# Letter to the Editor

## Insomnia Severity Is Associated With Decreased Executive Functioning in Patients With Suicidal Ideation and Drug Abuse

**To the Editor:** Insomnia has been associated with decreased executive functioning in those without substance use disorders.<sup>1</sup> Although numerous studies have linked impulsivity with substance abuse and suicidal ideation, its relationship with insomnia in the substance-abusing population is unclear.<sup>2–6</sup> In this preliminary study, we explore the relationship of insomnia severity with objective and subjective impulsivity measured by computerized behavioral tests and a self-report questionnaire, respectively, in patients with suicidal ideation/behavior attending a psychiatric emergency department. We hypothesized that a higher insomnia severity would be associated with increased objective impulsivity (a decrease in executive functioning) and higher subjective impulsivity scores.

**Method.** This investigation involved secondary analyses of crosssectional data from an ongoing study (N.S., J.L.E., unpublished data, 2012). Subjects were adults (N = 21,  $\leq$  65 years of age) who presented with suicidal ideation/behavior between July 2012 and December 2012 to the emergency department, where they were observed until their symptoms stabilized. We excluded patients with any motor response, visual or hearing disorders, psychotic symptoms, or inability to read or comprehend English. The instruments used in this study included the following:

- 1. The Stop-Signal Reaction-Time Task,<sup>7</sup> which assesses objective impulsivity through response inhibition (a facet of executive functioning) based on correct responses and reaction times<sup>7,8</sup>;
- The UPPS Impulsive Behavior Scale,<sup>9</sup> which is a 45-item self-report measure that assesses personality aspects of subjective impulsivity (the "S" sensation-seeking component was excluded in this protocol);
- 3. The sleep question from the Center for Epidemiology Studies-Depression Scale (CES-D),<sup>10</sup> which assesses insomnia by inquiring, "Over last week, my sleep was restless...." with the responses arrayed as "less than a day," "1-2 days," "3-4 days," and "5-7 days." The responses were categorized into "frequent" (ie, those with restless sleep for ≥ 5 nights/wk) or "infrequent" (those with ≤4 nights/ wk) insomnia on the basis of the distribution of responses, clinical significance, and similarity to analyses from prior literature<sup>11</sup>;
- 4. The remaining CES-D items, which assess depressive symptoms.

The institutional review board approved the study, and subjects signed informed consent prior to participation.

**Results.** The demographic variables included the following: the mean age was 38.3 (SD = 10.1) years, 18 (85.7%) identified themselves as African American, 18 (85.7%) were male, 9 (42.9%) were single, 16 (76.2%) were unemployed, 8 (38.1%) had  $\ge$  12 years of education, and 12 (57.1%) reported being homeless. Urine drug screens at admission were positive in 14 (66.7%) for cocaine, 6 (28.6%) for cannabis, 5 (23.8%) for phencyclidine, 4 (19.0%) for sedative-hypnotic medications, and 3 (14.3%) for opioids. Four subjects (19.0%) reported use of only 1 drug (cocaine).

Subjects with frequent insomnia had significantly higher CES-D scores. In analyses adjusted for demographic and mood covariates, those with frequent insomnia (as compared to those with infrequent insomnia) had a significantly decreased number of correct responses and a higher mean reaction time at 160 ms. Similarly, a higher reaction time was seen at 320 ms for this group, although this was not statistically significant. Those with frequent

#### Table 1. Measures of Impulsivity Across Insomnia Groups

	Insomnia		
	≤ Half the	>Half the	
Clinical Domain	Week $(n=7)$	Week $(n=14)$	P Value <sup>a</sup>
Depressive Symptoms			
CES-D total score <sup>b</sup>	$27.4 \pm 11.9$	$42.8\pm8.8$	.003
Objective Impulsivity			
SST <sup>c</sup>			
Correct responses, %	$58.3 \pm 36.1$	$30.9 \pm 27.6$	.042
RT <sub>160</sub>	$536.5 \pm 316.4$	$556.6 \pm 111.1$	.083
RT <sub>320</sub>	$601.3 \pm 105.0$	$613.8 \pm 105.1$	.512
Subjective Impulsivity			
UPPS <sup>c</sup>			
Urgency score	$28.2 \pm 4.8$	$23.3 \pm 5.3$	.441
Premeditation score	$29.7 \pm 6.2$	$28.2 \pm 5.8$	.90
Perseverance score	$26.8 \pm 4.6$	$23.5\pm5.5$	.168

<sup>a</sup>Values in boldface are statistically significant; the italicized value approaches statistical significance.

<sup>b</sup>Sleep item excluded from CES-D scores.

<sup>c</sup>Adjusted for demographic variables and mood symptoms.

Abbreviations: CES-D = Center for Epidemiology Depression Rating Scale,  $RT_{160}$  = reaction time at 160-msec delay,  $RT_{320}$  = reaction time at 320-msec delay, SST = Stop-Signal Reaction-Time Task, UPPS = UPPS Impulsive Behavior Scale.

insomnia (in comparison to those with infrequent insomnia) had nonsignificantly lower scores on the UPPS impulsivity scales (see Table 1).

The limitations associated with this preliminary study include the lack of a formal standardized insomnia rating instrument, the small sample size, and its cross-sectional nature. Despite the limitations, we observed that frequent sleep impairment was associated with a lower response inhibition on the Stop Signal Reaction Time Task without any difference in the personality aspects of impulsivity in this complex sample. These results suggest that improving sleep in this population might help improve mood and executive functioning and thus reduce the likelihood of behaviors precipitating visits to the emergency department. Future studies should assess for subjective and objective insomnia using standardized instruments and expand the range of impulsivity facets being assessed.

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### Letter to the Editor

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