The Relationship of Insomnia and Mental Health in College Students

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Abstract

Insomnia and mental health are highly interrelated in the general population, but no studies have examined these relationships in college students. This is a surprising gap in the literature when one considers that many mental health problems are first present in this age group. The current study examined the cross-sectional relationships between insomnia and mental health in undergraduate college students (N= 387, 67% female, mean age of 21 years), where insomnia was assessed with self-report and 1-week sleep diaries, and mental health was assessed with the Symptom Check List 90. Analyses showed that college students with insomnia had significantly more mental health problems than college students without insomnia in all 9 symptom dimensions and global severity index.
The Relationship of Insomnia and Mental Health in College Students

Insomnia is a highly prevalent disorder with strong interrelationships among mental health problems. Adults with insomnia often have concomitant health problems, which can make evaluating the relationship between their insomnia and mental health difficult. One way around this difficulty is to study a relatively healthy population to examine the relationship between mental health and insomnia. The college population is an excellent population for this use, as they are generally physically healthy and they represent the majority of their age group (i.e., 68% of high school graduates go on to college). Over 70% of college students report sleeping difficulties on a regular basis, making this a significant concern (Buboltz, Brown, & Soper, 2001). More specifically, 16-17% of college students report chronic insomnia (Cukrowicz, Otamendi, Pinto, & Bernert, 2006; Hardison, Neimeyer, & Lichstein, 2005), which is comparable to the prevalence in the general population (i.e., 9-15%; for a review see Ohayon & Roth, 2003). In an effort to determine the relationship between insomnia and mental health in a relatively healthy population, the current study examined the cross-sectional relationship between mental health symptomatology and insomnia in college students.

Prevalence of Insomnia in Psychiatric Disorders

Insomnia is a diagnostic criteria for most psychiatric disorders, so it is not surprising that insomnia is present in the majority of these disorders (Aikens et al., 1999; Arriaga, Lara, Matos-Pires, Cavaglia, & Bastos, 1995; Bixler et al., 2002; Harvey & Greenall, 2003; Johnson, Roth, & Breslau, 2006; Kazarian, Howe, Merskey, & Deinum, 1978, Kohn & Espie, 2005; Loayza et al., 2001; Morgan, 1992; Morin & Ware, 1996; Ohayon, Caulet, & Lemoine, 1998; Ohayon & Roth, 2003; Piccione, Tallarigo, Zorick, Wittig, & Roth, 1981; Sateia, Doghramji, Hauri, & Morin, 2000; Stepanski, 2006; Taylor, Lichstein, & Durrence, 2003; Taylor, Lichstein, Durrence,
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Reidel, & Bush, 2005; Thase, 2005; Weissberg, 2006; Zwi, 2005). Specifically, Acute Stress Disorder, Post Traumatic Stress Disorder, Generalized Anxiety Disorder, Panic Disorder, Obsessive-Compulsive Disorder, and the social phobia of performance anxiety are all closely related to sleep difficulties (Weissberg, 2006). Ohayon and colleagues found 10% of people diagnosed with a depressive disorder had insomnia symptoms (Ohayon et al., 1998), which would be expected when one considers many studies have found depressive symptoms and insomnia to be highly correlated (Aikens, Vanable, Tadimeti, Caruana-Montaldo, & Mendelson, 1999; Bixler, Vgontzas, Lin, Vela-Bueno, & Kales, 2002; Cukrowicz et al., 2006). Arriaga and colleagues found that people with Generalized Anxiety Disorder had "pervasive and intense" complaints of insomnia when clinically assessed (Arriaga et al., 1995). People with sleep panic attacks also had a higher percentage of insomnia and comorbid depression than those without panic attacks and this may alter the illness severity (Agargun & Kara, 1998). Some studies have also found that excessive worry and anxiety may maintain insomnia (Harvey, 2002). This research has been replicated and extended to show that people with insomnia are also more likely to be socially alienated at a clinically significant level and show decreased mental focus (Aikens et al., 1999).

