



Exposure to neighborhood violence and insufficient sleep among adolescents in the United States: Findings from a population-based study

Philip Baiden^{a,*}, Enoch Azasu^b, Catherine A. LaBrenz^a, John F. Baiden^c, Edinam C. Gobodzo^d, Vera E. Mets^e, Marisa N. Broni^f

^a The University of Texas at Arlington, School of Social Work, 501 W. Mitchell St., Box 19129, Arlington, TX 76019, USA

^b Saint Louis University School of Medicine, Department of Psychiatry and Behavioral Neuroscience, 1402 South Grand Blvd, St. Louis, MO 63104, USA

^c East Airport International School, P.O. Box KAPM 57, KIA, Accra, Ghana

^d Eastern Regional Hospital, P.O. Box 201, Koforidua, Ghana

^e University of Ghana, Department of Social Work, P.O. Box LG 419, Legon, Accra, Ghana

^f University of Ghana, School of Public Health, P.O. Box LG 25, Legon, Accra, Ghana

ARTICLE INFO

Keywords:

Neighborhood violence
Insufficient sleep
Mental health
Adolescents

ABSTRACT

Although studies have investigated and found an association between victimization and insufficient sleep among adolescents, few studies have examined the association between exposure to neighborhood violence and insufficient sleep among adolescents. The objective of this study was to investigate the cross-sectional association between exposure to neighborhood violence and insufficient sleep among adolescents. Data for this study came from the 2021 Youth Risk Behavior Survey. An analytic sample of 17,033 adolescents aged 14–18 (51.7 % male) was analyzed using binary logistic regression. The outcome variable investigated was insufficient sleep, and the main explanatory variable was exposure to neighborhood violence. Of the 17,033 adolescents, 76.5 % did not obtain the recommended 8 hours of sleep on an average school night, and 18.7 % were exposed to neighborhood violence. Controlling for the effects of other factors, exposure to neighborhood violence was associated with 1.33 times higher odds of having insufficient sleep ($AOR = 1.33$, 95 % $CI = 1.13–1.58$). Adolescents were more likely to get insufficient sleep if they were older, non-Hispanic Black, had poor mental health during COVID, felt sad or hopeless, engaged in excessive screen-time behaviors, or used alcohol. Physical activity, school connectedness, and parental monitoring all had protective effects on insufficient sleep. This study found that exposure to neighborhood violence was associated with insufficient sleep among adolescents over and above demographic and other covariates. Future studies that employ longitudinal designs may offer additional insight into the mechanisms underlying the association between exposure to neighborhood violence and insufficient sleep.

1. Introduction

A good night's sleep plays a vital role in brain function (Holm et al., 2009; Maski & Owens, 2016). The American Academy of Sleep Medicine (Paruthi et al., 2016) and the National Sleep Foundation (Hirshkowitz et al., 2015) recommend that adolescents ages 13–18 should sleep 8–10 hours per 24 hour period regularly to promote optimal health and mental well-being. However, various studies have found that most adolescents in the United States (U.S.) are not getting the recommended hours of sleep (Baiden et al., 2023; Gerber, 2014; Meldrum et al., 2018; Owens et al., 2014; Wheaton et al., 2018). Gariepy et al. (2020) examined sleep patterns among adolescents across 24 European and North

American countries and found that the proportion of adolescents not getting the recommended sleep on school days ranged from 14 % to 68 %. Data from the 2017 national Youth Risk Behavior Survey (YRBS) indicated that only one in four adolescents got the recommended eight or more hours of sleep on an average school night (Kann et al., 2018).

Insufficient sleep among adolescents has therefore been identified as a major public health issue (Hale & Troxel, 2018; Owens et al., 2014) and has been found to negatively impact language development (Edgin et al., 2015), neurodevelopmental conditions (Telzer et al., 2015), and academic performance (Dewald et al., 2010; Owens et al., 2014; Shochat et al., 2014). More importantly, insufficient sleep during adolescence is considered a significant risk factor for adverse consequences later in

* Corresponding author at: School of Social Work, The University of Texas at Arlington, 501 W. Mitchell St., Box 19129, Arlington, TX 76019, USA.
E-mail address: philip.baiden@uta.edu (P. Baiden).

adulthood (Baiden et al., 2015; Medic et al., 2017). As a result, optimal sleep is increasingly being recognized as an important factor for school achievement and mental well-being (Evers et al., 2020). The purpose of this study is to examine the association between exposure to neighborhood violence (NV) as a potential risk factor for insufficient sleep among adolescents.

1.1. Literature review

Risk factors associated with insufficient sleep among adolescents are complex and undoubtedly multifaceted (Baiden et al., 2019; Owens et al., 2014). The extant literature has demonstrated that several factors may influence insufficient sleep among adolescents, including family history of sleep disorder (Köse et al., 2017), poor mental health (Orchard et al., 2020; Zhang et al., 2017), and substance use (Baiden et al., 2023; Bilsky et al., 2016; Winsler et al., 2015). Several studies have also found that the COVID-19 lockdown-related measures worsened adolescent mental health (Anderson et al., 2022; Deng et al., 2023; Li et al., 2022), thereby significantly disrupting sleep habits and routine (Bruni et al., 2022; Melegari et al., 2023; Troxel et al., 2022). Wesley et al. (2023) investigated changes in duration, timing, and social jetlag in adolescent sleep during the COVID-19 pandemic among 3,494 adolescents aged 13–19 years old in the U.S. and found that on weekdays, bedtimes were delayed on average by 2.5 hours and wake times by 3.8 hours during COVID-19 compared to pre-COVID-19. They also found that depressive symptoms and decline in physical activity during COVID-19 were associated with delayed bed and wake times during COVID-19.

Other studies have also found that excessive screen time has the potential to negatively affect adolescents' sleep quality (Baiden et al., 2019; Kenney & Gortmaker, 2017; Woods & Scott, 2016). The American Academy of Pediatrics recommends limiting screen-time activities not relating to schoolwork to not more than 2 hours per day for children and adolescents (Chassiakos et al., 2016), as well as avoiding screen-time at least 1 hour before bedtime (Hill et al., 2016). Wang et al. (2020) found avoiding screen-time at least 1 hour before bedtime to be effective in mitigating against stressors and anxiety related to the COVID-19 pandemic among adolescents and consequently improved sleep quality. Moreover, research indicates that during the COVID-19 pandemic, adolescents were less physically active and engaged in more screen-time behaviors compared to pre-pandemic levels (Burkart et al., 2022; Duntun et al., 2020; Moore et al., 2020). Burkart et al. (2022) compared sedentary behaviors among children during the spring and summer of the COVID-19 pandemic and two years prior to COVID-19 pandemic and found that compared to pre-pandemic measures, children's physical activity level, sedentary behavior, sleep, screen time, and diet were adversely altered during the COVID-19 pandemic. Moreover, whereas psychosocial stressors such as bullying victimization (Donoghue & Meltzer, 2018; Sampasa-Kanyinga et al., 2018; Tang et al., 2023) and sexual violence victimization (Kajeepeta et al., 2015; Langevin et al., 2017; Wang et al., 2022) have been found to be associated with insufficient sleep among adolescents, one psychosocial stressor that has received relatively less research attention is exposure to NV. Indeed, chronic insomnia and recurrent nightmares are frequent occurrences among individuals with a history of traumatic life events (Baiden et al., 2015; Brownlow et al., 2016).

NV has been identified as a major public health issue affecting many individuals and communities in the U.S. (Centers for Disease Control and Prevention, 2022; Smith et al., 2019). Various studies have established a link between exposure to NV and a myriad of mental health problems (Butcher et al., 2016; Cooley et al., 2019; Phan & Gaylord-Harden, 2022), including the onset and development of posttraumatic stress disorder (Affrunti et al., 2018; Aisenberg et al., 2008), suicidal behaviors (Castellví et al., 2017), substance use (Harper et al., 2023; Meza et al., 2023; Udell et al., 2017), and risky sexual behaviors (Voisin et al., 2012, 2018). However, few studies have examined the association between exposure to NV and sleep among adolescents drawing on a large

nationally representative sample.

A growing body of studies in the U.S. has investigated the association between exposure to NV (Kliewer et al., 2019; Mrug et al., 2021; Semenza & Stansfield, 2021) as well as perception of neighborhood violence (Bagley et al., 2016; Meldrum et al., 2018; Philbrook et al., 2020) and adolescent sleep disruption. However, the majority of these studies used small and unrepresentative samples (Mrug et al., 2021; Semenza & Stansfield, 2021), focused on adolescents of specific demographic populations (Kliewer et al., 2019), or were from specific geographical locations (Meldrum et al., 2018; Philbrook et al., 2020), thereby limiting the generalizability of the findings. For instance, Kliewer et al. (2019) investigated the link between exposure to NV and sleep disruption in a sample of 107 African American adolescents in low-income urban areas of central Virginia and found a significant positive association between exposure to NV and sleep disruption. Mrug et al. (2021) followed a sample of 84 adolescents, 95 % African Americans, and investigated the bidirectional relationship between exposure to NV and sleep problems. They found that exposure to NV at age 13 predicted more sleep problems at age 16, but exposure to NV at age 16 did not predict sleep problems at age 17 (Mrug et al., 2021).

