



Research report

Depression and insomnia among adolescents: A prospective perspective

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ABSTRACT

Background: No studies of adolescents have examined the prospective, reciprocal association between insomnia and major depression.

Methods: A two-wave, community-based cohort of 3134 youths aged 11–17 at baseline. Major depression was assessed using DSM-IV criteria. Three measures of insomnia were used also following DSM-IV: P_1 , any symptom of insomnia; P_2 , any symptom plus impairment; P_3 , P_2 with no comorbid mood, anxiety or substance use disorders.

Results: In general, the association between insomnia and depression was stronger and more consistent for major depression than for symptoms of depression. Baseline insomnia (P_1 and P_2) increased subsequent risk of major depression 2–3-fold and P_1 2-fold in multivariate analyses. Major depression increased risk for subsequent insomnia 2–3-fold for P_1 and P_2 2-fold for P_2 in multivariate analyses. Results varied by measure of insomnia used.

Limitations: Only symptoms of insomnia were assessed, so we could not examine the effects of comorbid sleep disorders nor did we have objective or biological measures of disturbed sleep.

We also did not collect data on parental reports of youth depression nor insomnia or sleep problems.

Conclusion: Our results provide the first prospective data on insomnia and major depression among adolescents indicating the two are reciprocally related. More studies are needed examining trajectories of insomnia and major depression in childhood and adolescence.

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1. Introduction

Both insomnia and major depression are major public health problems affecting adolescents and young adults. Prevalences of insomnia among adolescents range from 4.4% for point prevalences to 13.4% for past year (Ohayon et al., 2000; Ohayon and Roberts, 2001; Roberts et al., 2006, 2008) and 10.7% for lifetime (Johnson et al., 2006). Prevalences for major depression range from 2% to 8% for one year and 12% to 18% for lifetime (Lewinsohn et al., 1993; Roberts et al., 2007; Canino et al., 2004; Costello et al., 2003; Merikangas et al., 2009, 2010).

A growing body of research indicates that there is an association between insomnia and major depression. From a diagnostic perspective, this is not surprising. Both insomnia and hypersomnia constitute one of the 9 DSM-IV diagnostic criteria for major depression for both adolescents and adults (American Psychiatric Association, 2000). In the case of insomnia, there also is a diagnostic link with major depression. A diagnostic distinction is made between primary

insomnia and insomnia secondary to several psychiatric disorders, including major depression (American Psychiatric Association, 2000).

Insomnia and major depression also appear to be linked epidemiologically. There is literature on the association between insomnia and major depression, particularly among adults (Ford and Kamerow, 1989; Vollrath et al., 1989; Breslau et al., 1996; Ohayon and Roth, 2003; Riemann and Voderholzer, 2003; Buysse et al., 2008) as well as some data on adolescents (Johnson et al., 2006; Liu et al., 2007; Gillespie et al., 2012). The evidence indicates that insomnia, particularly chronic insomnia, increases subsequent risk of major depression. However, the evidence thus far, albeit limited, suggests that major depression confers less risk for developing insomnia (Ohayon, 2007). However, these conclusions are based on retrospective reports from two prevalence studies (Ohayon and Roth, 2003; Johnson et al., 2006). The latter study focused on youths 13–16 using lifetime reports, and found prior insomnia predicted onset of major depression but not the reverse. While the data suggest an asymmetric association, the temporal association is not directly tested. To our knowledge, no study to date has examined the prospective association between insomnia and major depression among adolescents, and none have examined reciprocal effects using data from a cohort study.

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Given current DSM-IV diagnostic systems, and data suggesting insomnia and major depression are linked epidemiologically, there are questions about the nature of the link between these two conditions: are they comorbid disorders? Does insomnia increase the risk for major depression? Does major depression increase the risk of insomnia? Is the association bidirectional or unidirectional? The data are unclear.

Our purpose here is to reexamine the relation between insomnia and major depression in adolescence. That is, we examine whether prior insomnia increases subsequent risk of major depression, and whether the converse also holds as well.

We address these questions using a community-based, two-wave cohort of 4,175 youths 11–17 at baseline and 3134 of these youths followed up one year later, Teen Health 2000 (TH2K).

2. Methods

2.1. Sample

The sample was selected from households in the Houston metropolitan area enrolled in two local health maintenance organizations. One youth, aged 11–17 years, was sampled from each eligible household, oversampling for ethnic minority households. Initial recruitment was by telephone contact with parents. A brief screener was administered on ethnic status of the sample youths and to confirm data on age and sex of youths. Every household with a child 11–17 years of age was eligible. Because there were proportionately fewer minority subscriber households, sample weights were developed and adjusted by poststratification to reflect the age, ethnic, and sex distribution of the 5-county Houston metropolitan area in 2000. The precision of estimates are thereby improved and sample selection bias reduced to the extent that it is related to demographic composition (Andrews and Morgan, 1973). Thus, the weighted estimates generalize to the population 11–17 years of age in a metropolitan area of 4.7 million people.