Prevalence of Psychiatric Disorders in Insomnia

Conversely, 25% of people with insomnia (PWI) have a history of psychiatric disorders (Ohayon & Roth, 2003). Indeed, studies in adults show that PWI are 9.82 times more likely to have clinically significant depression and 17.35 times more likely to have clinically significant anxiety than people without insomnia (PWOI; Taylor et al., 2005). One frequently cited study found that 16.4% percent of PWOI had a psychiatric disorder in comparison with 40% in PWI (Ford & Kamerow, 1989). Another study found that as many as 50% of PWI have a primary
psychiatric disorder, and that those with insomnia had an increased risk for new diagnoses or a recurrence of their primary psychiatric disorder (Thase, 2005). Major depression is the most common mental health problem among new insomnia diagnoses, while anxiety disorders are the most common mental health problem associated with insomnia across all age groups (Morgan, 1992). This is not surprising considering psychiatric disorders are among the most common precipitators of insomnia (Stepanski, 2006).

*Insomnia as a risk factor.* Insomnia is also a consistent risk factor for depression, anxiety, and other psychological disorders (Mellinger, Balter, & Uhlenhuth, 1985; Ohayon & Roth, 2003; Riedel & Lichstein, 2000; Taylor et al., 2003; Taylor et al., 2005). The risk for developing depression was found to be much higher in PWI than PWOI both at baseline and at a 1 year follow up (Ford & Kamerow, 1989). Many studies have reported that PWI are 3.95–39.8 times more likely to develop major depression, 1.97–6.3 times more likely to develop anxiety disorders, and 4 times more likely to develop psychiatric disorders or psychic distress (Breslau, Roth, Rosenthal, & Andreski, 1996; Chang, Ford, Mead, Cooper-Patrick, & Klag, 1997; Dryman & Eaton, 1991; Ford & Kamerow, 1989; Roberts, Shema, Kaplan & Strawbridge, 2000; Taylor et al., 2003; Weissman, Greenwald, Nino-Murcia, & Dement, 1997). Some research has even suggested a direction of risk among insomnia, anxiety, and depression, where insomnia begins with anxiety and results in depression (Ohayon & Roth, 2003). Using the DSM-IV diagnoses with structured interviews of adolescents, Johnson et al. (2006) found that in cases of comorbid disorders, anxiety preceded insomnia 73% of the time, while insomnia preceded depression 69% of the time.

*Research on College Students*
College students are generally exposed to the same job stresses as that of adults. College students however, have to cope with other sleep inhibiting factors including increased independence from parents, erratic sleep/wake times (i.e., inadequate sleep during week and sleeping in on weekends), increased time on social activities, academic pressure, and shortened total sleep time due to competition among various factors for daytime hours. There is also the issue of different biological factors in college students than adults, such as hypothesized phase delay after onset of puberty due to circadian rhythm changes (Taylor, Jenni, Acebo, & Carskadon, 2005). In concert, all of these factors make college students considerably different from adults, warranting increased examination of the details involved in the associations of their insomnia with other factors (i.e., mental health).

To date, the relationship between sleep and mental health in college students has been remarkably understudied. This is troubling considering insomnia is closely related to mental health problems, even being a risk factor for their onset (e.g., Ford & Kamerow, 1989; Taylor et al., 2003). The college years are often when the first onset of mental disorders occur (Christie, Burke, Regier, & Rae, 1988; Kessler, Berglund, Demler, Jin, Merikangas, & Walters, 2005).

Some of the main advantages of studying college students are that (a) they are at greater risk than most other age groups for developing psychopathology, (b) insomnia is a significant problem in this group, (c) they are generally healthier than an older sample, allowing for risk factor analyses with fewer confounds. By studying the relationship between insomnia and mental health in otherwise healthy college students, we are allowed a unique view into this relationship.

Despite the high prevalence of insomnia in the college population (i.e., 17%), the disorder is a grossly under-recognized problem in this group (Buboltz, Brown, & Soper, 2001; Hardison et al., 2005). To date, only one study has been performed in college students focusing
on sleep and mental health relationships. Cukrowicz and colleagues looked at the cross-sectional relationship between nightmares and insomnia with depression and suicidality in college students ($n = 222$) who were not seeking treatment. Although insomnia and nightmares were significantly related to depression, but only nightmares were related to suicidality (Cukrowicz et al., 2006). Unfortunately, this study did not use a research diagnostic criteria for insomnia (Edinger et al., 2006) with prospective sleep diaries, instead this study used a cutoff score of 10 on the Insomnia Severity Index (Morin, 1993). This makes the results somewhat less generalizable, and difficult to compare to studies where a more rigorous definition of insomnia was used. Further, this study examined only depression and suicidality, ignoring many other important mental health problems.