In addition to risk factors, studies have found that factors such as school connectedness (Marsh et al., 2019; Steiner et al., 2019) and parental monitoring (Booth & Shaw, 2023; Villarreal & Nelson, 2018; Voisin et al., 2012) are important for the maintenance of mental well-being and may be protective against traumatic life events. A large cross-sectional study in Brazil found that lack of parental monitoring was associated with a higher prevalence of loneliness and sleep problems (Machado et al., 2020). The extant literature has also demonstrated the protective role of physical activity against problematic adolescent health behaviors (Kwan et al., 2012; Oman et al., 2018), including sleep difficulties (Baiden et al., 2019; Lang et al., 2013; Wunsch et al., 2017).

1.2. Current study

Although several studies have investigated and found an association between victimization and insufficient sleep (Donoghue & Meltzer, 2018; Langevin et al., 2017; Sampasa-Kanyinga et al., 2018; Tang et al., 2023; Wang et al., 2022) as well as NV and insufficient sleep (Bagley et al., 2016; Kliewer et al., 2019; Meldrum et al., 2018; Mrug et al., 2021; Philbrook et al., 2020; Semenza & Stansfield, 2021), to our knowledge, few studies have investigated the association between exposure to NV and insufficient sleep among adolescents drawing on a large nationally representative sample. Thus, drawing on a large nationally representative sample, the current study examines the cross-sectional association between exposure to NV and insufficient sleep among adolescents. We hypothesized that controlling for demographic, risk, and protective factors, adolescents who were exposed to NV would have a greater likelihood of reporting insufficient sleep. From a public health perspective, examining the association between exposure to NV and insufficient sleep using a more rigorous approach could help in identifying adolescents at risk for problematic health outcomes. Such an examination could also help inform the development of public health interventions aimed at helping adolescents who might be at risk of having insufficient sleep.

2. Methods

2.1. Data source and participants

Data for this study came from the 2021 Youth Risk Behavior Survey (YRBS). The YRBS is a cross-sectional, school-based national survey conducted by the CDC every two years to ascertain the prevalence, patterns, and co-occurrence of health risk behaviors that contribute to the leading causes of death and disability among adolescents in the U.S., provide comparable national, state, territorial, tribal, and local data, and to monitor progress toward achieving the Healthy People objectives and

other program indicators. Detailed information about the YRBS, including the objectives, methodology, and sampling procedure, is available (Brener et al., 2013; Mpofu et al., 2023) and in other publications by the authors (Baiden, Eugene, Nicholas, Spoor., & LaBrenz, 2023; Baiden, Jahan, Mets, & Adeku, 2023; Baiden, LaBrenz, Kim, Muehlenkamp, & Thrasher, 2023; Baiden, Mengo, & Small, 2021; Baiden, Morgan, & Logan, 2022; Baiden, Szlyk, et al., 2023; Baiden & Tadeo, 2020; Baiden, Wood, et al., 2023; Ziminski et al., 2022). The 2021 YRBS is a comprehensive instrument comprised of approximately 100 items covering various health risk behaviors including, risky driving behaviors, violence-related behaviors, victimization, mental health, suicidal thoughts and behaviors, sexual behaviors, substance use behaviors, dietary behaviors, sleep, screen-time, mental health during COVID-19, physical activity, concussion, school connectedness, parental monitoring, among others. The YRBS has been used extensively and has been found to demonstrate test-retest reliability of weighted kappa mean scores of 58 % or higher among community middle school (Zullig et al., 2006) and high school (Raghupathy & Hahn-Smith, 2012) adolescents. Brener et al. (2013) assessed reliability of the items in the YRBS and found that 72 % of the items had “substantial” or higher reliability with kappa coefficients ranging between 61 and 100 %. More recently, Charles et al. (2022) assessed test-retest reliability of the YRBS using kappa and weighted kappa analyses and found moderate to substantial reliability for nearly all items, suggesting that at-risk adolescents reliably reported their engagement in health risk behaviors across multiple administrations. Additional information about the validity of the items in the YRBS has been provided in a review by Brener et al. (2003). Items about sleep, mental health, suicidal ideation, sedentary behaviors, and substance use have been used in previous studies and have been found to adequately measure the constructs they intended to measure (Baiden et al., 2019, 2023; Dai et al., 2020; Hawkins et al., 2022; Johns et al., 2018; Lowry et al., 2021; Mantey et al., 2020, 2021, 2023; McBee-Strayer et al., 2020; Onyeaka et al., 2022). The study protocol for conducting the YRBS was approved by the CDC’s Institutional Review Board (IRB), and the data are publicly available. The current study was exempted from IRB approval by the lead author’s institution as the data had already been de-identified and contained no personal information.

2.2. Sample

The YRBS recruited 9th to 12th graders from both public and private schools to complete self-administered surveys. The YRBS utilized a three-stage cluster sample design to create a nationally representative sample of high school students. First, schools were selected systematically with probability proportional to enrollment in grades 9 through 12 using a random start from primary sampling units (PSUs), made up of entire counties, groups of smaller adjacent counties, or parts of larger counties. PSUs were categorized into different strata based on their metropolitan statistical area status (e.g., urban or rural) and the percentages of non-Hispanic Black (Black) and Hispanic students in each PSU. For the second-stage sampling, secondary sampling units were sampled with probability proportional to school enrollment size. The third and final stage of sampling comprised of a random sampling of one or two classrooms in each of grades 9 through 12 from either a required subject (e.g., English or social studies) or a required period (e.g., homeroom or second period). All students in sampled classes were eligible to participate. Schools, classes, and students who refused to participate were not replaced in the sampling design.

There were 17,232 respondents in the 2021 YRBS; however, the analyses conducted in this study were based on 17,033 adolescents aged 14 to 18 years. The percentage of missing data ranged from less than 1 % for sex to 47 % for parental monitoring. Missing data analysis was conducted using Pearson chi-square test of association to assess whether a group of respondents with observed data on one variable significantly differs from a group of respondents with missing data on another variable. We found that data were missing completely at random (MCAR),

that is, the probability of missingness on one variable was not dependent on any observed data or unobserved data (Van Ginkel et al., 2020). Given that data were MCAR, Multiple Imputation using Chained Equations (MICE) was chosen as the most appropriate technique to impute complete data (Van Buuren, 2018). We followed the four steps recommended by Azur et al. (2011) in imputing missing data and generated 20 imputed datasets. This number is generally considered sufficient to improve the model’s robustness (Azur et al., 2011; Graham et al., 2007). The authors have used a similar approach in handling missing data in previous studies (Baiden, Eugene, Nicholas, Spoor., & LaBrenz, 2023; Baiden, Jahan, Mets, & Adeku, 2023; Baiden, Onyeaka, et al., 2023; Baiden, Szlyk, et al., 2023; Baiden, Wood, et al., 2023).

2.3. Variables

2.3.1. Outcome variable

The outcome variable examined in this study was insufficient sleep and was measured as a binary variable. The original question asked respondents, “On an average school night, how many hours of sleep do you get?” with the following response options: “4 or less hours,” “5 hours,” “6 hours,” “7 hours,” “8 hours,” “9 hours,” and “10 or more hours.” Following the recommendations of the CDC (Kann et al., 2018) and the American Academy of Sleep Medicine (Paruthi et al., 2016), adolescents who reported getting less than 8 h of sleep on an average school night were considered to have insufficient sleep and were recoded as 1, whereas adolescents who reported getting eight or more hours of sleep on an average school night were considered to have sufficient sleep and were recoded as 0. This measure has been found to provide reliable estimates of insufficient sleep among adolescents (Baiden et al., 2019, 2023; Meldrum et al., 2018; Merianos et al., 2021; Sampasa-Kanyinga et al., 2018; Wheaton et al., 2018).

2.3.2. Explanatory variable

The main explanatory variable examined in this study was exposure to NV and was measured as a binary variable based on response to the question, “Have you ever seen someone get physically attacked, beaten, stabbed, or shot in your neighborhood?” Consistent with past research (Harper et al., 2023; Holloway et al., 2023), adolescents who answered “yes” were coded as 1, whereas adolescents who answered “no” were coded as 0.

2.3.3. Covariates

Covariates examined in this study included risk (i.e., poor mental health during COVID-19, feeling sad or hopeless, suicidal ideation, excessive screen time behaviors, current alcohol use, current cigarette smoking, and current use of marijuana) and protective factors (physical activity, school connectedness, and parental monitoring). These covariates were chosen based on the extant literature (Baiden et al., 2023; Bilsky et al., 2016; Burkart et al., 2022; Kenney & Gortmaker, 2017; Sampasa-Kanyinga et al., 2018; Wesley et al., 2023; Woods & Scott, 2016). Following the recommendations of the American Academy of Pediatrics (Chassiakos et al., 2016) and prior studies (Friel et al., 2020; Kann et al., 2018; Przybylski, 2019), responses for screen time were dichotomized into “0 = <3 hours per day per” versus “1 = ≥3 hours per day.” Detailed information about how each covariate was measured and the exact questionnaire wording are provided in Table 1.

