Journal of Psychiatric Research 45 (2011) 505–511

Contents lists available at ScienceDirect

Journal of Psychiatric Research

journal homepage: www.elsevier.com/locate/psychires

Sleep problems, suicidal ideation, and self-harm behaviors in adolescence

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ARTICLE INFO

Article history:
Received 1 May 2010
Received in revised form
8 September 2010
Accepted 11 September 2010

Keywords:
Sleep disturbance
Suicidal thoughts
Suicide attempts
Self-harm behaviors
Adolescence

ABSTRACT

Objective: Previous research has found an association between sleep problems and suicidal behavior. However, it is still unclear whether the association can be largely explained by depression. In this study, we prospectively examined relationships between sleep problems when participants were 12–14 years old and subsequent suicidal thoughts and self-harm behaviors—including suicide attempts—at ages 15–17 while controlling for depressive symptoms at baseline.
Methods: Study participants were 280 boys and 112 girls from a community sample of high-risk alcoholic families and controls in an ongoing longitudinal study.
Results: Controlling for gender, parental alcoholism and parental suicidal thoughts, and prior suicidal thoughts or self-harm behaviors when participants were 12–14 years old, having trouble sleeping at 12–14 significantly predicted suicidal thoughts and self-harm behaviors at ages 15–17. Depressive symptoms, nightmares, aggressive behavior, and substance-related problems at ages 12–14 were not significant predictors when other variables were in the model.
Conclusions: Having trouble sleeping was a strong predictor of subsequent suicidal thoughts and self-harm behaviors in adolescence. Sleep problems may be an early and important marker for suicidal behavior in adolescence. Parents and primary care physicians are encouraged to be vigilant and screen for sleep problems in young adolescents. Future research should determine if early intervention with sleep disturbances reduces the risk for suicidality in adolescents.

1. Introduction

In 2002, the Institute of Medicine report on *Reducing Suicide* recommended that prospective studies of populations at high risk for the onset of suicidal behavior were needed (Goldsmith et al., 2002). Of particular concern are adolescents, because suicide is the third leading cause of death in the 15–24-year old age group (Cash and Bridge, 2009). Although the Institute of Medicine report did not mention sleep disturbances as a risk factor for suicidality, a consistent and strong association between sleep disturbances and suicidality has been reported in both adults (Agargun et al., 2007; Chellappa and Araujo, 2007; McGirr et al., 2007; Sjostrom et al., 2007; Turvey et al., 2002; Wallander et al., 2007; Wojnar et al., 2009) and adolescents (Bailly et al., 2004; Barbe et al., 2005; Choquet et al., 1993; Choquet and Menke, 1990; Goldstein et al., 2008; Liu, 2004; Nrugham et al., 2008).

Among adolescents, insomnia has been linked to suicidal thoughts (Bailly et al., 2004; Barbe et al., 2005; Choquet and Menke, 1990), attempts (Bailly et al., 2004; Nrugham et al., 2008), and completed suicides (Goldstein et al., 2008). Similarly, nightmares have been linked to both suicidal thoughts (Choquet and Menke, 1990; Liu, 2004) and suicide attempts (Liu, 2004). These relationships have been reported in both general student populations (Liu, 2004; Nrugham et al., 2008) and clinical samples (Barbe et al., 2005). With one exception (Nrugham et al., 2008), however, most of these studies were cross-sectional in design. In the one prospective study already present in the literature, Nrugham et al. (2008) followed 265 students in Norway for 5 years, starting when they were approximately 15 years of age. Bivariate analyses demonstrated that insomnia at age 15 predicted suicide attempts during the next 5 years. In multivariate analyses that controlled for depressive symptoms, however, insomnia was no longer predictive. This is probably due to the well-established association between depression and suicide attempts in adolescents (Kovacs et al., 1993; Lewinsohn et al., 1994; Liu and Buysse, 2006). The results of this

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doi:10.1016/j.jpsychires.2010.09.005

study illustrate the importance of controlling for depressive symptoms. Nevertheless, the authors cautioned that a 70% follow-up rate and a small number of boys ($N = 61$) in the sample may have biased the results. More prospective studies are clearly needed to address the possible relationships between sleep problems and suicidal behavior.

Children of alcoholics (COAs) are another high-risk group for numerous adverse outcomes including substance use disorders, internalizing disorders, and externalizing disorders—all of which can increase the risk for suicidality (Lieberman, 2000; Zucker et al., 2008). Recent work also suggests that COAs may differ from other children by objectively measured sleep disturbance (Dahl et al., 2003; Tarokh and Carskadon, 2009). Therefore, the relationship between sleep disturbances and suicidality in COAs warrants study.

Here, we report to our knowledge the first prospective study of high-risk adolescents to investigate a potential link between sleep disturbances and subsequent suicidal thoughts and either self-harm behaviors or suicide attempts (self-harm/suicidal behaviors). We hypothesized that (1) COAs would have higher rates of sleep disturbance than non-COAs; (2) COAs would have higher rates of suicidal thoughts and self-harm/suicidal behaviors than non-COAs; and (3) sleep disturbances would prospectively predict the development of suicidal thoughts and self-harm/suicidal behaviors after controlling for depressive symptoms, COA status, and other potentially confounding variables. We used the terms "sleep disturbances," "poor sleep," "insomnia," and "sleep problems" interchangeably in this paper.

