The Impact of Insomnia and Sleep Disturbances on Depression and Suicidality

Kelly C. Cukrowicz, Ainhoa Otamendi, Jennifer V. Pinto, and Rebecca A. Bernert
Florida State University

Barry Krakow
Sleep and Human Health Institute, Albuquerque, New Mexico

Thomas E. Joiner, Jr.
Florida State University

Previous research has demonstrated an association between suicidality and sleep, suggesting that sleep disturbances may exacerbate mood dysregulation in participants suffering from mood disorders. The purpose of this study was to investigate the impact of sleep disturbances and insomnia on depression and suicidality in a nontreatment seeking sample of college students. Results indicated that insomnia and nightmares were significant predictors of symptoms of depression, while only nightmares significantly predicted suicidal ideation. Further analysis indicated that participants with elevated scores on insomnia, nightmares, or both experienced differing levels of depression and suicidal ideation. Future directions and treatment implications are discussed.

KEY WORDS: insomnia, nightmares, dreams, sleep, depression, suicidality

Sleep is a significant correlate of depression, and some sleep problems appear to predict future depression (Roberts, Shema, Kaplan & Strawbridge, 2000). Perlis and Colleagues (1997) demonstrated that patients who suffer from recurrent depressive symptoms have increased sleep disturbances (i.e., insomnia) prior to the recurrence of Major Depressive Disorder (MDD). Similarly, even after controlling for a history of depressive symptoms, prior insomnia is a significant predictor of subsequent depressive episodes (Breslau, Roth, Rosenthal, & Andreski, 1996). Ohayon, Caulet, and Lemoine (1998) also revealed that insomnia related to MDD leads to a greater number of additional psychological problems, psychosocial difficulties, and medical treatments than does MDD without insomnia.
These differences in sleep patterns, dream activity, and quality of sleep have led researchers to investigate the role of sleep in mood regulation. As compared to others, depressed patients typically enter rapid eye movement (REM) sleep much more quickly, experience activity in REM that is much more intense, and experience little to no deep sleep (Rush et al., 1986). Nofzinger et al. (1994) have also found that intense REM sleep is correlated with greater negative cognitions and negative affective states. Cartwright, Young, Mercer, and Bears (1998) reported that depressed participants who suffer a greater prevalence of unpleasant dreams at the beginning of the night are more likely to experience recurrence of symptoms within one year (compared to those with more unpleasant dreams at the end of the night).

Though the relationship between sleep problems and depression is well-established, less is known about the impact of sleep problems on suicidal ideation. Early studies in this area investigated whether sleep difficulties were important risk factors for suicide. These studies indicated that sleep difficulties (i.e., poor sleep quality, sleep panic, low sleep efficiency, increased REM activity and time) are significant predictors of suicidality and suicide (Agargun & Kara, 1998; Keshaven et al., 1994; Krakow et al., 2000; Lewis et al., 1996; Sabo, Reynolds, Kupfer, & Berman, 1991; Turvey et al., 2002).

Research indicates that differences in sleep exist between depressed patients who are suicidal compared to those who are not suicidal. Depressed patients who experience suicidal ideation often display increased REM activity and longer waking periods when compared to depressed patients without suicidal ideation (Keshaven et al., 1994; Yu, Zhang, Hour, Geng, & Xu, 2003). Additionally, depressed patients with suicidal ideation appear to report insomnia, hypersomnia, nightmares, and nocturnal panic attacks more frequently (Singareddy & Balon, 2001). Agargun et al. (1998) have further demonstrated that depressed patients with frequent nightmares, particularly women, show higher suicide scores and are more likely to be classified as suicidal than those with less frequent nightmares.

Agargun and Cartwright (2003) recently extended the study of suicidal behavior and sleep disturbances to a nonpatient sample of depressed participants. A significant negative correlation emerged between suicidality scores and REM latency for suicidal participants; a positive correlation was found for nonsuicidal participants. These findings suggest that depressed participants with elevated suicidality may fail to regulate their mood during sleep, possibly resulting in greater suicidal tendencies during waking hours. Such disturbances in sleep may lead to chronic fatigue and exhaustion. This may ultimately increase suicidal ideation, particularly if fatigue impairs coping skills or adaptive responses to stressful situations.