The current study examines the relationship between insomnia and symptomatology of a range mental health problems in college students. Based on previous research, it was hypothesized that college students with insomnia (CSWI) would have higher levels of mental health symptomatology than those without insomnia (CSWOI).

**Method**

**Participants**

College undergraduate students ($N = 387$, 67% female, mean age of 21 years) at the University of North Texas were recruited during the spring 2006 semester from an ongoing epidemiology study conducted by the Sleep and Health Research Lab. Participants were awarded 4 extra credit points in their psychology classes for completing a 2 hour survey battery from which data for the current study were extracted. This study was accessed through an online research pool within the department of psychology that advertises multiple studies in which students can participate for extra credit towards their psychology classes.
Measures

Health survey. We used the health survey portion of the battery for the subjective sleep complaint. At the beginning of the second page, we asked the question “Do you have a sleep problem?” followed by, “If yes, describe (e.g., trouble falling asleep, long or frequent awakenings, sleep apnea).” We then asked, “How many nights per week do you have this problem?” and “How long have you had this sleep problem? ___yrs ___mo.”

Sleep diaries. One-week sleep diaries were used to prospectively assess subjective sleep patterns. Participants were asked to complete diaries each morning daily for 7 days. The diaries asked participants to give an estimate of their sleep the night before (e.g., bedtime, sleep onset, etc.). Using sleep diaries along with health survey data (i.e., report of insomnia), we operationally defined CSWI as ≥31 minutes of sleep onset latency or wake time after sleep onset or a combination, ≥3 times per week, ≥6 months along with a subjective complaint. This criteria is common throughout the literature and has been empirically validated (Lichstein, Durrence, Taylor, Bush, Riedel, 2003). We did not use the daytime complaint portion of the insomnia definition because psychological problems are frequently part of daytime complaints of people with insomnia.

Symptom Check List (SCL-90). Mental health problems were assessed with the Symptom Check List (SCL-90). The SCL-90 is a 90-item self-report test in which the participant indicates how much distress each test item has caused them over the past week using a Likert-type scale of 0 to 4 (0 = not at all to 4 = extremely). The SCL-90 is an uncopyrighted version of the SCL-90 revised (SCL-90-R), explaining why it was used in this large, unfunded survey study. Differences between the SCL-90 and SCL-90-R are minimal, consisting of slight alterations of a few items and the addition of 2 items in the anxiety domain.
Answers are categorized into 9 symptom subscales (e.g., somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism). Three indices of distress severity with a given number are also given. General Symptomatic Index [GSI] gives the average score of the 90 items (Derogatis, Lipman, & Covi, 1973). Table 1 gives a brief description of areas covered by each dimension:

Insert Table 1 here.

The SCL-90 has high sensitivity and specificity as a screening instrument for global psychological distress and psychiatric disorders (Derogatis, Lipman, & Covi, 1973). The SCL-90 has an internal consistency reliability of 0.86 for Somatization, 0.86 for Obsessive-Compulsive, 0.86 for Interpersonal Sensitivity, 0.90 for Depression, 0.85 for Anxiety, 0.84 for Hostility, 0.82 for Phobic Anxiety, 0.80 for Paranoid Ideation, and 0.77 for Psychoticism. It has been validated with the MMPI scales and shows high criterion validity with this established measure. Each of the 9 dimensions showed high correlations with an MMPI scale except for Obsessive-Compulsive dimension due to no comparable scale on the MMPI (Derogatis, Rickel & Rock, 1976). Factorial invariance analysis (i.e., dimensional constancy reflecting generalizability) found that 8 of the 9 dimensions showed high constancy in factorial composition of the items, and the 9th (i.e., paranoid ideation) showed moderate characteristics, in relation to gender (Derogatis & Cleary, 1977). As would be expected from basically identical measures, the SCL-90 has similar reliability and validity data as the slightly modified SCL-90-R, indicating that the results reported here should generalize to results that may be found with the newer, copyrighted version (Rush, First, Blacker, & American Psychiatric Association, 2008).

