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Adolescent sleep disparities: sex and racial/ethnic differences

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ABSTRACT

Objectives: During adolescence, significant changes occur in sleep (eg, decreased sleep duration and increased sleep problems). To date, few studies have examined whether self-reported sleep duration differences exist between races/ethnicities in early adolescence (ages 11-14 years).
Methods: This study compared sexes and race/ethnicity groups on self-reported sleep duration in a large (n = 1543; 48.9% boys) racially/ethnically diverse (62.7% White, 23.7% Hispanic/Latino, 10.4% African American, and 3.2% Asian) sample of young adolescents (mean age, 12.31) drawn from local middle schools.
Results: A 2-way analysis of variance revealed that there was a trend for a significant sex effect ($P = .067$, partial $\eta^2 = .002$), with boys reporting more sleep than girls and significant race/ethnicity effects ($P < .001$, partial $\eta^2 = .012$), with Hispanic and African American students reporting shorter sleep duration than White and Asian students. The interaction between sex × race/ethnicity was significant ($P = .014$, partial $\eta^2 = .002$), with post hoc tests revealing that Hispanic males demonstrated significantly shorter sleep duration than White and Asian males and African American females demonstrating significantly shorter sleep duration than White females.
Conclusions: Given the literature showing short sleep duration is related to various negative health outcomes and all-cause mortality, more research is needed to determine the factors involved in these disparities.
Adolescent sleep disparities: sex and racial/ethnic differences.

Racial/ethnic health disparities rank among the nation's foremost health challenges.[1-3] In addition to environmental factors, social experiences, and health care quality and access issues, behavioral factors are also robust predictors of these outcomes.[4,5] Sleep is increasingly conceptualized as a health-relevant behavior,[6] with shorter sleep being related to a variety of negative health outcomes such as type 2 diabetes,[7] hypertension,[8] cardiovascular disease and events,[9] obesity,[10,11] hypercholesterolemia,[12,13] and all-cause mortality.[6,14] Short sleep duration has also been associated with psychological outcomes such as depression, anxiety,[15] and substance abuse[16] as well as deficits in cognitive functioning,[17] attention,[18,19] and academic performance.[20] Previous literature documents sex and racial/ethnic differences in sleep duration in adults,[21-25] with women sleeping longer than men[21,22] and African Americans and Hispanics sleeping less than Whites.[23-25] However, there are few studies examining such differences during adolescence, when such patterns may emerge and crystallize. Identifying the nature of these disparities in adolescence is an important step in designing and implementing prevention efforts, which could circumvent the long-term negative outcomes associated with short sleep duration.[12,13]

Adolescence is an important developmental period to examine, as this is a time during which sleep duration on school days significantly decreases.[26] To date, the data on sex and racial/ethnic differences in sleep duration in this age range are mixed. One report found that high school girls were more likely than boys (71.9% vs 66.7%, respectively) to sleep less than 8 hours on an average school night.[27] Conversely, studies of Turkish children, urban adolescents and high school students found girls slept longer than boys.[28,32,33] Still, other studies found no differences between young adolescent (ie, age 11-14 years) or high school (ie, age 14-18 years) boys and girls.[29-31]

Limited research exists examining sleep disparities among adolescents of different race/ethnicity groups. Most existing literature examines differences in sleep between African American and White groups and shows that African American students sleep less than White students.[32,33] Fewer studies examine sleep disparities in other race/ethnicities. Existing evidence shows that African American and Asian students sleep less than White and Hispanic students,[34,35] with mixed results between Hispanic and White children. Although 1 study reported Hispanic children sleep longer than White children,[36] another study reported the opposite but only on the weekends,[34] whereas yet another study reports no differences.[35] The current

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study adds to this literature by examining sleep duration disparities between African American, White, Hispanic, and Asian students.

There are several limitations to the existing literature. One limitation is that studies typically use parent-report questionnaires, which may become less accurate as children age and require less oversight by parents.[28,37-39] In addition, age ranges varied across studies (ie, 5-19 years old). This makes it difficult to have confidence in results (eg, 5-year-olds are considerably different from 11- or 19-year-olds) and compare results across studies. The current study examined sex and race/ethnicity differences in child-reported sleep durations in a group of racially/ethnically diverse young adolescents (ie, 11- to 14-year-olds).

Methods

Participants

Young adolescents attending 1 of 6 public middle schools in the Denton Independent School District, in Denton, TX, were recruited for the current study after approval by the University Human Subjects Research Institutional Review Board, the school district administrative offices, and the principals at each of the schools. A total of 1624 participants completed the study. Participants were excluded from the study for not providing sleep duration or race/ethnicity data or for being greater than 14 years old. Finally, 7 participants were excluded based on race/ethnicity criteria because of small cell sizes (ie, 6 American Indian/Alaskan Native and 1 Filipino). After these exclusions, the final sample was 1543 middle school girls (51.1%) and boys (48.9%), between the ages of 11 and 14 (Mean = 12.31; SD = .95). Race/ethnicity characteristics of the final sample included 62.7% White, 23.7% Hispanic/Latino, 10.4% African American, and 3.2% Asian.

