COMMENTARY

Bedtimes and the Blues: Evidence in Support of Improving Adolescent Sleep

Commentary on Gangwisch et al. Earlier parental set bedtimes as a protective factor against depression and suicidal ideation. SLEEP 2010;33:97-106.

Lauren Hale, PhD
Department of Preventive Medicine, State University of New York at Stony Brook, Stony Brook, NY

IN THIS ISSUE OF SLEEP, GANGWISCH AND COLLEAGUES’ PRESENT A NOVEL QUASI-EXPERIMENTAL ANALYSIS THAT SUPPORTS A CAUSAL RELATIONSHIP between chronic partial sleep deprivation and depression among adolescents. The positive association between chronic shortened sleep duration and depression is widely observed in the scientific literature. Although longitudinal data show that regular short sleep duration temporally precedes depression, it is unclear whether it is a cause of depression, or a prodromal or comorbid symptom. In order to design interventions that reduce depression and suicidal ideation, we need to better understand the causal pathways through which they arise.

In the absence of conducting an unrealistic and ethically questionable experimental study that repeatedly restricts teenagers’ sleep for long enough to potentially induce depressive symptoms, establishing a causal link presents a creative challenge to the researcher. The authors rise to the challenge by using parentally set bedtimes as a quasi-experiment, thereby taking advantage of a large nationally representative longitudinal study, Add Health. The idea is that parentally set bedtime is exogenous—not determined by the adolescent (nor his/her depressive state)—and thus not at risk of having a reverse causal relationship in which depression causes the late nights and short sleep durations. If it were true that parents set their children’s bedtimes based on their own parenting beliefs, and that such beliefs are unrelated to the depressive tendencies of an adolescent, then parental set bedtimes might act similarly to an experimental design in which parents are “randomly assigning” children to early and late bedtimes. Operating on this identifying assumption, the authors find that adolescents with bedtimes past midnight are 24% more likely to have depression and 20% more likely to have suicidal ideation compared to those with bedtimes earlier than 10PM after adjustment for confounding variables. Additional analyses show that the parentally set bedtime-depression relationship is attenuated by statistical adjustment of self-reports of sleep duration and perceptions of sleep sufficiency. These results suggest that the mediating pathway is indeed related to sleep duration and that sleep duration matters for mental health in teenagers.

The results of the analyses should be interpreted with some caution, however, because the use of parentally set bedtime does not fully satisfy the characteristics of a perfect exogenous force: There is likely some endogeneity between how adolescents behave and how parents set their bedtimes: parents may set bedtimes based on natural tendencies of the adolescent. For example, if a defiant teenager refuses to go to bed before midnight, a parent may know that it is fruitless to set a bedtime before 10 PM.

Finally, the presence of an early parentally set bedtime does not necessarily mean that it is enforced, nor that adolescents sleep more. To address these concerns, Gangwisch and colleagues present the remarkable finding that nearly 70% of adolescents report that they comply with their parent-determined bedtimes. It is less surprising, yet still important that the data show a strong relationship between earlier parentally set bedtimes and increased total sleep time.

Despite the imperfect exogeneity of the parentally set bedtime measure, this work adds weight to the evidence that insufficient sleep may cause depression and suicidal ideation. The study offers additional implications for adolescent health. In particular, this work shows that parentally mandated bedtimes actually do have a strong association with adolescent bedtimes and sleep duration. Given that regular high-quality sleep has been shown to have a wide range of positive outcomes on children and adolescents health and well-being, as a result of this work, we can recommend parents continue to set bedtimes for their children through adolescence.

