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COMMENTARY

Healthy School Start Times: Can We Do a Better Job in Reaching Our Goals?

Commentary on Thacher and Onyper. Longitudinal outcomes of start time delay on sleep, behavior, and achievement in high school. *SLEEP* 2016;39(2):271–281.

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A substantial body of evidence now supports the existence of significant health, mood, safety, and performance decrements associated with insufficient sleep in adolescents. Not only do chronic sleep loss and excessive daytime sleepiness in adolescents exist in epidemic proportions in the US, but these sleep decrements are associated with a wide range of impairments including higher rates of depression symptoms and suicidal ideation, increased risk-taking behaviors such as substance and alcohol use, poor school performance, more sports-related injuries, and an increased risk of motor vehicle accidents.[1–5] The adoption of later healthy school start times for middle and high school students, which accommodate the profound biological and circadian developmental changes in sleep regulation occurring during adolescence, represent one of the most potentially powerful means with which this public health crisis could be addressed. In point of fact, numerous studies have now shown that delayed middle and high school start times are associated with increased sleep and lower self-reported daytime sleepiness, decreased tardiness and improved attendance, fewer depression symptoms, and improved academic performance and standardized test scores.[6] Furthermore, a reduction in adolescent car crashes by as much as 65% to 70% in association with delayed start times has also been reported.[4,5] In response to this compelling evidence of health and performance benefits, the American Academy of Pediatrics in 2014 issued a Policy Statement recommending that school start times be delayed for middle and high school students until 08:30 or later.[7] This statement both echoed and elaborated upon others published by other national health advocacy organizations such as the American Medical Association Healthy People 2020 and the Centers for Disease Control.[8–10]

In their study on school start time change in this issue of *SLEEP*, co-authors Pamela Thacher and Serge Onyper[11] from St Lawrence University report their results from data collected in a small school district in upstate New York before school start times were delayed 45 minutes and at two points (2 months and 8 months) after the delay. In contrast to the findings of other "pre-post" design studies,[12–14] the resulting initial increase in sleep amounts associated with start time change (i.e., 20 minutes) was considerably less than the amount of the delay; moreover, average sleep duration returned to baseline after 8 months, presumably due to students shifting to a later bedtime over time. In terms of outcome measures, while academic performance did not improve at either time point, tardiness and disciplinary violation rates did decline initially and did not subsequently regress during the total study period. This suggests that adolescents may be better able to get to school on time and may have less problematic behavior if their schedules are better synchronized with their internal circadian clock even in the face of insufficient sleep.

While the findings were intriguing, there were several methodological issues in this study which suggest that the results may not be applicable to school systems in general. These include reliance on a self-report measures of sleep that has not been validated in the younger adolescent population (Pittsburgh Sleep Quality Index) and not corroborated by more objective measures such as actigraphy, and a relatively unique study population (i.e., a small, fairly rural and remarkably sociodemographically homogeneous community). Despite these limitations, the contributions of this study are important and ultimately revolve around the critical issues the findings raise. First, the study highlights some of the most important remaining "burning questions" regarding school start time change which further complicate an already complex issue for many communities around the country currently contemplating a change in school start time policy, as well as for researchers seeking to study those changes. These include whether certain types of school communities (according to size and type [rural, suburban, inner city], and those dependent on district busing versus public transportation versus "on foot" as in the current study) might benefit more or less from schools start time change. In addition it is not clear whether certain groups of students (e.g., those from ethnic/racial minorities, who are economically or academically challenged, or have different chronotypes) might have a differential response to start time change. It is also not know whether there is a universal "sweet spot" both in terms of the amount of the start time shift in minutes (e.g., 30 versus 60 minutes) and the actual new clock start time (e.g., 08:30 versus 09:00). Furthermore, the choice of outcomes in relationship to school start change is critical, both in terms of verifying previous findings regarding academic, mood, behavior, and safety measures and in potentially expanding the domains in which students might experience benefits (health, including BMI; safety, including accidental and sports-related injuries; self-regulation; and risk-taking behaviors). Finally, additional studies are needed to determine whether the benefits associated with healthy school start times are sustained over time, as questioned by this study's results.

This latter point underscores the second important underlying message of this study; that "operational" measures to improve sleep such as changing school start times may not only be less successful than anticipated in regards to changing individual behavior, but that any observed behavioral changes may not be self-sustaining. In other words, healthy school start times are *likely necessary but not sufficient* to reduce chronic sleep loss in adolescents. This observation should not be surprising to those of us, for example, who work with obese obstructive sleep

apnea patients in regards to weight loss interventions. Without the appropriate support and education, patients who go on a temporary restrictive "diet" without making critical eating and lifestyle changes frequently regress and gain the weight back. It has been long recognized in the obesity literature that sustained weight loss requires continual intervention.[15] Nutritional programs have found that both an educational component for patients and their support network to improve knowledge and encourage behavioral change and a strong maintenance phase are necessary for sustained weight loss success.

A similar model could also be applied to school start time change. Educational programs implemented both before and after start time change targeted towards a variety of key stakeholders including students, parents, school administrators, faculty, athletic directors and coaches, and extracurricular activities directors could complement, magnify, and help sustain the benefits of healthy school start times. These educational interventions should highlight normal developmental changes in sleep regulation across adolescence, the ongoing importance of sleep for health, safety, performance, and student well-being, and the role of parental limit setting and personal responsibility in establishing and maintaining healthy sleep practices (e.g., limiting caffeine use, screen time, and nighttime social networking) and avoiding high risk situations (e.g., driving while drowsy). On a school policy and community level, in order to further extend the impact of start time change other potential contributors to chronic sleep loss should also be examined. These include transportation schedules, homework burden, after-school employment, and early morning sport practices.

Ultimately, the results of Drs. Thacher and Onyper's study[11] should remind us that simply advocating for school start time change may not be enough. As members of the sleep medicine community, we have the knowledge and expertise (and, arguably, the responsibility) to conduct the research needed to address the myriad important questions remaining about the impact of school start time change and to provide guidance to school districts and communities in developing educational, programmatic and policy strategies to implement these changes and sustain their associated benefits

CITATION

Millman RP, Boergers J, Owens J. Healthy school start times: can we do a better job in reaching our goals? *SLEEP* 2016;39(2):267–268.

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