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## Community violence concerns and adolescent sleep

Erika J. Bagley, PhD<sup>a</sup>, Kelly M. Tu, PhD<sup>b,1</sup>, Joseph A. Buckhalt, PhD<sup>c</sup>, Mona El-Sheikh, PhD<sup>b,\*</sup><sup>a</sup> Psychology Department, Muhlenberg College, 2400 Chew St, Allentown, PA, 18140<sup>b</sup> Department of Human Development and Family Studies, Auburn University, 203 Spidle Hall, Auburn, AL, 36849<sup>c</sup> Department of Special Education, Rehabilitation and Counseling, Auburn University, 3084 Haley Center, Auburn, AL, 36849

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### ABSTRACT

**Objective:** The goal of this study was to examine links between concerns about community violence and objective and subjective sleep parameters in an adolescent sample. Sex was considered as a moderator of effects.

**Design:** The study used a cross-sectional design.

**Participants:** The community-based sample included 252 adolescents (53% girls) with an average age of 15.79 years ( $SD = 0.81$ ) from the Southeastern United States. The sample included 34% African American and 66% European American adolescents from a wide range of socioeconomic backgrounds.

**Measurements:** Adolescent-reported community violence concerns were assessed using a composite of 3 separate subscales that measured perceived community safety and threats of community and school violence. Sleep duration and quality were assessed using actigraphy, and subjective sleep problems and daytime sleepiness were measured with subscales of the School Sleep Habits Survey.

**Results:** Community violence predicted lower sleep efficiency, more long-wake episodes, and more sleep/wake problems and sleepiness. Sex-related moderation effects revealed that girls in the sample were more vulnerable to the effects of violence concerns on their objective sleep quality.

**Conclusions:** Findings highlight the role of community violence concerns on adolescents' sleep, revealing that greater community violence concerns are linked with lower levels of actigraphy-based and subjective reports of sleep quality, particularly for adolescent girls. Consideration of the mechanisms by which violence concerns may affect sleep is discussed.

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Exposure to community violence is a common experience for adolescents living in disadvantaged neighborhoods. Compared with adults, adolescents are at increased risk of exposure to community violence. The 2009 National Survey of Children's Exposure to Violence found that more than 60% of youth ages 12–17 years reported exposure to violence and nearly 20% reported having witnessed an assault within their communities in the past year. Being a victim of, having witnessed, or even hearing about violence within the neighborhood may lead youth to develop concerns about their own safety.<sup>1</sup> In a meta-analysis on the effects of exposure to community violence, Fowler and colleagues<sup>2</sup> concluded that as a consequence of community violence exposure, adolescents often develop concerns for their safety that cause them to experience a state of chronic hyperarousal. Prior research has shown that youth who were victims or witnesses of violence were less likely to show the normal, expected drop in

blood pressure at night (an indication of physiological hyperarousal), lending support to this pathway of effects.<sup>3</sup>

Links between concerns for safety and arousal raise questions about the possible effects of safety concerns on sleep for adolescents. A prominent framework articulated by Dahl<sup>4</sup> suggests that sleep and arousal/vigilance are contradictory processes and that sufficient and good quality sleep is most likely to occur when vigilance is reduced. Concerns for one's safety, therefore, may interfere with the initiation of sleep, reduce the total hours slept, and potentially have negative effects on sleep quality. The framework has been valuable to research examining links between violence in the home and children's sleep,<sup>5</sup> which has demonstrated that feelings of emotional insecurity and safety concerns mediate links between violence exposure and sleep.<sup>6</sup>

Several studies have demonstrated associations between poor neighborhood conditions, including exposure to violence and sleep disturbances in adolescents.<sup>7,8</sup> There is also a body of research that considers violence exposure and sleep problems as part of a broader constellation of symptoms related to post-traumatic stress disorder (for review, see Spilsbury<sup>9</sup>). Still, few studies have explicitly examined the relations between worry about safety and sleep in adolescents. Worry or concerns about one's safety may be a more proximal psychological variable linking violence exposure to sleep

\* Corresponding author at: Human Development and Family Studies, 203 Spidle Hall, Auburn University, Auburn, AL, 36849-5214. Tel.: +1 334 844 3294; fax: +1 334 844 4515.

E-mail address: [elshemm@auburn.edu](mailto:elshemm@auburn.edu) (M. El-Sheikh).

<sup>1</sup> Present address: Department of Human Development and Family Studies, University of Illinois at Urbana-Champaign, 2009 Christopher Hall, MC-081, 904 W. Nevada St., Urbana, IL, 61801.

problems. General worry has been shown to be one of the strongest predictors of self-reported disrupted sleep after accounting for sleep disturbance the prior year, traumatic stress, alcohol use, and demographic variables in a sample of African-American youth living in impoverished, inner-city neighborhoods.<sup>10</sup> Furthermore, there are a few notable empirical studies using adult samples that have shown that feelings of neighborhood safety are related to sleep. For example, in a large, national sample of adults in Argentina, self-reported sleep quality and duration were negatively associated with feelings of safety in one's neighborhood and home, particularly for women.<sup>11</sup> In another large international study across 6 countries, self-reported insomnia symptoms and reports of poor sleep quality were worse for those who reported feeling unsafe in their neighborhoods.<sup>12</sup>

The current study extends research conducted with adults to an adolescent sample by considering links between concerns about neighborhood safety and sleep. We examine these relations while accounting for general anxiety symptoms to mitigate potential confounds. Because prior research has often relied on self-report of both worry and sleep, the use of actigraphy-derived sleep in the current study reduces the effects of potential reporter bias on results. Consistent with the framework that vigilance interferes with the maintenance of sleep, we expected greater concerns for safety to be associated with poorer self-reported and objective sleep duration and quality. Sex is examined as a moderator, as prior research with adults<sup>11</sup> has shown women to be more vulnerable to the effects of safety concerns on sleep.