2. Methods

2.1. Participants

The present study is part of the Michigan Longitudinal Study, an ongoing longitudinal family study on the development of risk for alcohol and other substance use disorders (Zucker and Fitzgerald, 1991; Zucker et al., 2000). The larger study recruited a population-based sample of alcoholic men, their partners (whose substance use disorder was free to vary), and controls, as well as their initially 3–5-year-old sons ($N = 311$ families). The 3–11-year-old daughters in the families were also invited to participate after the study began. The majority of these girls joined the project between ages 6–11.

Alcoholic men were identified by population sampling methods involving (a) a canvass of all courts in a four-county-wide area for drunk drivers with high blood alcohol levels (BAL > 0.15%); and (b) a neighborhood canvass in the areas where the court-selected alcoholics lived to recruit additional alcoholics. The neighborhood canvass also recruited a control group of children and their families who resided in the same neighborhood as the alcoholic families, but whose parents had no lifetime history of substance abuse/dependence. Male offspring of control families was age-matched to the male child in the alcoholic family residing in the same neighborhood. Both biological parents were required to be living together in the same household (either as married couples or domestic partners) and to have a 3–5 year-old son living with them at the time of recruitment. Presence of fetal alcohol syndrome was an exclusionary criterion.

The current sample consists of longitudinal data from 280 boys and 112 girls. All adolescents provided data on suicidal behavior when they were 12–14 years old (Time 4) and 15–17 years old (Time 5). Seventy-five percent (75%) of participants had at least one parent who met a lifetime alcohol use disorder (AUD) diagnosis when they first took part in the study (i.e., 3–5 years old for most participants, 6–11 years old for some participants, as most girls joined the study at that age) and 25% of participants were controls with non-AUD parents.

All families were Caucasian–Americans. Less than 4 percent of the population in the study sampling area that met inclusion criteria was non-Caucasian. Given the study's sample size, if non-Caucasian ethnic/racial groups were included, the number available would not have permitted any effective analysis to be done. As there is an extensive literature showing a relationship between substance abuse and ethnic/racial status (Hasin et al., 2007; Kessler et al., 2005), including such variation in the study without being able to statistically model its effects would only contribute to error. Therefore, investigators originally opted to exclude this variation. The study thereafter has recruited an additional sample of both African-American and Hispanic families using parallel recruitment criteria; however, offsprings from these families are largely preadolescent and thus do not provide the endpoint data necessary for this study.

2.2. Procedures

Trained interviewers who were blind to family diagnostic status collected the data. The contact time for each family varied, depending on the data collection wave. Typically, each parent was involved for 9–10 h and each child for 7 h spread over seven sessions. A variety of age-appropriate tasks (e.g., questionnaires, semi-structured interviews, and interactive tasks) were administered, and most of the contacts occurred in the families' homes. Special arrangement was made to collect data from families who had relocated. No families were lost due to relocation.

Participants and their parents were interviewed at three-year intervals. Participants were 3–5 years old at Time 1, 6–8 years old at Time 2, 9–11 years old at Time 3, 12–14 years old at Time 4 and 15–17 years old at Time 5. The data presented in this paper were collected at Times 4 and 5, except for parental measures, which was diagnosed at Time 1 or when the participants first joined the study (some participants joined the study at ages 6–11).

When information about suicidal ideation or attempt was discovered, interviewers reported the information immediately to senior clinicians of the study. The clinicians assessed the circumstances and made a decision on whether any further action needed to be taken. If the risk for suicidal behavior was significant, our research staff would ask the participants for permission to inform their parents about the situation and provide referral information to the family. Moreover, a follow-up contact would be conducted to make sure that the family had pursued the referral and that the suicidal risk of the participants was no longer an issue.

2.3. Instruments and measures

2.3.1. Adolescent measures

The Youth Self Report questionnaire (YSR; Achenbach, 1991) was used to collect data about sleep disturbances, suicidal thoughts and self-harm behavior, depressive symptoms, and aggressive behavior. The YSR is a widely used self-report instrument measuring childhood behavioral problems, keyed to the past six months. Responses are given on a three-point scale (0 = not true; 1 = somewhat or sometimes true; 2 = very true or often true). It was administered at two time points, once when participants were between 12 and 14 years old (Time 4), and again when participants were between 15 and 17 years old (Time 5).

Two YSR items were used to measure suicidal thoughts and either self-harm or suicidal behavior at both Times 4 and 5. Specifically, suicidal thoughts were measured by the item "I think about killing myself." Self-harm behavior, including suicide attempts, was measured by the item "I deliberately try to harm or kill myself." Responses were recoded as dichotomous variables (0 = not true, 1 = sometimes or often true), as less than 1% of the