



Insomnia symptoms, behavioral/emotional problems, and suicidality among adolescents of insomniac and non-insomniac parents



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ABSTRACT

The aim of this study was to examine insomnia symptoms, behavioral problems, and suicidality among adolescents of insomniac parents (IP) and non-insomniac parents (NIP). A family survey of sleep and health was conducted among 1090 adolescents and their parents in Jinan, China. Adolescents completed a sleep and health questionnaire to report their sleep and mental health problems. Parents reported their insomnia symptoms and history of mental disorders. Insomnia, behavioral problems, and suicidal behavior were compared between IP adolescents and NIP adolescents. IP adolescents were more likely than NIP adolescents to report insomnia symptoms, use of sleep medication, suicidal ideation, suicide plan, and suicide attempt. IP adolescents scored significantly higher than NIP adolescents on withdrawn and externalizing behavioral problems. After adjustment for demographics and behavioral problems, parental insomnia remained to be significantly associated with adolescent suicidal ideation and suicide plan. Our findings support the need for early screening and formal assessment of sleep and mental health in adolescents of insomniac parents.

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1. Introduction

Sleep in adolescents is characterized by insufficient sleep, increased daytime sleepiness, and a tendency to develop irregular sleep patterns and sleep disturbances (Carskadon and Acebo, 2002; Liu et al., 2008; Gradisar et al., 2011). Sleep insufficiency and sleep problems influence child's school performance and mental health (Dahl and Lewin, 2002; Roberts et al., 2002). Sleep changes and sleep disturbances during adolescence are associated with multiple biological, developmental, psychological, social-cultural, familial, and school factors (Carskadon and Acebo, 2002; Dauvilliers et al., 2005; Owens, 2005). Although several studies have examined familial aggregation and genetic transmission of sleep behavior, sleep quality, and some sleep disorders (Partinen et al., 1983; Dauvilliers et al., 2005; Watson et al., 2006; Zhang et al., 2009; Wing et al., 2012), little is known about mental health problems and suicidal behavior among adolescents of parents with insomnia.

Several twin studies have generally shown modest levels of genetic determination with heritability estimates in the range of

20–57% for various aspects of sleep behaviors and symptoms, including sleep timing, morningness–eveningness, overall sleep quality, and polysomnographic (PSG) sleep parameters (Linkowski, 1999; Watson et al., 2006). In a recent family study of insomnia in 5695 school-aged children and 4939 parents, Zhang et al. (2009) reported a robust familial aggregation of insomnia. The authors found that the prevalence of insomnia significantly increased with parental insomnia status, from 3.0% for children of parents without insomnia, to 7.1% for those whose fathers alone had insomnia, 9.5% for those whose mothers alone had insomnia, and 11.9% for those whose parents both had insomnia. However, in this study, insomnia symptoms of children and parents were reported by parents only and that some important confounding factors such as present mental health status in children and parents were not measured. In another study of the similarities between adolescent and parent sleep patterns ($n=293$), sleep in mothers, but not fathers, was significantly correlated with adolescent sleep onset latency (Brand et al., 2009a). However, both parental and adolescent sleep was rated by adolescent children. Reporting of parental sleep may be biased by the adolescents' own mood and information processing.

Sleep disorders in parents may not only relate to their offspring's sleep through genetic or non-genetic mechanisms, but may also have direct or indirect effects on child mental health (Bernert et al., 2007; Gregory et al., 2012). For example, parental

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insomnia may increase the risk of their offspring's behavioral and emotional problems by genetic transmission of sleep problems as described above. The association between adolescent sleep problems and psychopathology, behavioral problems, and daily functioning in adolescents has been well established (Breslau et al., 1996; Liu and Zhou, 2002; Roberts et al., 2002; Buysse et al., 2008; Blank et al., 2015). Parental insomnia may also increase family stress and influence parenting functioning (Bernert et al., 2007; Gregory et al., 2012), which, in turn, increases risk of offspring's psychopathology. Furthermore, the risk of offspring's psychopathology could be increased due to the interaction of shared genetic and environmental factors associated with parental insomnia (Gehrman et al., 2011). However, little is known about sleep problems and psychopathology in the offspring of parents with insomnia.

The current study addressed these aforementioned limitations by asking adolescents and parents to report their own sleep problems separately and examined insomnia symptoms, behavioral/emotional problems, and suicidal behavior among adolescent offspring of insomniac parents (IP) compared with those of non-insomniac parents (NIP).

2. Method

2.1. Participants

This report represents part of an epidemiological project on sleep and adolescent health in three public middle school and three public high schools, conducted in March–April of 2005, in Jinan city, China. The sampling and procedure have been described elsewhere (Liu et al., 2008). Briefly, this study was designed to obtain a sample of approximately 1000 participants with about 500 7th graders and 500 10th graders. We restricted our participants to 7th and 10th graders in order to follow them for two years before graduation. After getting permission from the principals of the target schools before implementation of the study, we randomly selected 16 classes of 7th graders and 10 classes of 10th graders on the basis of the class sizes of the six target schools. All of the students in the target classes were recruited as potential participants.

2.2. Procedure

Self-administered paper-and-pencil questionnaires were used to collect data on adolescent and parent sleep via the Adolescent Health Questionnaire (AHQ) and Parent and Family Questionnaire (PFQ). Adolescents were asked to complete the AHQ within one and half hours in the classroom setting during school days. Adolescents who returned the AHQ were asked to bring the PFQ to their parents to obtain parental sleep problems. One of the parents was invited to fill out the PFQ, either mother or father, chosen by the family. The PFQ asked about parent's sleep problems and history of mental disorders for both parents and was completed by the parent within 2 weeks. This procedure of data collection was approved by the Research Ethical Committee of Shandong University and target schools. Students and parents were invited to participate in the survey and their participation was voluntary without any penalties for nonparticipation. This is the most commonly used procedure to conduct school-based surveys in China (Liu et al., 2000, 2001).