2.3.4. Demographic variables

We controlled for the following demographic variables. Age was measured in years, whereas sex was coded as “0 = Male” versus “1 = Female.” Sexual identity was coded as a nominal variable into “0 = Straight,” “1 = Lesbian/gay,” “2 = Bisexual,” and “3 = Other/questioning” with “Straight” as the reference category. Race/ethnicity was coded as a nominal variable into the following categories “0 = non-Hispanic White,” “1 = non-Hispanic Black,” “2 = Hispanic,” “3 = Asian,” “4 = Native American/American Indian,” and “5 Other race/ethnicity”

Table 1
List of risk and protective factors

Variable name	Question	Response options (analytic coding)
Poor mental health during COVID	During the COVID-19 pandemic, how often was your mental health not good? (Poor mental health includes stress, anxiety, and depression.)	Never, Rarely, Sometimes, Most of the time, and Always (Most of the time/ Always versus Sometimes/ Rarely/Never)
Symptoms of depression	During the past 12 months, did you ever feel so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some usual activities?	No, yes (No versus Yes)
Suicidal ideation	During the past 12 months, did you ever seriously consider attempting suicide?	No, yes (No versus Yes)
Excessive screen time behavior	On an average school day, how many hours do you spend in front of a TV, computer, smart phone, or other electronic device watching shows or videos, playing games, accessing the Internet, or using social media (also called "screen time")? (Do not count time spent doing schoolwork.)	Less than 1 hour per day, 1 hour per day, 2 hours per day, 3 hours per day, 4 hours per day, and 5 or more hours per day (Less than 3 hours per day versus 3 or more hours per day)
Current alcohol use	During the past 30 days, on how many days did you have at least one drink of alcohol?	0 days, 1 or 2 days, 3 to 5 days, 6 to 9 days E. 10 to 19 days, 20 to 29 days, and All 30 days (0 days versus 1 or more days)
Current cigarette smoking	During the past 30 days, on how many days did you smoke cigarettes?	0 days, 1 or 2 days, 3 to 5 days, 6 to 9 days E. 10 to 19 days, 20 to 29 days, and All 30 days (0 days versus 1 or more days)
Current use of marijuana	During the past 30 days, how many times did you use marijuana?	0 days, 1 or 2 days, 3 to 5 days, 6 to 9 days E. 10 to 19 days, 20 to 29 days, and All 30 days (0 days versus 1 or more days)
Physically active	During the past 7 days, on how many days were you physically active for a total of at least 60 minutes per day? (Add up all the time you spent in any kind of physical activity that increased your heart rate and made you breathe hard some of the time.) Adolescents who engaged in physical activity that met the CDC recommended physical activity guidelines of 60 minutes per day were recoded as 1; otherwise, they were recoded as 0.	0 days, 1 day, 2 days, 3 days, 4 days, 5 days, 6 days, and 7 days (Not active versus Active)
School connectedness	Do you agree or disagree that you feel close to people at your school?	Strongly agree, Agree, Not sure, Disagree, and Strongly disagree (Strongly agree/ Agree versus Not sure/ Disagree/Strongly disagree)
Parental monitoring	How often do your parents or other adults in your family know where you are going or with whom you will be?	Never, Rarely, Sometimes, Most of the time, and Always (Most of the time/ Always versus Sometimes/ Rarely/Never)

with non-Hispanic White as the reference category.

2.4. Data analyses

Data were analyzed using descriptive, bivariate, and multivariable

analytic techniques. The general distribution of all the variables included in the analysis was first examined using percentages. Bivariate associations among the explanatory and control variables were examined to check for the presence of multicollinearity. There was moderate correlation among poor mental health during COVID-19, symptoms of depression, and suicidal ideation. However, the results suggest that none of the variables had a variance inflation factor greater than four to pose a problem of multicollinearity. We then examined the bivariate association between demographic characteristics and exposure to NV using binary logistic regression. For the main analysis, we employed binary logistic regression to examine the cross-sectional association between exposure to NV and insufficient sleep while controlling for demographic characteristics, risk, and protective factors. Three binary logistic regression models were fitted with variables entered in a hierarchical order. In Model 1, we regressed insufficient sleep on exposure to NV while controlling for demographic factors due to their a priori importance. Model 2 consists of variables in Model 1 plus risk factors. The fully adjusted model consists of variables in Model 2 plus protective factors. To examine whether the effects of exposure to NV on insufficient sleep differs based on demographic characteristics (i.e., age, sex, sexual identity, and race/ethnicity), we tested a two-way interaction between exposure to NV and each of the demographic characteristics. We found that none of the two-way interaction effects were statistically significant. Adjusted odds ratios (AORs) are reported with their 95 % Confidence Intervals (CI). Variables were considered significant if the *p*-value was less than 0.05. Stata’s “svyset” command was used to adjust for the weighting and complexity of the multistage cluster sampling design employed by the YRBS. All analyses were performed using STATA 17 MP (Stata Corp., College Station, Texas, USA).

3. Results

3.1. Sample characteristics

The distribution of the study variables is presented in Table 2. Of the 17,033 adolescents examined, a little over three in four (76.5 %) got insufficient sleep on an average school night. About one in five adolescents (18.8 %) were exposed to NV. Nearly four in ten adolescents (39.8 %) reported feeling sad or hopeless, 34.6 % had poor mental health during COVID, and 21.4 % experienced suicidal ideation during the past 12 months. The distribution of substance use factors are as follows: current alcohol use (22.9 %), current use of marijuana (15.7 %), and current cigarette smoking (3.9 %). Less than half of the adolescents (46.0 %) met the recommended physical activity level. About six in ten adolescents (60.8 %) had high school connectedness, and 86.3 % had high parental monitoring.

3.2. Bivariate association between demographic characteristics and exposure to NV

In Table 3, we found that each additional year increase in age increased the odds of exposure to NV by 5 % (OR = 1.05, *p* = .038, 95 % CI = 1.01–1.10). Compared to males, adolescent females had 8 % lower odds of being exposed to NV (OR = 0.92, *p* = .033, 95 % CI = 0.85–0.99). Adolescents who self-identified as bisexual had 1.73 times higher odds of being exposed to NV when compared to adolescents who self-identified as straight (OR = 1.73, *p* < .001, 95 % CI = 1.47–2.03). The odds of being exposed to NV were 2.42 times higher for non-Hispanic Black adolescents (OR = 2.42, *p* < .001, 95 % CI = 1.90–3.09), 2.02 times higher for Hispanics (OR = 2.02, *p* < .001, 95 % CI = 1.66–2.45), 1.87 times higher for adolescents who self-identified as American Indian/Native Hawaiian/Pacific Islander (OR = 1.87, *p* = .006, 95 % CI = 1.21–2.91), and 1.84 times higher for adolescents who self-identified as other (OR = 1.84, *p* < .001, 95 % CI = 1.42–2.38) when compared to their non-Hispanic White counterparts. Adolescents who self-identified as Asian had 41 % lower odds of being exposed to NV when compared

Table 2
Sample characteristics (n = 17,033).

Variables	Frequency (Weighted %)
Outcome variable	
Had insufficient sleep	
No	4,004 (23.5)
Yes	13,029 (76.5)
Explanatory variable	
Exposure to neighborhood violence	
No	13,837 (81.2)
Yes	3,196 (18.8)
Demographic variables	
Age	
14 years	3,403 (20.0)
15 years	4,427 (26.0)
16 years	4,276 (25.1)
17 years	3,904 (22.9)
18 years	1,023 (6.0)
Sex	
Male	8,804 (51.7)
Female	8,229 (48.3)
Sexual identity	
Straight	12,769 (74.9)
Lesbian/gay	526 (3.1)
Bisexual	1,900 (11.2)
Other/questioning	1,838 (10.8)
Race/ethnicity	
Non-Hispanic White	9,300 (54.6)
Non-Hispanic Black	2,369 (13.9)
Hispanic	3,259 (19.1)
Asian	851 (5.0)
Native American/American Indian	240 (1.4)
Other race/ethnicity	1,014 (6.0)
Risk factors	
Poor mental health during COVID	
No	11,139 (65.4)
Yes	5,894 (34.6)
Symptoms of depression	
No	10,258 (60.2)
Yes	6,775 (39.8)
Suicidal ideation	
No	13,395 (78.6)
Yes	3,638 (21.4)
Excessive screen behaviors	
No	4,161 (24.4)
Yes	12,872 (75.6)
Currently drink alcohol	
No	13,139 (77.1)
Yes	3,894 (22.9)
Current cigarette smoking	
No	16,362 (96.1)
Yes	671 (3.9)
Current marijuana use	
No	14,358 (84.3)
Yes	2,675 (15.7)
Protective factors	
Physically active	
No	9,196 (54.0)
Yes	7,837 (46.0)
School connectedness	
Low	6,685 (39.2)
High	10,348 (60.8)
Parental monitoring	
Low	2,329 (13.7)
High	14,704 (86.3)

to their non-Hispanic White counterparts (OR = 0.59, $p = .003$, 95 % CI = 0.42–0.83).

3.3. Multivariable logistic regression examining the association between exposure to NV and insufficient sleep

Table 4 shows the multivariable logistic regression results examining the association between exposure to NV and insufficient sleep while controlling for demographic, risk, and protective factors. Controlling for demographic factors in Model 1, adolescents who were exposed to NV

Table 3
Bivariate association between demographic factors and exposure to neighborhood violence (N = 17,033).

Variables	OR (95% C.I.)	p-value
Age in years	1.05 (1.01-1.10)	.038
Sex (Male)		
Female	0.92 (0.85-0.99)	.033
Sexual identity (Straight)		
Lesbian/gay	1.25 (0.95-1.63)	.105
Bisexual	1.73 (1.47-2.03)	<.001
Other/questioning	1.16 (0.98-1.38)	.086
Race/ethnicity (Non-Hispanic White)		
Non-Hispanic Black	2.42 (1.90-3.09)	<.001
Hispanic	2.02 (1.66-2.45)	<.001
Asian	0.59 (0.42-0.83)	.003
American Indian/Native Hawaiian/Pacific Islander	1.87 (1.21-2.91)	.006
Other	1.84 (1.42-2.38)	<.001

Note: Reference category is indicated in parenthesis. OR indicates odds ratio.

had 1.54 times higher odds of having insufficient sleep when compared to adolescents who were not exposed to NV (adjusted odds ratio (AOR) = 1.54, $p < .001$, 95 % CI = 1.32–1.79). This significant association was partially attenuated with the addition of other factors in Models 2 and 3. In the fully adjusted model, exposure to NV was associated with 1.33 times higher odds of having insufficient sleep (AOR = 1.33, $p = .001$, 95 % CI = 1.13–1.58).