## Method

### Participants

Data for the current study are drawn from the fourth wave (collected from 2012 to 2013) of the Family Stress Study; community violence and actigraphic sleep measures were not collected at earlier waves. Recruited through flyers distributed to elementary schools in the Southeastern United States, children were eligible for the study if their parents had been living together for at least 2 years and if they were not diagnosed with the following: attention deficit/hyperactivity disorder, developmental delays, clinical sleep disorder, or a chronic illness. At T1, 251 school-aged children participated, and 79% ( $n = 199$ ) of those children participated at T4. To increase the sample size, an additional 53 families were recruited at T4 from the same schools as the original sample using the same inclusion/exclusion criteria. The participants recruited at T4 did not differ from those recruited at T1 on demographic or primary study variables.

The final analytic sample consisted of 252 adolescents (118 boys, 134 girls; 66% European American, 34% African American;  $M_{\text{age}} = 15.79$  years,  $SD = 0.81$ ). Income-to-needs ratio (annual family income divided by federal poverty threshold for a given family size<sup>13</sup>) indicated that families in the current wave were from a wide range of socioeconomic backgrounds. Approximately 42% of families were living in or near the poverty line (ratio  $\leq 2$ ), 22% were of lower middle class (ratio  $> 2$  and  $< 3$ ), and 36% were of middle class (ratio  $\geq 3$ ). The majority (82%) of adolescents lived in a 2-parent household, 14% lived in a single-parent household, and 4% lived with a legal guardian(s).

### Procedure

The study was approved by the university's institutional review board. Consent and assent for participation were obtained from parents and adolescents, respectively. Objective sleep data were collected during the regular school year, excluding holidays and obtained from actigraphs worn on adolescents' nondominant wrist at bedtime

for 7 consecutive nights. Sleep diaries were used to corroborate actigraphy data.<sup>14</sup> Nights during which medication was used (reported in sleep diary) were excluded from analyses. Families visited the laboratory 3.96 days ( $SD = 12.25$ ) following the last night of actigraphy to complete questionnaires.

## Measures

### Community violence concerns

Adolescents completed the 6-item crime safety subscale of the Neighborhood Walkability Scale.<sup>15</sup> Items (eg, "There is high crime in my neighborhood"; "I am worried about being outside alone around my home because I am afraid of being taken or hurt by a stranger") were rated on a 4-point scale (1 = strongly disagree to 4 = strongly agree;  $\alpha = .89$ ). Items from the Community Experiences Questionnaire<sup>16</sup> were adapted to assess adolescents' perceptions of threats of violence in their community and schools. Threats of community violence were assessed with 7 items (eg, "How worried are you that someone will break in or force their way into your home?";  $\alpha = .94$ ), and school violence was assessed with 8 items (eg, "How worried are you that someone will break in your locker?";  $\alpha = .90$ ). Items were rated on a 5-point scale (0 = not at all to 4 = a whole lot).

Adolescent reports of crime safety ( $M = 7.97$ ,  $SD = 3.26$ ) and threats of community ( $M = 2.37$ ,  $SD = 4.28$ ) and school ( $M = 2.44$ ,  $SD = 3.95$ ) violence were moderately to highly correlated ( $r$ s ranged from .43 to .62,  $P$ s  $< .001$ ). Scores for each measure were standardized and averaged to create a composite score, hereafter referred to as *community violence*.

### Objective sleep

Sleep data were obtained through Motionlogger Octagonal Basic actigraphs (Ambulatory Monitoring Inc, Ardsley, NY<sup>17</sup>), and Sadeh's scoring algorithm was used to score each epoch.<sup>18</sup> On average, participants had 5.44 nights ( $SD = 1.77$ ) of usable actigraphy data; missing data were due to forgetting to wear the watch, mechanical problems, or exclusion of nights with medication use. Because of poor estimation of regular sleep,<sup>19</sup> sleep data for adolescents with fewer than 5 nights of actigraphy data (23%) were not included in analyses. The following well-established sleep parameters were derived by averaging actigraphy data across all available nights: (a) sleep minutes—the number of minutes from sleep onset to wake time; (b) sleep efficiency—percentage of epochs scored as sleep between sleep onset and wake time; and (c) long-wake episodes—the number of wake episodes of 5 minutes or more. Night-to-night stability during the week was high for all sleep parameters ( $\alpha$ s ranged from .75 to .92).

### Subjective sleep

Adolescents completed the School Sleep Habits Survey,<sup>20</sup> which measures how often participants experienced sleep/wake problems and sleepiness during the past 2 weeks. The Sleep/Wake problem scale (10 items) assesses problems such as irregular sleep times, unscheduled sleep, staying up late at night, oversleeping, and satisfaction with one's sleep. Items were rated on 5-point scale (1 = never to 5 = every day/night;  $\alpha = .77$ ). The Sleepiness scale (9 items) assesses whether participants struggled to stay awake during various activities (eg, watching TV, taking a test); 1 item regarding sleepiness while driving was excluded. Items were rated on a 4-point scale (1 = no to 4 = struggled to stay awake and fallen asleep;  $\alpha = .71$ ).

### Control variables

Some variables were associated with primary study variables and were controlled in analyses, including child sex (0 = girls, 1 = boys),

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