2.3. Measures of sleep problems and behavioral/emotional problems in adolescents

Adolescent sleep problems during the past month were assessed by the AHQ, which includes a set of items designed to elicit information about sleep, demographics, health history, lifestyles, and behavioral and emotional problems (Liu et al., 2008). Three items were used to evaluate insomnia: difficulty initiating sleep (DIS), difficulty maintaining sleep (DMS), and early morning awaking (EMA). Two items addressed use of sleep medication ("How often do you use prescribed/non-prescribed sleep pills?"). All of the problem items were answered with frequency responses of less than once per week, 1–2 times per week, 3–5 times per week, or almost every day. Insomnia symptom was considered clinically significant if the problem occurred at least three times a week. The internal consistency (Cronbach α) was 0.66 for sleep items with the current sample.

The Youth Self-Report (YSR) of Child Behavior Checklist was used to measure adolescent behavioral problems (Achenbach, 1991). As a screening instrument, it has been applied widely in clinical assessment and research. It comprises 103 problem items to which the respondent can answer "0" if the problem is not true of him or herself, "1" if the item is somewhat or sometimes true, and "2" if it is very

true or often true. The participant was asked to score each item that describes him or her now or within the past six months. By summing 1 s and 2 s on all problem items, eight syndromes (withdrawn, somatic complaints, anxious/depressed, social problems, thought problems, attention problems, delinquent behavior, and aggressive behavior) and two second-order factors (internalizing and externalizing) can be assessed. The externalizing factor is made up of the aggressive behavior and delinquent behavior; the internalizing factor is made up of the anxious/depressed, withdrawn and somatic complaints. A Chinese version of the YSR was used in this study, which has been reported to have satisfactory reliability and validity (Liu et al., 1987, 2000). The Cronbach α was 0.77 for withdrawn, 0.82 for somatic complaints, 0.88 for anxious/depressed, 0.74 for social problems, 0.76 for thought problems, 0.80 for attention problems, 0.74 for delinquent behavior, and 0.88 aggressive behavior with the current sample.

2.4. Measures of insomnia and history of mental disorders in parents

Sleep problems and history of mental disorders among parents were assessed by the PFQ. The parent was asked "Do you often have sleep problems, such as difficulty falling sleep, difficulty maintaining sleep, or early morning awakening?" and "Does your spouse often have sleep problems, such as difficulty falling sleep, difficulty maintaining sleep, or early morning awakening?" If the answer was "yes", the father or mother was considered to have insomnia symptoms. Insomnia symptoms for fathers and mothers were recorded, separately (Liu et al., 2008).

The parent was asked two questions about the history of mental disorders. "Have you/your spouse ever seen a doctor for mental health problems, such as mental disorders, alcohol abuse, or drug dependence?" "Have you/your spouse ever been hospitalized due to mental health problems, such as mental disorders, alcohol abuse, or drug dependence?" If the answer was "yes" for either question, the father or mother was considered to have mental health problems. Similar to insomnia questions, mother's and father's histories were recorded, separately.

2.5. Measure of suicidal and self-injury behavior

The AHQ has four questions concerning suicidal and self-injury behavior, which were adapted from our previous survey (Liu et al., 2000; Liu and Tein, 2005) and Teen Health 2000 (Roberts et al., 1998). The first question represents suicidal ideation: "I have thought seriously about killing myself." The second question indicates suicide plan: "I have had a plan to kill myself." The third question indicates suicide attempts "I have tried to kill myself." The 4th question is to ask about self-injury: "I have deliberately tried to hurt myself." All of the questions ask about adolescent suicidal behavior over the entire lifetime and have a "yes/no" answer. If a respondent answered "yes" on a question, he or she was considered to have the behavior. The Cronbach α was 0.69 for the suicidal items with the current sample.

2.6. Statistical analysis

Chi-square tests or student *t* tests were performed to examine the differences between IP adolescents and NIP adolescent in terms of age, sex, and residence (rural vs. urban). Rural vs. urban residence was used to indicate social economic status of the adolescent's family as there were huge differences in family income, parental education, and parental occupation between rural and urban residents in China (Xie and Zhou, 2014). General linear models were performed to examine the differences of mean scores on behavioral/emotional problem scales between IP adolescents and NIP adolescents, adjusting for potential confounding effects of age, sex, residence, and insomnia symptoms in the adolescents.

Logistic regression analyses were performed to examine the associations of parental insomnia symptoms with use of sleep medication, insomnia symptoms and suicidal behavior in the adolescents. Age, sex, residence, internalizing and externalizing problems in the adolescents were adjusted when examining the association between parental insomnia and adolescent insomnia symptoms and use of sleep medication. Age, sex, residence, insomnia symptoms, and internalizing and externalizing problems in the adolescents were adjusted when examining the association between parental insomnia symptoms and adolescent suicidal behavior. Odds ratios (ORs) and their 95% confidence intervals (CIs) were calculated to quantify these associations. All statistical analyses were performed using IBM SPSS Statistics for Windows, Version 20.0 (Armonk, NY: IBM Corp).

3. Results

Of 1090 students who were asked to participate, 1066 (97.8%) returned AHQs and 838 (76.9%) had parent-completed PFQs. A total of 798 adolescents whose parents answered the questions about insomnia were included in this analysis, including 43 adolescents of insomniac parents (16 students of fathers, 24 students of mothers,

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