Age was significantly associated with the odds of having insufficient sleep in all three models. In the fully adjusted model, each additional year increase in age was associated with 1.23 times higher odds of having insufficient sleep (AOR = 1.23, $p < .001$, 95 % CI = 1.18–1.29). Sex lost its significance once we adjusted for risk factors in Model 2 and protective factors in Model 3. In the fully adjusted model, the odds of having insufficient sleep were 1.53 times higher for adolescents who self-identified as non-Hispanic Black (AOR = 1.53, $p = .001$, 95 % CI = 1.22–1.93) and 1.39 times higher for adolescents who self-identified as Asian (AOR = 1.39, $p = .007$, 95 % CI = 1.10–1.75), both when compared to adolescents who self-identified as non-Hispanic White. Adolescents were more likely to have insufficient sleep if they had poor mental health during COVID-19 (AOR = 1.62, $p < .001$, 95 % CI = 1.41–1.85), felt sad or hopeless (AOR = 1.31, $p = .002$, 95 % CI = 1.11–1.54), engaged in excessive screen time behaviors (AOR = 1.25, $p < .001$, 95 % CI = 1.11–1.42), or currently use alcohol (AOR = 1.31, $p = .006$, 95 % CI = 1.09–1.59). Controlling for other factors, cigarette smoking was associated with 37 % lower odds of having insufficient sleep (AOR = 0.63, $p = .013$, 95 % CI = 0.44–0.91). All three protective factors included in Model 3 were significantly associated with lower odds of having insufficient sleep. Controlling for other factors, adolescents who met the recommended physical activity level had 19 % lower odds of having insufficient sleep when compared to their counterparts who did not meet the recommended physical activity level (AOR = 0.81, $p = .012$, 95 % CI = 0.69–0.95). Compared to adolescents with low school connectedness, adolescents with high school connectedness had 15 % lower odds of having insufficient sleep (AOR = 0.85, $p = .005$, 95 % CI = 0.77–0.95). Lastly, adolescents with high parental monitoring had 17 % lower odds of having insufficient sleep when compared to their counterparts with low parental monitoring (AOR = 0.83, $p = .020$, 95 % CI = 0.71–0.97).

Table 4
Multivariable logistic regression results examining the association between exposure to neighborhood violence and insufficient sleep (n = 17,033).

Variables	Model 1		Model 2		Model 3	
	AOR (95% C.I.)	p-value	AOR (95% C.I.)	p-value	AOR (95% C.I.)	p-value
Exposure to neighborhood violence (No)						
Yes	1.54 (1.32-1.79)	<.001	1.36 (1.15-1.60)	.001	1.33 (1.13-1.58)	.001
Demographic variables						
Age in years	1.27 (1.21-1.33)	<.001	1.25 (1.20-1.30)	<.001	1.23 (1.18-1.29)	<.001
Sex (Male)						
Female	1.27 (1.12-1.44)	<.001	1.04 (0.91-1.18)	.538	1.02 (0.90-1.15)	.721
Sexual identity (Straight)						
Lesbian/gay	1.19 (0.83-1.70)	.343	0.97 (0.67-1.40)	.867	0.93 (0.64-1.34)	.684
Bisexual	1.34 (1.11-1.62)	.003	1.04 (0.85-1.27)	.715	1.00 (0.82-1.22)	.981
Other/questioning	1.13 (0.92-1.39)	.227	0.98 (0.80-1.20)	.856	0.94 (0.77-1.14)	.510
Race/ethnicity (Non-Hispanic White)						
Non-Hispanic Black	1.48 (1.19-1.85)	.001	1.64 (1.31-2.05)	<.001	1.53 (1.22-1.93)	.001
Hispanic	0.94 (0.80-1.10)	.435	0.95 (0.81-1.11)	.518	0.91 (0.77-1.07)	.244
Asian	1.31 (1.04-1.66)	.023	1.42 (1.12-1.79)	.004	1.39 (1.10-1.75)	.007
Native American/American Indian	1.05 (0.62-1.77)	.863	1.04 (0.63-1.74)	.864	1.01 (0.60-1.71)	.955
Other race/ethnicity	1.37 (0.98-1.93)	.065	1.40 (0.99-1.98)	.059	1.37 (0.96-1.95)	.082
Risk factors						
Poor mental health during COVID (No)						
Yes			1.63 (1.43-1.86)	<.001	1.62 (1.41-1.85)	<.001
Symptoms of depression (No)						
Yes			1.36 (1.15-1.60)	<.001	1.31 (1.11-1.54)	.002
Suicidal ideation (No)						
Yes			1.09 (0.93-1.29)	.277	1.07 (0.91-1.27)	.388
Engaged in excessive screen time behaviors (No)						
Yes			1.25 (1.11-1.41)	<.001	1.25 (1.11-1.42)	<.001
Alcohol use (No)						
Yes			1.30 (1.07-1.57)	.009	1.31 (1.09-1.59)	.006
Smoke cigarette (No)						
Yes			0.65 (0.45-0.93)	.019	0.63 (0.44-0.91)	.013
Marijuana use (No)						
Yes			0.94 (0.75-1.17)	.547	0.91 (0.72-1.13)	.389
Protective factors						
Physically active (No)						
Yes					0.81 (0.69-0.95)	.012
School connectedness (Low)						
High					0.85 (0.77-0.95)	.005
Parental monitoring (Low)						
High					0.83 (0.71-0.97)	.020

Note: Reference category is indicated in parenthesis.

4. Discussion

Drawing on a large nationally representative sample, the objective of this study was to examine the cross-sectional association between exposure to NV and insufficient sleep among adolescents. We found that about one in five adolescents were exposed to NV, and more than three in four adolescents had insufficient sleep on an average school night. The proportion of adolescents exposed to NV is consistent with some past studies (Farrell & Zimmerman, 2019; Mrug et al., 2021), but at the same time lower than what some other studies have found (Gaylord-Harden et al., 2020; Meza et al., 2023). Differences in prevalence estimates of exposure to NV could be due to the use of an at-risk population or a single item to measure exposure to NV. Meza et al. (2023) measured NV using a single item from the adverse childhood experiences questionnaire and found that 56 % of their African American and Hispanic adolescents with a history of juvenile incarceration were exposed to NV. Mrug et al. (2021) found that 19 % of adolescents in their study said they were beaten up by someone in their neighborhood, 21 % saw somebody they knew being beaten up, and 12 % saw someone they knew being chased or seriously threatened. The proportion of adolescents not getting the recommended amount of sleep is consistent with past research (Baiden et al., 2019; Meldrum et al., 2018; Wheaton et al., 2018).

We found support for our hypothesis that there would be an association between exposure to NV and insufficient sleep after controlling for demographic, risk, and protective factors. The findings of this study add to the existing literature that has found that experiencing stressful events could adversely affect sleep health (Donoghue & Meltzer, 2018;

Langevin et al., 2017; Sampasa-Kanyinga et al., 2018; Tang et al., 2023; Wang et al., 2022). At the same time, the findings of the present study extend previous work that has examined exposure to NV and sleep using unrepresentative samples. Exposure to NV can significantly affect sleep patterns of adolescents, potentially resulting in difficulties falling asleep or staying awake during sleep. One possible mechanism through which NV may adversely impact sleep is the development of frequent nightmares. Indeed, chronic insomnia and recurrent nightmares are regular occurrences among individuals with a history of traumatic life events (Baiden et al., 2015; Brownlow et al., 2016). These nightmares could potentially disrupt the normal sleep cycle, making it challenging for adolescents to initiate sleep and maintain sleep continuity. In addition, exposure to NV could increase stress levels, making it difficult to initiate and maintain sleep (Heissel et al., 2018). Recognizing the psychological impact of NV and addressing the underlying distress associated with nightmares is crucial in developing interventions aimed at improving sleep quality and reducing sleep disturbances among adolescents exposed to NV.

Regarding the interaction between exposure to NV and race/ethnicity, our study may have been underpowered to detect a significant interaction between exposure to NV and race/ethnicity on insufficient sleep. However, the finding that non-Hispanic Black adolescents were more likely to be exposed to NV and more likely to have insufficient sleep aligns with the existing literature on this topic. For instance, Philbrook et al. (2020) used data from the Family Stress Study at Auburn University in Alabama and investigated the association between NV concerns and adolescents' sleep and found that African American

adolescents who showed higher levels of concern for NV were more likely to report fewer sleep minutes and had lower sleep efficiency. While our study did not specifically examine the mechanisms underlying the association between race/ethnicity, exposure to NV, and insufficient sleep, a similar pattern of results suggests that race-related stressors, such as NV concerns, may contribute to sleep difficulties among non-Hispanic Black adolescents. Further research is needed to explore the underlying mechanisms and identify strategies to address these disparities, with the goal of promoting healthier sleep outcomes among racially/ethnically diverse populations exposed to NV.

