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Longitudinal Relationship Between Mental Health Symptoms and Sleep Disturbances and Duration in Maltreated and Comparison Adolescents

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A B S T R A C T

Purpose: To examine the longitudinal relationships between mental health symptoms and sleep for male and female maltreated and comparison adolescents.
Methods: Participants were from a longitudinal study of child maltreatment (maltreated $n = 247$; comparison $n = 138$). The current analyses used data from Time 3 (T3; average age 13.7 years) and Time 4 (T4; average age 18.2 years). Path models tested cross-lagged effects between mental health symptoms (depression and Post Traumatic Stress Disorder [PTSD]) and sleep (disturbances and duration) and main effects of maltreatment on Time 4 variables, stratified by sex.
Results: Reciprocal relationships between depressive and PTSD symptoms and sleep disturbances were found only for females. Specifically, depressive and PTSD symptoms at T3 predicted sleep disturbances at T4 and sleep disturbances at T3 also predicted depressive and PTSD symptoms at T4. Regarding sleep duration, PTSD symptoms at T3 predicted shorter sleep duration at T4 among females but not for males. There was no effect of maltreatment status on mental health symptoms or sleep disturbance, but maltreated adolescents reported longer sleep duration at T4 than comparison adolescents.
Conclusions: The reciprocal nature of the relationship between mental health symptoms and sleep disturbances in females highlights the need to treat both mental health symptoms as well as sleep problems in female adolescents to improve mental and physical health. The absence of a negative effect of maltreatment on sleep may be due to the fact that the maltreated youth and comparison youth lived in the same low-income urban communities and were exposed to the same nocturnal environmental irritants.

IMPLICATIONS AND CONTRIBUTION

By testing females and males separately, this study was able to identify the reciprocal associations between mental health symptoms (depression and Post Traumatic Stress Disorder [PTSD]) and sleep disturbances in females. It is important to treat both mental health symptoms as well as sleep problems in female adolescents to improve mental and physical health.

Recent evidence details the serious effects of inadequate sleep on adolescents' physical and psychosocial health, involvement in risky behaviors, and school performance [1]. The relationship between mental health and sleep problems in adolescence

is complex as there are likely reciprocal relations [2–4]. Additionally, mental health and sleep problems differ by sex, highlighting the need to examine these associations separately for males and females [5,6]. Furthermore, a history of childhood maltreatment has been linked to mental health problems and sleep problems [7–9]. Understanding how mental health affects sleep as well as how sleep affects mental health is important for developing prevention and interventions to enhance mental health and minimize sleep problems in at-risk youth. The present study used data from a study of maltreated adolescents and a comparison population to examine the longitudinal relationships between mental health symptoms (depression and Post Traumatic Stress Disorder [PTSD]) and sleep (disturbances and duration) separately for males and females and how mental health and sleep might be affected by experiences of childhood maltreatment in adolescence.

Existing studies showed a strong relationship between depressive and PTSD symptoms and sleep problems. In a sample of more than 10,000 adolescents in Norway, there was a significant relationship between insomnia and depression for both males and females [10]. Other evidence points to sleep problems at age four as a predictor of depressive symptoms in mid-adolescence [11]. In a longitudinal study of adolescents, sleep deprivation (6 hours or shorter) predicted a depression diagnosis one year later [12]. Research also suggests that sleep disruptions are present in adults with PTSD [13]. However, other studies show opposite effects, that mental health symptoms predict sleep problems [14]. In youth ages 8 to 15, there was both a cross-sectional relationship between sleep disturbances and PTSD symptoms and a longitudinal relationship of sleep disturbances to escalation of PTSD symptoms [15]. Overall, the causal associations between mental health and sleep are unclear.

Sex differences have further confounded the relations between depressive and PTSD symptoms and sleep problems [5,6]. Two meta-analyses on sex differences concluded females were more likely to have insomnia [6] and meet the criteria of a PTSD diagnosis than men [16]. Sex differences in depression symptomology are supported for adolescents with females showing higher prevalence than males [5]. Few studies exist examining sex differences in depression and PTSD symptoms in maltreated youth, a population particularly vulnerable to mental health problems [17].