Despite a growing interest in the relationships between sleep disturbances and suicidality, and previous reports on the impact of insomnia or nightmares on suicidal ideation or behavior, no studies have looked at the impact of these sleep problems on suicidal symptoms in a nontreatment seeking sample of college students. Because suicidal ideation, insomnia, and nightmares are not uncommon among university students, the current study was conducted to elucidate not only the prevalence of these sleep problems, but also their interrelations with symptoms of depression and suicide. We tested the hypothesis that insomnia and nightmares would be significant predictors of depressive symptoms and suicidality in nontreat-
ment seeking participants. An exploratory hypothesis aimed to determine whether sleep problems were unique predictors of suicide, after controlling for depressive symptoms. The third hypothesis was that participants with clinically elevated scores on insomnia, nightmares, or both would show significant elevations on severity of depressive and suicidal symptoms.

**METHOD**

**Participants**

Two hundred twenty-two participants ($M = 19.2$ years-old, $SD = 1.8$) were recruited from the Florida State University Psychology Department’s undergraduate student subject pool. Students participated as part of an introductory psychology course research requirement and received one credit point for each hour of participation. Participants were treated in accordance with the “Ethical Principles of Psychologists and Code of Conduct” (American Psychological Association, 1992). The sample was composed of 158 women and 64 men. Seventy-one percent of the sample was Caucasian, 12% African American, 11% Hispanic, 2% Native American, and 4% other.

**Materials**

*Insomnia Severity Index (ISI)*

The ISI is a seven item self-report scale that addresses subjective symptoms and consequences of insomnia, as well as the degree of distress caused by these problems in the individual. The scale is scored on a 0 to 4 scale, with a maximum total score of 28. A score greater than 10 is considered reflective of significant insomnia. The internal consistency of this questionnaire and convergence with other insomnia measures has been well supported (Bastien, Vallières, & Morin, 2001; Morin, 1993). The internal consistency of this scale for our sample is .85.

*Disturbing Dreams and Nightmare Severity Index (DDNSI)*

The DDNSI is a seven item self-report scale that addresses disturbing dreams and nightmares. It is a revised version of the Nightmare Frequency Questionnaire (Krakow, Shrader, et al., 2002). The scale is scored on a 0 to 37 scale, with scores greater than 10 indicating clinical levels of disturbing dreams and nightmares (Krakow, Melendrez, et al., 2002). The internal consistency for this scale for our sample is .80.

*Depression Severity Index - Suicide Subscale (DSISS)*

The DSISS is a four-item self-report questionnaire designed to identify the frequency and intensity of suicidal ideation and impulses in the past two weeks.
Scores on each item range from 0 to 3, and on the overall questionnaire from 0–12, with higher scores reflecting greater severity of suicidal ideation (Joiner, Pfaff, & Acres, 2002). The DSISS was developed by Metalsky and Joiner (1997) as part of a larger depressive symptom index called the Hopelessness Depression Symptom Questionnaire. Internal consistency and construct validity have been demonstrated (Joiner, Pfaff, & Acres, 2002; Metalsky & Joiner, 1997).

**Beck Depression Inventory (BDI)**

The BDI, a 21-item self-report inventory, was used to assess the presence of depressive symptoms within the previous two weeks. Scores on symptoms associated with depression were rated 0 to 3. Total scores on the BDI can range from 0 to 63, with higher scores reflecting greater levels of depressive symptoms. Although the BDI is not indicative of the full clinical syndrome of depression, it has yielded adequate reliability estimates, and has been well validated as a measure of depressive symptomatology (see Beck & Steer, 1987, for a review).

**Procedures**

Participants signed up for specific time intervals during which to complete the study session. These study sessions were conducted in a computer lab to facilitate computer-based administration of all assessment instruments. Each study session involved assessment of between two and 27 participants. A trained research assistant was available at all times in the computer lab. This made it possible for participants to ask questions when they were unclear as to the meaning of any of the questions.

Participants were administered the ISI, DDNSI, DSISS, and BDI, which took approximately 15 minutes to complete. Measures were randomly ordered across participants. Upon completion of these instruments, the research assistant reviewed responses to determine if any participants showed signs of suicidal ideation. In the event that a participant had elevated suicide risk (as defined by Joiner, Walker, Rudd, & Jobes, 1999), research assistants contacted the appropriate personnel.