The association between poor mental health, specifically during the COVID-19 pandemic, and insufficient sleep in our study aligns with existing literature on the association between mental health and sleep. The COVID-19 pandemic has brought about unique stressors and challenges that have had a profound impact on individuals' mental well-being. The findings of our study highlight how these unprecedented circumstances, coupled with symptoms of depression, contribute to insufficient sleep among adolescents. While the link between mental health and sleep has been extensively studied (Orchard et al., 2020; Zhang et al., 2017), the impact of the COVID-19 pandemic adds a novel dimension, emphasizing the importance of considering the specific context and stressors associated with the pandemic. Understanding the interplay between mental health and sleep during times of crisis can inform interventions and support systems that address both aspects of well-being, ultimately promoting better sleep and mental health outcomes for adolescents.

Excessive screen time, particularly from social media use, has emerged as a significant concern affecting the sleep patterns of adolescents. Woods and Scott (2016) demonstrated the negative impact of social media use on various aspects of well-being, including sleep quality. Their findings indicate that adolescents who engaged in higher levels of social media use, particularly during nighttime, and those with a strong emotional investment in social media experience poorer sleep quality, increased anxiety and depression, and lower self-esteem. The findings of the present study corroborate a growing body of evidence that highlights the detrimental effects of excessive screen time, specifically social media use on adolescent sleep quality (Baiden et al., 2019; Garmy et al., 2018; Ghekiere et al., 2019; Kenney & Gortmaker, 2017). Acknowledging the influence of excessive screen time on sleep health is crucial in developing targeted interventions and guidelines to promote healthier technology habits among adolescents and mitigate the potential negative consequences on sleep and overall well-being. Our study builds upon this knowledge by providing further support for the association between excessive screen-time and insufficient sleep among adolescents. Examining nighttime-specific social media use and emotional investment in social media are two important avenues for future investigation in relation to adolescent sleep.

Our study identified three protective factors associated with meeting the recommended hours of sleep among adolescents: physical activity, school connectedness, and parental monitoring. Regular physical activity promotes better sleep quality and duration by regulating energy levels and inducing relaxation (Wunsch et al., 2017). School connectedness, which refers to a sense of belonging and support within the school environment, may help establish structured routines that facilitate healthy sleep habits. In addition, parental monitoring has been found to play a crucial role in shaping adolescent health risk behaviors (Booth & Shaw, 2023; Villarreal & Nelson, 2018; Voisin et al., 2012), including the establishment of regular bedtime routines and ensuring sufficient sleep duration (Machado et al., 2020). Parents who regularly monitor their adolescent's activities, including their screen-time and sleep patterns, can positively influence their sleep habits and promote healthier behaviors (Canadian Paediatric Society, 2019; Meltzer et al., 2021). By setting clear expectations and enforcing consistent bedtime routines, parents can help their adolescents develop regular sleep schedules thereby ensuring they get the recommended sleep hours. Additionally, parental monitoring provides an opportunity for open

communication and guidance regarding the importance of sleep for overall health and well-being. When parents engage in monitoring their adolescent's sleep, they can identify potential barriers or issues that may disrupt sleep and address them effectively.

4.1. Implications

The findings of this study have some implications for school personnel, researchers, healthcare professionals, and parents aiming to promote healthy sleep among adolescents. By understanding the association between exposure to NV and insufficient sleep, interventions can be developed to address these two public health concerns effectively. First and foremost, adolescents should be educated about the importance of sleep and the potential impact of exposure to NV on their sleep health. Some cognitive and behavioral interventions have been found to be effective in improving sleep among school-age children and adolescents (Aslund et al., 2018). While these have largely focused on individual-level therapies with adolescents, findings from our study also highlight the importance of understanding family and community contexts that may contribute to poor sleep. Indeed, recent studies have explored school and community-based interventions to improve sleep outcomes for children (Cain et al., 2011; Egan et al., 2022). Thus, schools and community organizations can implement sleep education programs that raise awareness about the benefits of sufficient sleep and provide strategies for managing stress related to NV. This may provide opportunities to target adolescents in neighborhoods with higher rates of community violence or discord. Adolescents should be encouraged to prioritize their sleep and establish consistent sleep schedules, aiming for the recommended 8–10 hours of sleep per night.

Second, regular physical activity has been identified as an important factor in promoting healthy sleep among adolescents. Encouraging adolescents to engage in regular exercise can improve sleep quality and duration. However, it is important to note that physical activity should not be too close to bedtime, as it can stimulate the body and make it difficult to fall asleep (Baiden et al., 2023). Therefore, it is recommended that adolescents engage in physical activity earlier in the day, allowing for a sufficient wind-down period before bedtime. Third, parental involvement and support are crucial in promoting healthy sleep habits among adolescents. Parents should be encouraged to participate in sleep intervention studies and programs to enhance their knowledge and skills in supporting their adolescent's sleep health. These interventions can provide parents with strategies to create a sleep-conducive environment, establish consistent bedtime routines, and foster open communication about sleep-related concerns. Furthermore, healthcare professionals should routinely screen adolescents for sleep difficulties and assess the potential impact of exposure to NV on their sleep patterns. Sleep intervention studies and programs can be integrated into school settings to provide tailored interventions and support to adolescents and their families.

4.2. Limitations and direction for future research

This study has some limitations that are worth acknowledging. First, the cross-sectional nature of the data restricts our ability to draw any causal conclusion regarding the association between exposure to NV and insufficient sleep, as well as other covariates. Thus, only association can be inferred. Future research should employ longitudinal designs to better understand the temporal order and potential causal mechanisms linking exposure to NV to insufficient sleep among adolescents. Second, insufficient sleep was assessed using a single item, which may not capture the full complexity of sleep quality. Future research should consider incorporating standardized measures or utilizing sleep tracking devices, such as Fitbit, to provide a more comprehensive assessment of sleep duration, quality, and patterns. Third, the use of secondary data constrained our ability to examine other important factors that could influence the association between exposure to NV and insufficient sleep.

For instance, measuring mental health diagnosis instead of symptoms could provide a more comprehensive understanding of this association. Future studies should incorporate more detailed assessments of mental health and consider additional relevant factors, such as socioeconomic status, neighborhood characteristics, and social support.

4.3. Conclusion

In conclusion, our study revealed that adolescents exposed to NV had higher odds of experiencing insufficient sleep, even after adjusting for various demographic, risk, and protective factors. To promote healthy sleep among adolescents, educating them about the benefits of sufficient sleep and implementing sleep education programs is crucial. Parental involvement is essential, and engaging parents in sleep intervention studies can equip them with knowledge and strategies to support adolescents' sleep habits. Tailored interventions should be developed to address the specific needs of adolescents exposed to NV to improve sleep health outcomes. This, in turn, can also have a protective effect on other physical and mental health outcomes that have been linked through prior research as influencing insufficient sleep among adolescents.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.childyouth.2023.107351>.