Procedure
After signing up for the study online, participants were asked to download and fill out the health survey packet, containing the SCL-90 as well as other questionnaires not used in this study and a 1-week sleep diary. Extra credit points were awarded after the return of the packet. Data collection ended in the spring of 2006 with a sample of 387 college students. Cross-sectional analyses were run on the sample after the conclusion of collection. The University of North Texas Institutional Review Board on human subjects approved all methodology and informed consent was obtained from all participants prior to participation. All statistical analyses were performed using SPSS 12.0.1 for Windows (SPSS, Inc. Chicago, IL).

Results

A one-way multivariate analysis of variance (MANOVA) was conducted to see if CSWI had higher scores (i.e., more mental health problems) on the 9 mental health symptom dimensions of the SCL-90, than CSWOI. Our results indicated that CSWI (9.8%) had significantly more mental health problems as a whole than CSWOI, Wilk's $\lambda = .66, F(2, 253) = 13.34, p < .001$. As can be seen in Table 2, follow-up univariate analyses found significant differences in all 9 symptom dimensions and in the global severity index at the $p < .05$ level. These results support the hypothesis that CSWI have significantly increased mental health symptomatology than CSWOI.

Discussion

This study found that chronic insomnia is common in college students (9.8%), and that CSWI self-reported much higher levels of mental health symptomatology than CSWOI. These data are in agreement with prevalence data from college population studies (Cukrowicz et al., 2006; Hardison et al., 2005), and insomnia and mental health studies in the general population
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(e.g., Ford & Kamerow, 1989; Ohayon & Roth, 2003; Taylor, Lichstein, & Durrence, 2003; Taylor, Lichstein, Durrence, Reidel, & Bush, 2005). However, this is the first study to look at insomnia and mental health symptomatology in the college student population specifically, and this study also examined a much larger array of mental health symptomatology than previous studies examining insomnia and mental health in the general population.

Specifically, we found that all nine dimensions of the SCL-90 (see Tables 1 & 2) were significantly higher in CSWI. This finding is in line with current data in the general population (Aikens et al., 1999; Arriaga, Lara, Matos-Pires, Cavaglia, & Bastos, 1995; Bixler et al., 2002; Harvey & Greenall, 2003; Johnson et al., 2006; Kazarian, Howe, Merskey, & Deinum, 1978, Kohn & Espie, 2005; Loayza et al., 2001; Morgan, 1992; Morin & Ware, 1996; Ohayon et al., 1998; Ohayon & Roth, 2003; Piccione, Tallarigo, Zorick, Wittig, & Roth, 1981; Sateia, Doghramji, Hauri, & Morin, 2000; Stepanski, 2006; Taylor et al., 2003; Taylor et al., 2005; Thase, 2005; Weissberg, 2006; Zwi, 2005). Although it is unclear if the insomnia resulted in increased mental health symptomatology or if mental health symptomatology led to insomnia in college students, it is clear that this is a problem for the college population as well as the general population.

A methodological limitation of our study is that it only assessed the relationship of insomnia and mental health symptomatology cross-sectionally. We attempted to collect follow-up data at a time period of one year later. Unfortunately, only 3.84% (N = 14; CSWI = 5; CSWOI = 9) responded to this follow-up study. There are a variety of likely reasons for this. For one, we did not pay students for participation in any phase of the study, instead offering only extra-credit in psychology classes. For the follow-up portion, it is likely that participants were no longer enrolled at UNT or in psychology courses, making the extra-credit payment
ineffective. Future research is needed to evaluate the causes of the current study’s low retention rate in this phase of the study in the college population (i.e., phone contact, monetary incentive, etc.).

Other limitations of our study include self-reported symptomatology of mental health and the use of sleep diaries. These are viewed as less than optimal because they are both subjective and are conducted after the fact. More objective measures such as polysomnography or actiwatch use are advised for future studies.

In the future, we also suggest using multiple assessors of mental health, including the use of Structured Clinical Interviews for DSM-IV Disorder Diagnoses. This would allow for a more definitive association between insomnia and mental health symptomatology. Obtaining a more detailed mental health history is recommended in order to reaffirm or disconfirm the findings of the SCL-90. Other suggestions for future research include assessing this relationship over a longer time period in order to address the progression of this relationship.

As mentioned throughout, the college age group is particularly susceptible to the onset of major psychiatric disorders. The current study shows that the significant relationship between insomnia and mental health found in the general population holds true in college population as well. Other studies are now needed examining the prospective nature of this relationship to determine if insomnia is a risk factor for mental health problem onset or maintenance of these disorders. If so, the next logical step would be to develop primary and secondary prevention programs, which might attenuate some of the more salient consequences (i.e., dropout) for this age group that possibly result in employment difficulties, lower SES, etc.
References


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Table 1.