Gangwisch et al. report that on average adolescents are sleeping 7 hours and 53 minutes, more than an hour less than the recommended 9 hours. Thus, earlier bedtimes may not be enough, as a range of other factors affect adolescent sleep duration. For example, computer use and television watching are known to both delay time in bed and affect sleep quality. Future studies should investigate whether the implementation of other household routines (e.g., limiting electronics after 9 PM, restricting caffeine intake, and incorporating exercise into daily routines) can cause improvements in sleep and subsequent changes in mental and physical health.
There are a variety of community-level factors that can affect adolescent sleep. For example, school start time is associated with earlier wake times, and less total sleep time.\textsuperscript{9,11,12} Additional research into the relationship between adolescent sleep duration and depression should consider looking for variation in depression based on school start time, because school start time may serve as a better exogenous variable. Beyond school start time, adolescent schedules are driven by extracurricular activities, after-school employment, and social activities. Policy and community efforts aimed at improving adolescent sleep should be explored.

Given a growing body of knowledge linking child and adolescent sleep to cognitive, behavioral, and health outcomes, this article raises a larger concern about sleep contributing social disparities in health.\textsuperscript{6,7,13} Starting early in life, social, economic, and neighborhood factors have an influence on sleep routines and sleep quality.\textsuperscript{9,12,14-16} To give all children a fair chance at a healthy and happy life, we should seek to create an environment in which all children and adolescents are able to get the sleep they need.

**DISCLOSURE STATEMENT**

Dr. Hale has indicated no financial conflicts of interest.

**REFERENCES**

1. Gangwisch J, Babiss L, Malaspina D, Turner J, Zammit G, Posner K. Earlier parental set bedtimes as a protective factor against depression and suicidal ideation. Sleep 2010;33:97-106.
2. Taylor DJ, Lichstein KL, Durrence HH, Riedel BW, Bush AJ. Epidemiology of insomnia, depression, and anxiety. Sleep 2005;28:1457-64.
3. Cukrowicz KC, Otamendi A, Pinto JV, Bernert RA, Krakow B, Joiner TE. The impact of insomnia and sleep disturbances on depression and suicidality. Dreaming 2006;16:1-10.
4. Roberts RE, Shema SJ, Kaplan GA, Strawbridge WJ. Sleep complaints and depression in an aging cohort: A prospective perspective. Am J Psychiatry 2000;157:81-8.
5. Liu X. Sleep and adolescent suicidal behavior. Sleep 2004;27:1351-8.
6. Sadeh A, Gruber R, Raviv A. The effects of sleep restriction and extension on school-age children: what a difference an hour makes. Child Dev 2003;74:444-55.
7. Chen X, Beydoun MA, Wang Y. Is sleep duration associated with childhood obesity? a systematic review and meta-analysis. Obesity (Silver Spring) 2008;16:265-74.
8. Moore M, Meltzer LJ. The sleepy adolescent: causes and consequences of sleepiness in teens. Paediatr Respir Rev 2008;9:114-20; quiz 120-1.
9. Knutson KL, Lauderdale DS. Sociodemographic and behavioral predictors of bed time and wake time among US adolescents aged 15 to 17 years. J Pediatr 2009;154:426-30.
10. Dworak M, Schierl T, Bruns T, Struder HK. Impact of singular excessive computer game and television exposure on sleep patterns and memory performance of school-aged children. Pediatrics 2007;120:978-85.
11. Wolson AR, Spaulding NL, Dandrow C, Baroni EM. Middle school start times: the importance of a good night’s sleep for young adolescents. Behav Sleep Med 2007;5:194-209.
12. Adam EK, Snell EK, Pendry P. Sleep timing and quantity in ecological and family context: a nationally representative time-diary study. J Fam Psychol 2007;21:4-19.
13. Buckhalt JA, El-Sheikh M, Keller P. Children’s sleep and cognitive functioning: race and socioeconomic status as moderators of effects. Child Dev 2007;78:213-31.
14. Hill TD, Burdette AM, Hale L. Neighborhood disorder, sleep quality, and psychological distress: Testing a model of structural amplification. Health Place 2009.
15. Hale L, Berger LM, LeBourgeois MK, Brooks-Gunn J. Social and demographic predictors of preschoolers’ bedtime routines. J Dev Behav Pediatr 2009;30:394-402.
16. Spilsbury JC, Storfer-Isser A, Drotar D, Rosen CL, Kirchner HL, Redline S. Effects of the home environment on school-aged children’s sleep. Sleep 2005;28:1419-27.