References

- Affrunti, N. W., Suárez, L., & Simpson, D. (2018). Community violence and posttraumatic stress disorder symptoms in urban youth: The moderating influence of friend and parent support. *Journal of Community Psychology*, *46*(5), 636–650.
- Aisenberg, E., Ayón, C., & Orozco-Figueroa, A. (2008). The role of young adolescents' perception in understanding the severity of exposure to community violence and PTSD. *Journal of Interpersonal Violence*, *23*(11), 1555–1578.
- Anderson, K. N., Swedo, E. A., Trinh, E., Ray, C. M., Krause, K. H., Verlenden, J. V., Clayton, H. B., Villaveces, A., Massetti, G. M., & Niolon, P. H. (2022). Adverse childhood experiences during the COVID-19 pandemic and associations with poor mental health and suicidal behaviors among high school students—Adolescent Behaviors and Experiences Survey, United States, January–June 2021. *Morbidity and Mortality Weekly Report*, *71*(41), 1301–1305.
- Aslund, L., Arnberg, F., & Lekander, M. (2018). Cognitive and behavioral interventions to improve sleep in school-age children and adolescents: A systematic review and meta-analysis. *Journal of Clinical Sleep Medicine*, *14*(11), 1937–1974.
- Azur, M. J., Stuart, E. A., Frangakis, C., & Leaf, P. J. (2011). Multiple imputation by chained equations: What is it and how does it work? *International Journal of Methods in Psychiatric Research*, *20*(1), 40–49.
- Bagley, E. J., Tu, K. M., Buckhalt, J. A., & El-Sheikh, M. (2016). Community violence concerns and adolescent sleep. *Sleep Health*, *2*(1), 57–62.
- Baiden, P., Eugene, D. R., Nicholas, J. K., Spoor, S. P., & LaBrenz, C. A. (2023). Misuse of prescription opioids and suicidal behaviors among Black adolescents: Findings from the 2017 and 2019 Youth Risk Behavior Survey. *Journal of Racial and Ethnic Health Disparities*, *10*, 1856–1868.
- Baiden, P., Fallon, B., den Dunnen, W., & Boateng, G. O. (2015). The enduring effects of early-childhood adversities and troubled sleep among Canadian adults: A population-based study. *Sleep Medicine*, *16*(6), 760–767.
- Baiden, P., Jahan, N., Mets, V. E., & Adeku, Y. (2023). An examination of the association between risky sexual behaviors and suicidal behaviors among adolescents: Findings from the 2017 Youth Risk Behavior Survey. *Current Psychology*, *42*, 10375–10386.
- Baiden, P., LaBrenz, C. A., Kim, J. Y., Muehlenkamp, J. J., & Thrasher, S. (2023). Risk and protective factors associated with suicidal ideation and suicide attempts among black adolescents based on the 2017 Youth Risk Behavior Survey. *Journal of Black Psychology*, *49*(3), 319–358.
- Baiden, P., Mengo, C., & Small, E. (2021). History of physical teen dating violence and its association with suicidal behaviors among adolescent high school students: Results from the 2015 Youth Risk Behavior Survey. *Journal of Interpersonal Violence*, *36* (17–18), NP9526–NP9547.
- Baiden, P., Morgan, M. A., & Logan, M. W. (2022). Sports- and physical activity-related concussion, binge drinking and marijuana use among adolescents: The mediating role of depression and suicidal ideation. *Substance Use & Misuse*, *57*(4), 504–515.
- Baiden, P., Onyeaka, H. K., Aneni, K., Wood, B., LaBrenz, C. A., Muoghalu, C., Peoples, J. E., Szlyk, H. S., Gobodzo, E. C., Baiden, J. F., Adeku, Y., Mets, V. E., Brown, F. A., & Cavazos-Rehg, P. (2023). Perceived racial discrimination and polysubstance use among racial/ethnic minority adolescents in the United States. *Drug and Alcohol Dependence*, *248*, 109894.
- Baiden, P., Spoor, S. P., Nicholas, J. K., Brown, F. A., LaBrenz, C. A., & Spadola, C. (2023). Association between use of electronic vaping products and insufficient sleep among adolescents: Findings from the 2017 and 2019 YRBS. *Sleep Medicine*, *101*, 19–27.
- Baiden, P., Szlyk, H. S., Peoples, J. E., Vázquez, M. M., Eugene, D. R., & Cavazos-Rehg, P. (2023). Association between sexual identity, health risk behaviors, and mental health outcomes among Black adolescents: Findings from a population-based study. *Journal of Affective Disorders Reports*, *12*(100511), 1–8.
- Baiden, P., & Tadeo, S. K. (2020). Investigating the association between bullying victimization and suicidal ideation among adolescents: Evidence from the 2017 Youth Risk Behavior Survey. *Child Abuse & Neglect*, *102*, 104417.
- Baiden, P., Tadeo, S. K., & Peters, K. E. (2019). The association between excessive screen-time behaviors and insufficient sleep among adolescents: Findings from the 2017 youth risk behavior surveillance system. *Psychiatry Research*, *281*, Article 112586.
- Baiden, P., Wood, B., LaBrenz, C. A., Onyeaka, H. K., Hagedorn, A., Vazquez, C. E., ... Brown, F. A. (2023). Investigating the co-occurrence of marijuana use and prescription opioid misuse with multiple suicide attempts among adolescents with a history of suicidal ideation. *Psychiatry Research*, *329*, 115519.
- Bilsky, S. A., Feldner, M. T., Knapp, A. A., Babson, K. A., & Leen-Feldner, E. W. (2016). The interaction between anxiety sensitivity and cigarette smoking level in relation to sleep onset latency among adolescent cigarette smokers. *Journal of Adolescence*, *51*, 123–132.
- Booth, J. M., & Shaw, D. S. (2023). Examining parental monitoring, neighborhood peer anti-social behavior, and neighborhood social cohesion and control as a pathway to adolescent substance use. *Journal of Child and Family Studies*, *32*(2), 626–639.
- Brener, N. D., Billy, J. O., & Grady, W. R. (2003). Assessment of factors affecting the validity of self-reported health-risk behavior among adolescents: Evidence from the scientific literature. *Journal of Adolescent Health*, *33*(6), 436–457.
- Brener, N. D., Kann, L., Shanklin, S., Kinchen, S., Eaton, D. K., Hawkins, J., & Flint, K. H. (2013). Methodology of the youth risk behavior surveillance system—2013. *Morbidity and Mortality Weekly Report: Recommendations and Reports*, *62*(1), 1–20.
- Brownlow, J. A., McLean, C. P., Gehrman, P. R., Harb, G. C., Ross, R. J., & Foa, E. B. (2016). Influence of sleep disturbance on global functioning after posttraumatic stress disorder treatment. *Journal of Traumatic Stress*, *29*(6), 515–521.
- Bruni, O., Malorgio, E., Doria, M., Finotti, E., Spruyt, K., Melegari, M. G., Villa, M. P., & Ferri, R. (2022). Changes in sleep patterns and disturbances in children and adolescents in Italy during the Covid-19 outbreak. *Sleep Medicine*, *91*, 166–174.
- Burkart, S., Parker, H., Weaver, R. G., Beets, M. W., Jones, A., Adams, E. L., ... Armstrong, B. (2022). Impact of the COVID-19 pandemic on elementary schoolers' physical activity, sleep, screen time and diet: A quasi-experimental interrupted time series study. *Pediatric Obesity*, *17*(1), e12846.
- Butcher, F., Holmes, M. R., Kretschmar, J. M., & Flannery, D. J. (2016). Polyvictimization across social contexts: Home, school, and neighborhood violence exposure. *Criminal Justice and Behavior*, *43*(12), 1726–1740.
- Cain, N., Gradisar, M., & Moseley, L. (2011). A motivational school-based intervention for adolescent sleep problems. *Sleep Medicine*, *12*(3), 246–251.
- Canadian Paediatric Society, & O. (2019). Digital media: Promoting healthy screen use in school-aged children and adolescents. *Paediatrics & Child Health*, *24*(6), 402–408.
- Castellví, P., Miranda-Mendizábal, A., Parés-Badell, O., Almenara, J., Alonso, L., Blasco, M., Cebrià, A., Gabilondo, A., Gili, M., & Lagares, C. (2017). Exposure to violence, a risk for suicide in youths and young adults: A meta-analysis of longitudinal studies. *Acta Psychiatrica Scandinavica*, *135*(3), 195–211.
- Centers for Disease Control and Prevention. (2022). *Community Violence Prevention*. <https://www.cdc.gov/violenceprevention/communityviolence/index.html>.
- Charles, N. E., Strong, S. J., Floyd, P. N., Burns, L. C., Sigurdson, L., & Barry, C. T. (2022). Test-retest reliability of self-reported substance use and sexual risk behavior among at-risk adolescents. *Psychological Reports*, *00332941221100459*.
- Chassiakos, R. Y. L., Radesky, J., Christakis, D., Moreno, M. A., Cross, C., Hill, D., ... Swanson, W. S. (2016). Children and adolescents and digital media. *Pediatrics*, *138* (5).
- Cooley, J. L., Ritschel, L. A., Frazer, A. L., & Blossom, J. B. (2019). The influence of internalizing symptoms and emotion dysregulation on the association between witnessed community violence and aggression among urban adolescents. *Child Psychiatry & Human Development*, *50*, 883–893.
- Dai, H., Ingram, D. G., & Taylor, J. B. (2020). Hierarchical and mediation analysis of disparities in very short sleep among sexual minority youth in the US, 2015. *Behavioral Sleep Medicine*, *18*(4), 434–446.
- Deng, J., Zhou, F., Hou, W., Heybati, K., Lohit, S., Abbas, U., Silver, Z., Wong, C. Y., Chang, O., & Huang, E. (2023). Prevalence of mental health symptoms in children and adolescents during the COVID-19 pandemic: A meta-analysis. *Annals of the New York Academy of Sciences*, *1520*(1), 53–73.
- Dewald, J. F., Meijer, A. M., Oort, F. J., Kerkhof, G. A., & Bögels, S. M. (2010). The influence of sleep quality, sleep duration and sleepiness on school performance in children and adolescents: A meta-analytic review. *Sleep Medicine Reviews*, *14*(3), 179–189.