Procedure

Parental consent and child assent were obtained during school registration, before participation in the study. Students were then asked to complete approximately 30 minutes of questionnaires during their physical education class. Upon completion of the questionnaires, students at each school were entered into a lottery drawing for cash prizes.[40] All data collection took place during the regular school year (2010-2011).

Measures

Information on the students' race/ethnicity, sex, grade level, and age was provided by the school district. Race/ethnicity categories included American Indian/Alaskan Native, Asian, Native American/Pacific Islander, Filipino, Hispanic/Latino, Black/African American, and White. Information on student-reported sleep duration was obtained by student self-report on the Pittsburgh Sleep Quality Index.[41]

Table
Sleep duration means and SDs for sex and race/ethnicity.

Race/ethnicity	Sex						Total		
	Male			Female					
	n	Mean	(SD)	n	Mean	(SD)	n	Mean	(SD)
Asian	29	8.52[a]	(0.87)	21	8.15	(1.75)	50	8.37	(1.31)
Hispanic	163	7.94[a,b]	(1.44)	202	8.16	(1.38)	365	8.06	(1.41)
African American	74	8.35[*]	(1.22)	86	7.80[c,*]	(1.45)	160	8.05	(1.37)
White	489	8.44[b]	(1.28)	479	8.30[c]	(1.26)	968	8.37	(1.27)
Total	755	8.33	(1.31)	788	8.20	(1.34)	1543	8.27	(1.32)

Matching letters represent significantly different ethnicity pairwise comparisons within sex ($P < .05$).
[a] Represents comparison between Asian and Hispanic males (P= .031).
[b] Represents comparison between Hispanic and White males (P< .001).
[c] Represents comparison between African American and White females (P= .019).
[*] Represents significantly different sex pairwise comparisons within ethnicity ($P < .05$).

Results

Overall, this sample of young adolescents reportedly slept an average of 8.27 (SD = 1.32) hours per night. Means and SDs for males and females within each race/ethnicity group are reported in the Table. A 2-way univariate analysis of variance was performed with sex and race/ethnicity as the grouping variables and student-reported sleep duration as the outcome variable. The analysis of variance revealed that there was a trend for a significant main effect for sex ($P = .067$, partial $\eta^2 = .002$), with boys reporting more sleep than girls. There was a significant main effect for race/ethnicity ($P < .001$, partial $\eta^2 = .012$), with Hispanic and African American adolescents reporting significantly shorter sleep duration than Asian and White adolescents.

The results indicate a significant sex × race/ethnicity interaction effect ($P = .014$, partial $\eta^2 = .002$). Within males, there was a significant difference between ethnicities ($P < .001$), with post hoc tests revealing significantly lower sleep durations in Hispanic males (7.95 hours) than both Asian (8.51 hours; P = .031) and White (8.44 hours; $P < .001$) males, but no differences between African Americans (8.05 hours) and these other race/ethnicities. Within females, there was a significant difference between ethnicities ($P = .014$), with post hoc tests revealing significantly lower sleep durations in African American females (7.80 hours) than White females (8.30 hours; Ps < .05) but no differences among Asian (8.15 hours) or Hispanic (8.16 hours) females.

Simple effects testing of sex differences within each race/ethnicity group revealed significant differences between African American ($P = .011$) males (8.35 hours) and females (7.80 hours) and a similar trend ($P = .078$) in Whites (males = 8.44 hours, females = 8.30 hours), with no significant sex differences among Asian or Hispanic participants.

Discussion

The aim of the current study was to determine if there were sex and race/ethnicity differences in sleep duration in a sample of young adolescents. The adolescents slept an average of 8.27 hours per night as a whole, which is nearly an hour less than the 9.25 hours recommended for adolescents to maintain optimal daytime alertness.[42] Hispanic males slept less than Asian and White males, and African American females slept less than White females. African American females slept significantly less than African American males, with a similar trend among Whites.

With respect to sex differences, the results of the current study supported those of the Centers for Disease Control and Prevention[27] study, wherein boys demonstrated significantly longer sleep duration than girls. It is possible that biological and social determinants may be playing a role in the sex differences in sleep duration. For instance, girls enter puberty earlier (10 or 11 years old) than boys (12 years old; American Medical Association, 2001), which could result in sleep period phase delays.[43,44] In addition, females are more likely to text message,[45] instant message, or use social networking sites[46] than males, which commonly happens after lights out[47] and could result in further truncation of sleep time. It is not clear, however, why these differences would have only been present in African American adolescents. One possible explanation may be that African Americans enter puberty earlier than Whites,[48] thus potential biological effects on sleep may be more evident in this racial/ethnic group.

Results were in agreement with those of previous research showing that African Americans have shorter sleep durations than Whites,[24,32,33,49] but this effect was only significant in females. The findings that, among males, Hispanic students slept less than both Asian and White students were unique. Racial/ethnic differences in