Sleepiness and sleep deprivation have been linked to a myriad of negative outcomes in adolescents.^{26,36–49} Examples of some of these consequences are presented in **Box 1**. It must be noted, however, that some of the associations presented have not always been consistent, such as in the case of students with higher grades sometimes exhibiting worse sleep than those with poor grades,⁴⁸ and that bidirectional relationships, such as those between sleep duration and substance use, are sometimes present.⁴⁰

APPROACH TO A SLEEPY ADOLESCENT

Measuring Sleepiness

It is important to differentiate sleepiness from chronic fatigue. Sleepiness is defined as an inability

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