Childhood maltreatment has been found to affect sleep across development. In a study of maltreated school-aged children with behavior problems, sleep disturbances were greater than in a comparison population [18]. In a retrospective study, adults who identified any child maltreatment reported more sleep disturbances than adults who did not report adverse childhood experiences [19]. Sex differences have been found for the relationship between child maltreatment and sleep problems. Self-report of childhood sexual abuse in both males and female adults was associated with insomnia within the last month, with females having higher odds of insomnia than men [20]. In summary, there are links between sleep, mental health symptoms, and maltreatment but the directionality and relationships between these three issues have not been established.

The current study used a longitudinal design with adolescents with child welfare-identified maltreatment (n = 247) and a comparison group (n = 138) living in the same community. The aim of our research was to examine the relationship between mental health symptoms (depression and PTSD) and sleep (dis-turbances and duration) during adolescence. Since the relationship between mental health symptoms and sleep is likely complex and could be bidirectional [3], we used a cross-lagged model to test these relationships. We hypothesized that maltreatment would affect mental health symptoms and sleep in adolescence, and mental health symptoms would be associated with poorer sleep across adolescence and vice versa. In addition, due to known sex differences in both sleep and mental health, we stratified the analysis.

Methods

Participants

At Time 1 (T1), the enrolled sample for this longitudinal study of the effect of maltreatment on adolescent development included 454 adolescents aged 9–13 years old (303 maltreated and 151 comparison). Participants were selected from a large city in California if they met the following criteria: 9–12 years old; identified as Latino, black, or white (non-Latino); and resided in one of 10 zip codes in a designated county. The maltreated sample was recruited from active cases in the child welfare department (CWD) if they had a new referral to the CWD during the preceding month for any type of maltreatment. With the approval of the CWD, the county juvenile court, and the institutional review board of the affiliated university, potential participants were contacted by mail and 77% agreed to participate. The comparison group was recruited using school lists of children aged 9–12 years residing in the same zip codes. Comparison caregivers were also contacted by mail and approximately 50% agreed to participate. Comparison caregivers reported no previous or ongoing experience with CWDs. Upon enrollment in the study, the maltreatment and comparison groups were similar in age (mean [M] = 10.93 years, standard deviation [SD] = 1.16), sex (53% male), and neighborhood characteristics. We used addresses of the homes in which the children were living and found only minor differences in the nine categories relevant to characterizing the social, educational, economic, and demographic nature of neighborhoods and deemed important for child development [21]. We identified the maltreatment experiences of the children recruited from the CWD using case review at T1 (see [22] for details of the record abstraction). Categories included neglect (n = 169), emotional abuse (n = 118), physical abuse (n = 113), and sexual abuse (n = 46) and 76% of the youth experienced more than one type.

Data for the current study came from data collected at Time 3 (T3) and/or Time 4 (T4; approximately 4.5 years between T3 and T4) of this ongoing longitudinal study. At T3, the average age of participants was 13.7 years (SD = 1.42; n = 191 maltreated and n = 128 comparison; 2.7 years after T1) and at T4, the average age was 18.2 years (SD = 1.47; n = 222 maltreated; n = 128 comparison, 7.2 years after T1). The final sample included 247 maltreated (64.2%) and 138 comparison (35.8%) participants with a fairly even distribution of males (48.3%) to females (51.7%). Participants were black (40%) or Latino (36.9%), Bi-Racial (13.2%) or white (9.9%). Compared with T1, participants not seen at T3 were more likely to be Latino (odds ratio [OR] = 3.37, p < .01) and in the maltreatment group (OR = 5.36, p < .01), and those not seen at T4 were more likely to be in the maltreatment group (OR = 2.45, p < .01) and male (OR = 1.86, p < .01).