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Somatization</td>
<td>pain and discomfort in the cardiovascular, respiratory, gastrointestinal, and other systems and includes somatic experiences from anxiety</td>
</tr>
<tr>
<td>Obsessive-Compulsive</td>
<td>unremitting or irresistible thoughts, actions, or impulses</td>
</tr>
<tr>
<td>Interpersonal Sensitivity</td>
<td>feelings of personal inadequacy, uneasiness, and discomfort during social interactions</td>
</tr>
<tr>
<td>Depression</td>
<td>dysphoric affect, withdrawal of interest in activities, loss of energy, and lack of motivation</td>
</tr>
<tr>
<td>Anxiety</td>
<td>restlessness, nervousness, tension, dissociation, and panic attacks</td>
</tr>
<tr>
<td>Hostility</td>
<td>urges to break things, frequent arguments, and uncontrollable outbursts of temper</td>
</tr>
<tr>
<td>Phobic Anxiety</td>
<td>social phobic behavior and fears towards travel, open spaces, crowds, and public places</td>
</tr>
<tr>
<td>Paranoid Ideation</td>
<td>suspiciousness, hostility, projective thinking, centrality, delusions, grandiosity, and loss of self</td>
</tr>
<tr>
<td>Psychoticism</td>
<td>withdrawal and isolation along with more severe symptoms such as auditory hallucinations, external thought control and insertion, and thought broadcasting</td>
</tr>
</tbody>
</table>
Table 2.

Means and standard deviations of college students with insomnia (CSWI) and college students without insomnia (CSWOI) on SCL-90 dimensions

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Mean CSWI</th>
<th>Mean CSWOI</th>
<th>Standard Deviation CSWI</th>
<th>Standard Deviation CSWOI</th>
<th>F</th>
<th>p</th>
<th>η²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Somatization</td>
<td>.91</td>
<td>.47</td>
<td>.54</td>
<td>.38</td>
<td>36.18</td>
<td>.001</td>
<td>.121</td>
</tr>
<tr>
<td>Obsessive Compulsive</td>
<td>1.31</td>
<td>.87</td>
<td>.82</td>
<td>.64</td>
<td>14.45</td>
<td>.001</td>
<td>.052</td>
</tr>
<tr>
<td>Interpersonal Sensitivity</td>
<td>1.01</td>
<td>.68</td>
<td>.92</td>
<td>.55</td>
<td>9.35</td>
<td>.002</td>
<td>.034</td>
</tr>
<tr>
<td>Depression</td>
<td>1.28</td>
<td>.71</td>
<td>.95</td>
<td>.54</td>
<td>27.74</td>
<td>.001</td>
<td>.096</td>
</tr>
<tr>
<td>Anxiety</td>
<td>.87</td>
<td>.44</td>
<td>.83</td>
<td>.45</td>
<td>23.10</td>
<td>.001</td>
<td>.081</td>
</tr>
<tr>
<td>Hostility</td>
<td>.82</td>
<td>.54</td>
<td>.81</td>
<td>.51</td>
<td>8.12</td>
<td>.005</td>
<td>.030</td>
</tr>
<tr>
<td>Phobic Anxiety</td>
<td>.31</td>
<td>.15</td>
<td>.45</td>
<td>.29</td>
<td>8.38</td>
<td>.004</td>
<td>.031</td>
</tr>
<tr>
<td>Paranoid Ideation</td>
<td>.90</td>
<td>.60</td>
<td>.85</td>
<td>.60</td>
<td>7.55</td>
<td>.006</td>
<td>.028</td>
</tr>
<tr>
<td>Psychoticism</td>
<td>.64</td>
<td>.31</td>
<td>.69</td>
<td>.38</td>
<td>19.17</td>
<td>.001</td>
<td>.068</td>
</tr>
<tr>
<td>Global Severity Index</td>
<td>.97</td>
<td>.54</td>
<td>.64</td>
<td>.38</td>
<td>32.26</td>
<td>.001</td>
<td>.110</td>
</tr>
</tbody>
</table>
Figure Caption

Figure 1. SCL-90 scores in college students with insomnia (CSWI) versus college students without insomnia (CSWOI; all ps < .05).