**Data Analysis**

To examine the prevalence of insomnia and nightmare problems, percentages of those reaching clinical levels of severity for the ISI and DDNSI were calculated. We predicted that insomnia and nightmares would be significant predictors of depressive symptoms and suicidality in nontreatment seeking participants. An exploratory hypothesis aimed to determine whether sleep problems were unique predictors of suicidality, after controlling for depressive symptoms. Linear regression equations were constructed separately for depressive symptoms and suicidality to test this hypothesis. The first regression equation included continuous scores on the ISI and DDNSI as independent variables (IVs) and continuous BDI scores as the dependent variable (DV). The second equation included ISI and DDNSI as IVs
and DSISS as the DV. To determine the association between sleep variables and suicidality beyond depressive symptoms, a third equation was created, in which depression was included in the first step and in the second step, the ISI and DDNSI (IVs) were included as predictors of DSISS scores (the DV).

We also predicted that participants with clinically elevated scores on insomnia, nightmares, or both would show significantly elevated depressive and suicidal symptoms. Analysis of variance (ANOVA) was conducted using sleep group as the IV (no sleep problems, insomnia problems only, nightmare problems only, or both) and continuous BDI and DSISS scores as DVs. Post hoc analyses were included to determine specific between-groups differences.

RESULTS

An evaluation of assumptions of normality, multicolinearity, singularity, homoscedasticity of residuals, homogeneity of variance, linearity, and homogeneity of regression indicated no violations of assumptions. Correlations between variables, descriptive statistics, and frequencies are presented in Tables 1 and 2. The prevalence rates of insomnia problems and nightmare problems were 16% and 8%, respectively, with 6% having difficulty with both.

Regression analyses were employed to determine whether insomnia or disturbing dreams and nightmares significantly predicted symptoms of depression and suicidality. As suicidality is often associated with depression, the prediction of symptoms of depression was explored first. This regression analysis included insomnia and disturbing dream and nightmare scores from the ISI and DDNSI as IVs and depression symptoms from the BDI as the DV. This regression equation was significant, $R^2 = .60$, $F(2, 221) = 62.48$, $p < .001$. Examination of significant individual predictors indicated that both insomnia and disturbing dreams and nightmares were significant and roughly equal predictors of depression, $\beta_s = .55$, $t = 6.42$, $p < .001$ and $.58$, $t = 6.88$, $p < .001$, respectively. The second regression analysis included ISI and DDNSI scores (IVs) and suicidality scores from the DSISS (DV). This regression equation was significant, $R^2 = .43$, $F(2, 221) = 24.95$, $p < .001$. Examination of significant individual predictors indicated that only

<table>
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<th>Variable</th>
<th>1</th>
<th>2</th>
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<th>4</th>
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<tbody>
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<td>1. ISI</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>2. DDNSI</td>
<td>.30***</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>3. BDI</td>
<td>.48***</td>
<td>.49***</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>4. DSISS</td>
<td>.21**</td>
<td>.43***</td>
<td>.54***</td>
<td>—</td>
</tr>
<tr>
<td>$M$</td>
<td>7.13</td>
<td>5.26</td>
<td>10.02</td>
<td>.59</td>
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<tr>
<td>$SD$</td>
<td>5.10</td>
<td>5.13</td>
<td>7.65</td>
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Table 1. Correlations and Descriptive Statistics for Variables Associated With Sleep, Anxiety, Depression, and Suicidality

Note. ISI = Insomnia Severity Index; DDNSI = Disturbing Dreams and Nightmare Severity Index; BDI = Beck Depression Inventory; DSISS = Depression Severity Index-Suicidality Subscale. ** $p < .01$. *** $p < .001$. Impact of Sleep Disturbances 5
disturbing dreams and nightmares was a significant predictor of suicidality, $\beta = .11$, $t = 6.21$, $p < .05$. The third regression analysis included BDI score in step one and ISI and DDNSI scores in step two, with suicidality scores from the DSISS as the DV. The regression model was significant, $R^2 = .57$, $F(3, 220) = 35.56$, $p < .001$. Examination of significant individual predictors indicated that disturbing dreams and nightmares was a significant predictor of suicidality, $\beta = .22$, $t = 3.40$, $p < .001$ after controlling for depressive symptoms (which of course were also highly associated with suicidality scores; $r$ for BDI and DSISS $= .54^{**}$).