Data were collected on sample youths and one adult caregiver using computer-assisted personal interviews and self-administered questionnaires. The computerized interview contained the structured psychiatric interview (see below) and demographic data on the youths and the household. Height and weight measures were conducted after the completion of the interviews. The interviews and measurements were conducted by trained, lay interviewers. The interviews took on average 1–2 h, depending on the number of psychiatric problems present. Interviews, questionnaires, and measurements were completed with 4175 youths at baseline, representing 66% of the eligible households. There were no significant differences among ethnic groups in completion rates. Youths and caregivers were followed up approximately 12 months later using the same assessment battery used at baseline. The cohort consisted of 3134 youths plus their caregivers in Wave 2 (75% of Wave 1 dyads). All youths and parents gave written informed consent prior to participation. All study forms and procedures were approved by the University of Texas Health Science Center Committee for Protection of Human Subjects.

2.2. Measures

2.2.1. Depression

Data on psychiatric disorders were collected using the youth version of the Diagnostic Interview Schedule for Children, Version 4 (DISC-IV), a highly structured instrument with demonstrated reliability and validity (Shaffer et al., 2000). Interviews were conducted by college-educated, lay interviewer who had been

extensively trained using protocols provided by Columbia University. Interviews with the DISC-IV were administered using laptop computers.

Depression is measured using two alternate strategies. First, we examine the association between sleep and major depression using DSM-IV diagnostic criteria (American Psychiatric Association, 2000). The 12-month period prevalence was 1.7%. Then, given that much of the literature has focused on symptoms of depression, we examine disturbed mood in the past 12 months, defined as depressed mood, irritable mood or anhedonia (baseline prevalence was 57.6%).

2.2.2. Sleep

None of the existing psychiatric diagnostic interviews designed for epidemiologic research with children and adolescents have included modules eliciting symptoms of DSM sleep disorders. We inquired about symptoms of disturbed sleep, focusing primarily on symptoms of insomnia, their frequency, and duration.

Our measures attempt to operationalize DSM-IV symptom criteria for a diagnosis of insomnia. That is, we collected data on the symptoms of insomnia specified in the DSM-IV. The insomnia items are trouble falling asleep (DIS), waking up in the middle of the night and finding it hard to go back to sleep (DMS1), waking up frequently but able to go back to sleep (DMS2), waking up very early (EMA), and nonrestorative sleep (NRS). The time referent is the past 4 weeks. The subject could respond “rarely or never, sometimes, often, or almost every day.” The DSM-IV symptom criteria for insomnia include all of these symptoms, and the symptoms should cause significant distress or impairment. To qualify for a diagnosis of primary insomnia, the symptoms must not occur exclusively during another sleep disorder, occur during another psychiatric disorder, or be due to the effects of alcohol, drugs, or medication. The measures operationalize DSM-IV symptom criteria and thus have content validity. Our rates of insomnia are highly comparable to those reported by Ohayon et al. (2000), demonstrating external validity, and are correlated with other factors consistent with the literature, providing evidence of construct validity.

We define insomnia several ways: P_1 =any symptom of insomnia. P_2 =at least 1 symptom of disturbed sleep with either daytime fatigue or daytime sleepiness (as indicators of impairment). $P_3=P_2$ excluding any subject who met the first 2 criteria who also met DSM-IV diagnostic criteria for a mood disorder, an anxiety disorder, or a substance use disorder in the past year. We should note that P_3 is not equivalent to a full DSM-IV diagnosis of primary (or secondary) insomnia but approximates such a diagnosis as our measures permit.

2.2.3. Covariates

We include as covariates known correlates of both depression and sleep: age, gender, and family income.

Family income was assessed using total household income in the past year: <\$35,000, \$35,000–\$64,999, and \$65,000 or more.

Age was assessed by age at most recent birthdate: 12 or less, 13–15, and 16 or older.

2.3. Analyses

First, the relationship between insomnia (P_1 , P_2 , P_3) and depression (yes, no) at Wave 1 is examined, calculating crude odds ratios and then adjusted odds ratios controlling for age, gender, and family income. Second, insomnia (P_1 , P_2 , P_3) at Wave 1 is used to predict depression at Wave 2, first examining crude odds ratios and then adjusted odds ratios controlling for the

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