- Donoghue, C., & Meltzer, L. J. (2018). Sleep it off: Bullying and sleep disturbances in adolescents. *Journal of Adolescence*, *68*, 87–93.
- Dunton, G. F., Do, B., & Wang, S. D. (2020). Early effects of the COVID-19 pandemic on physical activity and sedentary behavior in children living in the US. *BMC Public Health*, *20*(1), 1–13.
- Edgin, J. O., Tooley, U., Demara, B., Nyhuis, C., Anand, P., & Spanò, G. (2015). Sleep disturbance and expressive language development in preschool-age children with Down syndrome. *Child Development*, *86*(6), 1984–1998.
- Egan, K. A., Waring, M. E., & Wang, M. L. (2022). Pilot intervention targeting sugary drink intake associated with improvements in adolescent sleep duration. *Journal of Nutrition Education and Behavior*, *54*(3), 276–281.
- Evers, K., Chen, S., Rothmann, S., Dhir, A., & Pallesen, S. (2020). Investigating the relation among disturbed sleep due to social media use, school burnout, and academic performance. *Journal of Adolescence*, *84*, 156–164.
- Farrell, C., & Zimmerman, G. M. (2019). Violent lives: Pathways linking exposure to violence to suicidal behavior in a national sample. *Archives of Suicide Research*, *23*(1), 100–121.
- Friel, C. P., Duran, A. T., Shechter, A., & Diaz, K. M. (2020). US children meeting physical activity, screen time, and sleep guidelines. *American Journal of Preventive Medicine*, *59*(4), 513–521.
- Garipey, G., Danna, S., Gobiņa, I., Rasmussen, M., de Matos, M. G., Tynjälä, J., Janssen, I., Kalman, M., Villuruša, A., & Husarova, D. (2020). How are adolescents sleeping? Adolescent sleep patterns and sociodemographic differences in 24 European and North American countries. *Journal of Adolescent Health*, *66*(6), S81–S88.
- Garmy, P., Clausson, E. K., Nyberg, P., & Jakobsson, U. (2018). Insufficient sleep is associated with obesity and excessive screen time amongst ten-year-old children in Sweden. *Journal of Pediatric Nursing*, *39*, e1–e5.
- Gaylord-Harden, N. K., Burnside, A., & Tinsley, D. (2020). The prevalence and longitudinal patterns of continuous community violence exposure and trauma-related symptoms in adolescent male serious offenders. *Journal of Traumatic Stress*, *33*(4), 541–551.
- Gerber, L. (2014). Sleep deprivation in children: A growing public health concern. *Nursing Management*, *45*(8), 22–28.
- Ghekiere, A., Van Cauwenberg, J., Vandendriessche, A., Inchley, J., Gaspar de Matos, M., Borraccino, A., Gobina, I., Tynjälä, J., Deforche, B., & De Clercq, B. (2019). Trends in sleeping difficulties among European adolescents: Are these associated with physical inactivity and excessive screen time? *International Journal of Public Health*, *64*, 487–498.
- Graham, J. W., Olchowski, A. E., & Gilreath, T. D. (2007). How many imputations are really needed? Some practical clarifications of multiple imputation theory. *Prevention Science*, *8*, 206–213.
- Hale, L., & Troxel, W. (2018). Embracing the school start later movement: Adolescent sleep deprivation as a public health and social justice problem. *American Journal of Public Health*, *108*(5), 599–600.
- Harper, C. R., Li, J., Sheats, K., Hertz, M. F., Merrill-Francis, M., Friar, N. W., ... Hoots, B. E. (2023). Witnessing community violence, gun carrying, and associations with substance use and suicide risk among high school students—Youth Risk Behavior Survey, United States, 2021. *MMWR Supplements*, *72*(1), 22–28.
- Hawkins, G. T., Lee, S. H., Michael, S. L., Merlo, C. L., Lee, S. M., King, B. A., ... Underwood, J. M. (2022). Individual and collective positive health behaviors and academic achievement among US high school students, Youth Risk Behavior Survey 2017. *American Journal of Health Promotion*, *36*(4), 651–661.
- Heissel, J. A., Sharkey, P. T., Torrats-Espinoso, G., Grant, K., & Adam, E. K. (2018). Violence and vigilance: The acute effects of community violent crime on sleep and cortisol. *Child Development*, *89*(4), e323–e331.
- Hill, D., Ameenuddin, N., Reid Chassiakos, Y. L., Cross, C., Hutchinson, J., Levine, A., ... Swanson, W. S. (2016). Media and young minds. *Pediatrics*, *138*(5).
- Hirshkowitz, M., Whitton, K., Albert, S. M., Alessi, C., Bruni, O., DonCarlos, L., Hazen, N., Herman, J., Katz, E. S., & Kheirandish-Gozal, L. (2015). National Sleep Foundation's sleep time duration recommendations: Methodology and results summary. *Sleep Health*, *1*(1), 40–43.
- Holm, S. M., Forbes, E. E., Ryan, N. D., Phillips, M. L., Tarr, J. A., & Dahl, R. E. (2009). Reward-related brain function and sleep in pre/early pubertal and mid/late pubertal adolescents. *Journal of Adolescent Health*, *45*(4), 326–334.
- Holloway, T. D., Harvanek, Z. M., Xu, K., Gordon, D. M., & Sinha, R. (2023). Greater stress and trauma mediate race-related differences in epigenetic age between Black and White young adults in a community sample. *Neurobiology of Stress*, *26*, Article 100557.
- Johns, M. M., Lowry, R., Rasberry, C. N., Dunville, R., Robin, L., Pampati, S., ... Kollar, L. M. (2018). Violence victimization, substance use, and suicide risk among sexual minority high school students—United States, 2015–2017. *Morbidity and Mortality Weekly Report*, *67*(43), 1211–1215.
- Kajepeta, S., Gelaye, B., Jackson, C. L., & Williams, M. A. (2015). Adverse childhood experiences are associated with adult sleep disorders: A systematic review. *Sleep Medicine*, *16*(3), 320–330.
- Kann, L., McManus, T., Harris, W. A., Shanklin, S. L., Flint, K. H., Queen, B., Lowry, R., Chyen, D., Whittle, L., & Thornton, J. (2018). Youth risk behavior surveillance—United States, 2017. *MMWR Surveillance Summaries*, *67*(8), 1–114.
- Kenney, E. L., & Gortmaker, S. L. (2017). United States adolescents' television, computer, videogame, smartphone, and tablet use: Associations with sugary drinks, sleep, physical activity, and obesity. *The Journal of Pediatrics*, *182*, 144–149.
- Kliwer, W., Robins, J. L., & Borre, A. (2019). Community violence exposure, sleep disruption, and insulin resistance in low-income urban adolescents. *International Journal of Behavioral Medicine*, *26*, 437–442.
- Köse, S., Yilmaz, H., Ocakoğlu, F. T., & Özbaran, N. B. (2017). Sleep problems in children with autism spectrum disorder and intellectual disability without autism spectrum disorder. *Sleep Medicine*, *40*, 69–77.
- Kwan, M. Y., Cairney, J., Faulkner, G. E., & Pullenayegum, E. E. (2012). Physical activity and other health-risk behaviors during the transition into early adulthood: A longitudinal cohort study. *American Journal of Preventive Medicine*, *42*(1), 14–20.
- Lang, C., Brand, S., Feldmeth, A. K., Holsboer-Trachler, E., Pühse, U., & Gerber, M. (2013). Increased self-reported and objectively assessed physical activity predict sleep quality among adolescents. *Physiology & Behavior*, *120*, 46–53.
- Langevin, R., Hébert, M., Guidi, E., Bernard-Bonin, A.-C., & Allard-Dansereau, C. (2017). Sleep problems over a year in sexually abused preschoolers. *Paediatrics & Child Health*, *22*(5), 273–276.
- Li, S. H., Beames, J. R., Newby, J. M., Maston, K., Christensen, H., & Werner-Seidler, A. (2022). The impact of COVID-19 on the lives and mental health of Australian adolescents. *European Child & Adolescent Psychiatry*, *31*(9), 1465–1477.
- Lowry, R., Haarbauer-Krupa, J., Breiding, M. J., & Simon, T. R. (2021). Sports and physical activity-related concussion and risk for youth violence. *American Journal of Preventive Medicine*, *60*(3), 352–359.
- Machado, A. K., Wendt, A., Ricardo, L. I., Marmitt, L. P., & Martins, R. C. (2020). Are parental monitoring and support related with loneliness and problems to sleep in adolescents? Results from the Brazilian School-based Health Survey. *Children and Youth Services Review*, *119*, Article 105682.
- Mantey, D. S., Omega-Njemnobi, O., Barroso, C. S., & Kelder, S. H. (2020). Self-reported history of concussions is associated with risk factors for suicide completion among high school students. *Journal of Affective Disorders*, *263*, 684–691.
- Mantey, D. S., Omega-Njemnobi, O., & Kelder, S. H. (2021). Self-reported history of concussions is associated with risk factors for suicide completion among middle school students: A cross-sectional study. *Journal of Psychiatric Research*, *132*, 191–194.
- Mantey, D. S., Yockey, R. A., & Springer, A. E. (2023). Digital screen time and suicidality during high school: How important is cyberbullying? A mediation analysis using the youth risk behavioral surveillance survey, 2011–2019. *Preventive Medicine*, *166*, Article 107330.
- Marsh, R. J., Higgins, K., Morgan, J., Cumming, T. M., Brown, M., & McCreery, M. (2019). Evaluating school connectedness of students with emotional and behavioral disorders. *Children & Schools*, *41*(3), 153–160.
- Maski, K., & Owens, J. A. (2016). Insomnia, parasomnias, and narcolepsy in children: Clinical features, diagnosis, and management. *The Lancet Neurology*, *15*(11), 1170–1181.
- McBee-Strayer, S. M., Alexy, E. R., Sheftall, A. H., Heck, K. M., Dombrowski-Stork, C. A., Bergdoll, E. E., ... Bridge, J. A. (2020). Old-for-Grade status and suicide risk in US High school students. *Archives of Suicide Research*, *24*(sup2), S282–S292.
- Medic, G., Wille, M., & Hemels, M. E. (2017). Short- and long-term health consequences of sleep disruption. *Nature and Science of Sleep*, 151–161.
- Meldrum, R. C., Jackson, D. B., Archer, R., & Ammons-Blanfort, C. (2018). Perceived school safety, perceived neighborhood safety, and insufficient sleep among adolescents. *Sleep Health*, *4*(5), 429–435.
- Melegari, M. G., Ferri, R., Giallonardo, M., Donfrancesco, R., & Bruni, O. (2023). Changes in sleep duration and disturbances during Covid-19 lockdown and internalizing-externalizing behaviors in children with attention deficit hyperactivity disorders. *Sleep Medicine*, *101*, 183–189.
- Meltzer, L. J., Williamson, A. A., & Mindell, J. A. (2021). Pediatric sleep health: It matters, and so does how we define it. *Sleep Medicine Reviews*, *57*, Article 101425.
- Merianos, A. L., Mahabee-Gittens, E. M., & Choi, K. (2021). Tobacco smoke exposure and inadequate sleep among US school-aged children. *Sleep Medicine*, *86*, 99–105.
- Meza, J. L., Bondoc, C., Keshav, N., Bosco, J., & Barnert, E. (2023). *Exploring the Link Between Neighborhood Violence and Health Among African-American and Latinx Youth Returning Home After Incarceration*, 52, 538–558.
- Mpofu, J. J., Underwood, J. M., Thornton, J. E., Brener, N. D., Rico, A., Kilmer, G., Harris, W. A., Leon-Nguyen, M., Chyen, D., & Lim, C. (2023). Overview and methods for the Youth Risk Behavior Surveillance System—United States, 2021. *MMWR Supplements*, *72*(1), 1–12.
- Moore, S. A., Faulkner, G., Rhodes, R. E., Brussoni, M., Chulak-Bozzer, T., Ferguson, L. J., ... Tremblay, M. S. (2020). Impact of the COVID-19 virus outbreak on movement and play behaviours of Canadian children and youth: A national survey. *International Journal of Behavioral Nutrition and Physical Activity*, *17*(1), 1–11.
- Mrug, S., Orihuela, C. A., & Veerasammy, A. (2021). Reciprocal relationships between exposure to community violence and sleep problems across adolescence. *The Journal of Early Adolescence*, *41*(7), 982–995.
- Oman, R. F., Clements-Nolle, K., Lu, M., & Lensch, T. (2018). An investigation of youth assets and physical activity and BMI using a longitudinal cohort design. *American Journal of Health Promotion*, *32*(8), 1751–1754.
- Onyeaka, H. K., Muoghalu, C., Baiden, P., Okine, L., Szlyk, H. S., Peoples, J. E., ... Torous, J. (2022). Excessive screen time behaviors and cognitive difficulties among adolescents in the United States: Results from the 2017 and 2019 national youth risk behavior survey. *Psychiatry Research*, *316*, Article 114740.
- Orchard, F., Gregory, A. M., Gradirar, M., & Reynolds, S. (2020). Self-reported sleep patterns and quality amongst adolescents: Cross-sectional and prospective associations with anxiety and depression. *Journal of Child Psychology and Psychiatry*, *61*(10), 1126–1137.
- Owens, J., Adolescent Sleep Working Group, Committee on Adolescence, Au, R., Carskadon, M., Millman, R., Wolfson, A., Braverman, P. K., Adelman, W. P., & Breuner, C. C. (2014). Insufficient sleep in adolescents and young adults: An update on causes and consequences. *Pediatrics*, *134*(3), e921–e932.
- Paruthi, S., Brooks, L. J., D'Ambrosio, C., Hall, W. A., Kotagal, S., Lloyd, R. M., Malow, B. A., Maski, K., Nichols, C., & Quan, S. F. (2016). Recommended amount of