One-way ANOVAs were performed on two DVs associated with depression and suicidality: BDI and DSISS. The IV was sleep group (no sleep problems, insomnia problems only, nightmare problems only, and both sleep problems). ANOVA indicated significant group differences on the BDI, $F(3, 221) = 32.02$, $p < .001$ (see Figure 1). Post hoc analyses indicated significant differences on BDI scores between the no sleep problems group and all other sleep problems groups, and between the insomnia problems only and both sleep problems groups ($p < .001$). These results indicate that depression was significantly higher for all sleep problems groups compared to the no sleep problems group. Within the sleep

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>ISI M</th>
<th>ISI SD</th>
<th>DDNSI M</th>
<th>DDNSI SD</th>
<th>BDI M</th>
<th>BDI SD</th>
<th>DSISS M</th>
<th>DSISS SD</th>
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<tr>
<td>No sleep problems</td>
<td>156</td>
<td>4.9</td>
<td>3.1</td>
<td>3.5</td>
<td>3.0</td>
<td>7.5</td>
<td>5.4</td>
<td>0.3</td>
<td>0.9</td>
</tr>
<tr>
<td>Insomnia problems only</td>
<td>35</td>
<td>14.3</td>
<td>2.8</td>
<td>4.4</td>
<td>3.6</td>
<td>13.2</td>
<td>8.5</td>
<td>1.0</td>
<td>1.4</td>
</tr>
<tr>
<td>Nightmare problems only</td>
<td>18</td>
<td>6.4</td>
<td>3.0</td>
<td>14.9</td>
<td>4.3</td>
<td>17.3</td>
<td>6.9</td>
<td>1.9</td>
<td>2.1</td>
</tr>
<tr>
<td>Both sleep problems</td>
<td>13</td>
<td>16.3</td>
<td>4.3</td>
<td>15.4</td>
<td>3.8</td>
<td>21.3</td>
<td>9.7</td>
<td>1.5</td>
<td>2.0</td>
</tr>
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</table>

*Note.* ISI = Insomnia Severity Index; DDNSI = Disturbing Dreams and Nightmare Severity Index; BDI = Beck Depression Inventory; DSISS = Depression Severity Index-Suicidality Subscale.

Figure 1. Beck Depression Inventory scores for participants with no sleep problems, insomnia problems only, nightmare problems only, and both sleep problems.
problems groups, the highest self-ratings of depression occurred in the both sleep problems group. The nightmare problems only group did not differ significantly from the insomnia problems only or both sleep problems groups.

One-way ANOVA indicated that suicidality symptoms on the DSIVS also varied significantly by group, \( F(3, 221) = 12.45, p < .001 \) (see Figure 2). Post hoc analyses indicated significant differences between the no sleep problems and nightmare problems only group \( (p < .001) \) and the no sleep problems and both sleep problems groups \( (p < .01) \). The insomnia problems only group differed significantly from the nightmare problems only group \( (p < .05) \). These results indicate that those experiencing nightmares (either in the nightmare problems only group or the both sleep problems group) reported significantly higher suicidality than those not experiencing nightmares.

**DISCUSSION**

The results of this study indicated that 16% and 8% of participants in a nontreatment seeking sample of college students experience problems with insomnia and disturbing dreams respectively. Six percent of these participants experienced problematic levels of both insomnia and disturbing dreams and nightmares. These results indicated that sleep disruptions are relatively common among young adults in a college environment.

The correlations between sleep, depression, and suicidality variables suggest that disturbances in sleep such as difficulty falling asleep, early awakening, poor sleep quality, and nightmares are associated with negative affect or low mood and

![Figure 2](image-url). Depression Severity Index–Suicidality Subscale scores for participants with no sleep problems, insomnia problems only, nightmare problems only, and both sleep problems.

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suicidal ideation or desire. These results are consistent with previous studies indicating an association between depression and insomnia (Borkovec, 1982; Riedel & Lichstein, 2000; Roberts et al., 2000). In addition, prior research suggesting an association between sleep disturbances and nightmares in patients with depression and suicidality has also been supported (Agargun & Cartwright, 2003; Cartwright et al., 1998; Nofzinger et al., 1994; Singareddy & Balon, 2001; Wood & Bootzin, 1990).

The hypothesis that both insomnia and disturbing dreams and nightmares would be significant predictors of depressive symptoms was partially supported by the results. The relation between insomnia and depression has been well supported in the literature; however, no research has examined the predictive role of dreams and nightmares for depression in a college sample. Experiences of disturbing dreams and nightmares may play a role in depression by reducing sleep quality. These results suggest that not only is lack of sleep associated with depression, but that even during sleep, mood dysregulation may be problematic. Thus, the mechanisms whereby insomnia and nightmares operate may be similar. The content of disturbing dreams and nightmares may also increase levels of distress and negative cognition during waking states, further increasing any existing propensity to depressive symptoms.

The relation between sleep difficulties and suicidality was of particular interest in this study. The results supported a predictive role for disturbing dreams and nightmares, but not for insomnia. This indicates that disruptions in sleep associated with disturbing dreams and nightmares play an important role in the development and maintenance of suicidal ideation. This pattern held even after controlling for the effects of depression on suicidality. This suggests that distressing cognitions and experiences may be re-experienced during the sleep hours, leading to a greater sensitivity to cues and emotions during the day. If diminished sleep quality is associated with disturbing dreams and nightmares, it is likely to render sufferers less able to regulate emotions and tolerate distress. Again, this may ultimately exacerbate symptoms and increase suicidal ideation.

Group differences indicated that depressive symptoms and suicidality were highest for participants with elevated scores on experiences of disturbing dreams and nightmares. Depressive symptoms were highest for participants experiencing both insomnia and disturbing dreams and nightmares, whereas suicidality was highest among participants with only disturbing dreams and nightmares. Therefore, despite our expectation that a cumulative effect would result in greater elevations for both areas of impairment, this was not supported with respect to suicidality. This may indicate that the disturbing dreams and nightmares result in great distress for these patients.

This study is limited by several methodological factors: restricted age range of participants; retrospective self-reported sleep measures; and self-reported symptom information. Although most participants in this study were between the ages of 18 and 24, this age range represents the typical age of onset for relevant disorders, and it was demonstrated that many participants had already begun to develop associated difficulties with sleep. Furthermore, although we were able to examine a range of problems associated with insomnia, analyses were not performed separately on these elements of insomnia (i.e., difficulty initiating or maintaining sleep, or early morning awakening) due to the small number of questions investigating these separate insomnia patterns. The addition of prospective sleep diaries may have aided in our ability to examine these patterns of sleep disturbance. Finally, diag-
nistic information was gathered by self-report of depressive symptoms and suicidality. Though the addition of a diagnostic interview would have added to the validity of this information, high concordance has been found between symptom ratings and diagnostic information (Morin, 1993; Krakow et al., 2000).

The results of this study suggest a number of future directions for research aimed at understanding the relation between depression, suicide, and sleep disturbances. In particular, future research should examine whether disturbing dreams and nightmares are associated with depression and suicidality via disruptions in sleep quality or via content that increases negative cognitions and emotional dysregulation. This research should aim to determine whether experiences of disturbing dreams or nightmares serve to increase insomnia or decrease sleep quality overall. Finally, the relation between these sleep disturbances and hypersomnia should be explored. Specifically, the prevalence of these disruptions in sleep should be evaluated prospectively to ascertain whether they eventually result in hypersomnia. Investigation into the temporal sequence of these symptoms, insomnia onset, and nightmare onset would help to elucidate this relation. The addition of objective polysomnographic and sleep diary data are warranted to further examine the development of sleep disturbances and their association with symptoms of depression and suicidality.

There are a number of treatment implications for the findings of this study. First, the high correlations between sleep disturbances and depression and suicidality indicates the need for patients and therapists to monitor sleep regularly as part of the assessment process and treatment plan. Due to the emergence of nightmares as a significant factor in depression and suicidality, the assessment of nightmares should be included in the diagnostic interview for these patients. In addition, sleep hygiene and daily rhythm monitoring may aid in identifying the prodromal phases of these disorders by identifying the onset of sleep problems (especially nightmares) as specific risk factors for depression and suicidal ideation. Treatment plans should specifically address the prevalence and content of nightmares for patients. Imagery rehearsal therapy (IRT; Krakow et al., 2001) teaches a patient to change the nightmare content while awake and then picture this new dream in the mind’s eye. IRT may serve to decrease the fear and arousal that is associated with nightmares. Thus, participants without sleep disturbances may require a more traditional treatment approach, whereas those with nightmare or insomnia problems may need additional treatment due to a greater severity in symptoms.

REFERENCES