- sleep for pediatric populations: A consensus statement of the American Academy of Sleep Medicine. *Journal of Clinical Sleep Medicine*, 12(6), 785–786.
- Phan, J., & Gaylord-Harden, N. (2022). Examining the pathologic adaptation model of community violence exposure in justice involved adolescents: The moderating and mediating effects of moral disengagement. *Journal of Child & Adolescent Trauma*, 15, 669–681.
- Philbrook, L. E., Buckhalt, J. A., & El-Sheikh, M. (2020). Community violence concerns and adolescent sleep: Physiological regulation and race as moderators. *Journal of Sleep Research*, 29(3), e12897.
- Przybylski, A. K. (2019). Digital screen time and pediatric sleep: Evidence from a preregistered cohort study. *The Journal of Pediatrics*, 205, 218–223.
- Raghupathy, S., & Hahn-Smith, S. (2012). Reliability of the high school Youth Risk Behavior Survey when administered online. *International Quarterly of Community Health Education*, 32(2), 135–148.
- Sampasa-Kanyinga, H., Chaput, J.-P., Hamilton, H. A., & Colman, I. (2018). Bullying involvement, psychological distress, and short sleep duration among adolescents. *Social Psychiatry and Psychiatric Epidemiology*, 53, 1371–1380.
- Semenza, D. C., & Stansfield, R. (2021). Non-Fatal gun violence and community health behaviors: A neighborhood analysis in Philadelphia. *Journal of Behavioral Medicine*, 44(6), 833–841.
- Shochat, T., Cohen-Zion, M., & Tzischinsky, O. (2014). Functional consequences of inadequate sleep in adolescents: A systematic review. *Sleep Medicine Reviews*, 18(1), 75–87.
- Smith, N. A., Voisin, D. R., Yang, J. P., & Tung, E. L. (2019). Keeping your guard up: Hypervigilance among urban residents affected by community and police violence. *Health Affairs*, 38(10), 1662–1669.
- Steiner, R. J., Sheremenko, G., Lesesne, C., Dittus, P. J., Sieving, R. E., & Ethier, K. A. (2019). Adolescent connectedness and adult health outcomes. *Pediatrics*, 144(1), e20183766.
- Tang, W., Chen, M., Wang, N., Deng, R., Tang, H., Xu, W., & Xu, J. (2023). Bullying victimization and internalizing and externalizing problems in school-aged children: The mediating role of sleep disturbance and the moderating role of parental attachment. *Child Abuse & Neglect*, 138, Article 106064.
- Telzer, E. H., Goldenberg, D., Fuligni, A. J., Lieberman, M. D., & Gálvan, A. (2015). Sleep variability in adolescence is associated with altered brain development. *Developmental Cognitive Neuroscience*, 14, 16–22.
- Troxel, W. M., Palimaru, A. I., Klein, D. J., Dong, L., Dickerson, D. L., Brown, R. A., Johnson, C. L., & D'Amico, E. J. (2022). Changes in sleep-wake patterns and disturbances before and during COVID-19 in Urban American Indian/Alaska Native adolescents. *Behavioral Sleep Medicine*, 20(3), 343–356.
- Udell, W., Hotton, A. L., Emerson, E., & Donenberg, G. R. (2017). Does parental monitoring moderate the impact of community violence exposure on probation youth's substance use and sexual risk behavior? *Journal of Child and Family Studies*, 26, 2556–2563.
- Van Buuren, S. (2018). *Flexible imputation of missing data*. CRC Press.
- Van Ginkel, J. R., Linting, M., Rippe, R. C., & van der Voort, A. (2020). Rebutting existing misconceptions about multiple imputation as a method for handling missing data. *Journal of Personality Assessment*, 102(3), 297–308.
- Villarreal, D. L., & Nelson, J. A. (2018). Parental monitoring and adolescent risk behaviors: The moderating role of adolescent internalizing symptoms and gender. *Journal of Child and Family Studies*, 27, 3627–3637.
- Voisin, D. R., Hotton, A., & Neilands, T. (2018). Exposure to community violence and sexual behaviors among African American youth: Testing multiple pathways. *Behavioral Medicine*, 44(1), 19–27.
- Voisin, D. R., Tan, K., Tack, A. C., Wade, D., & DiClemente, R. (2012). Examining parental monitoring as a pathway from community violence exposure to drug use, risky sex, and recidivism among detained youth. *Journal of Social Service Research*, 38(5), 699–711.
- Wang, Z., Li, W., Cui, N., Sun, X., Rong, T., Deng, Y., Meng, M., Shan, W., Zhang, Y., & Ordway, M. (2022). The association between child maltreatment and sleep disturbances among preschoolers. *Child Abuse & Neglect*, 127, Article 105525.
- Wang, G., Zhang, Y., Zhao, J., Zhang, J., & Jiang, F. (2020). Mitigate the effects of home confinement on children during the COVID-19 outbreak. *The Lancet*, 395(10228), 945–947.
- Wesley, L. K., Cooper, E. H., Brinton, J. T., Meier, M., Honaker, S., & Simon, S. L. (2023). A national survey of US adolescent sleep duration, timing, and social jetlag during the COVID-19 pandemic. *Behavioral Sleep Medicine*, 21(3), 291–303.
- Wheaton, A. G., Jones, S. E., Cooper, A. C., & Croft, J. B. (2018). Short sleep duration among middle school and high school students—United States, 2015. *Morbidity and Mortality Weekly Report*, 67(3), 85–90.
- Winsler, A., Deutsch, A., Vorona, R. D., Payne, P. A., & Szklo-Coxe, M. (2015). Sleepless in Fairfax: The difference one more hour of sleep can make for teen hopelessness, suicidal ideation, and substance use. *Journal of Youth and Adolescence*, 44, 362–378.
- Woods, H. C., & Scott, H. (2016). # Sleepyteens: Social media use in adolescence is associated with poor sleep quality, anxiety, depression and low self-esteem. *Journal of Adolescence*, 51, 41–49.
- Wunsch, K., Kasten, N., & Fuchs, R. (2017). The effect of physical activity on sleep quality, well-being, and affect in academic stress periods. *Nature and Science of Sleep*, 117–126.
- Zhang, J., Paksarian, D., Lamers, F., Hickie, I. B., He, J., & Merikangas, K. R. (2017). Sleep patterns and mental health correlates in US adolescents. *The Journal of Pediatrics*, 182, 137–143.
- Ziminski, D., Szlyk, H. S., Baiden, P., Okine, L., Onyeaka, H. K., Muoghalu, C., & Cavazos-Reh, P. (2022). Sports- and physical activity-related concussions and mental health among adolescents: Findings from the 2017 and 2019 Youth Risk Behavior Survey. *Psychiatry Research*, 312, 114542.
- Zullig, K. J., Pun, S., Patton, J. M., & Ubbes, V. A. (2006). Reliability of the 2005 middle school youth risk behavior survey. *Journal of Adolescent Health*, 39(6), 856–860.