

# Association Between Short Sleep and Suicidal Ideation and Suicide Attempt Among Adults in the General Population

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**Objective:** To determine the association between sleep, mental disorders, and suicidal ideation (SI) and suicide attempt (SA) among adults in the community.

**Design:** Cross-sectional.

**Setting:** National Comorbidity Survey (n = 8098).

**Participants:** A representative sample of adults in the United States.

**Measurements and Results:** Multiple logistic regression analyses were used to determine the association between usual number of hours of sleep during a 24-h period and SI and SA (past 12 months and lifetime). Analyses were adjusted for differences in demographic characteristics and comorbid mental disorders. Additional analyses examined the relationship between hours of sleep and the odds of SA among adults with SI, compared with SI without SA. Short sleep was associated with significantly increased odds of SI (OR 2.5, 95% CI: 1.6-3.9) and SA (OR 3.0, 95% CI: 1.4-6.4), and with SA among those with SI (past 12 months). These associations persisted after adjusting

for differences in demographic characteristics and mental disorders, though the links between short sleep and SA among those with SI were no longer statistically significant after adjusting for panic, mood, and substance use disorders.

**Conclusions:** Short sleep appears to be associated with increased likelihood of SI and SA, independent of the effects of comorbid mental disorders, among adults in the community. Among adults with SI, short sleep is associated with increased odds of SA, and this association seems largely related to the presence of panic attacks, mood, and substance use disorders. Future studies should investigate the nature of these relationships, and whether and how mental health problems may play a role.

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SLEEP HAS LONG BEEN IDENTIFIED AS A FACTOR STRONGLY ASSOCIATED WITH MENTAL DISORDERS. PROBLEMS WITH SLEEP ARE A PART OF THE DIAGNOSTIC criteria for several mental disorders, including major depression, bipolar disorder, and generalized anxiety disorder, and play a key role in the regulation of physical functioning. In recent years, there has been increased interest in the relationship between sleep abnormalities and mental disorders; there has also been increased interest in the relationship between sleep and the regulation of aggressive and impulsive behaviors in clinical and preclinical studies. Research in this area, with mainly converging results, comes from three sources. First, clinical studies show that problems with sleep are common among persons with suicidal ideation (SI), suicide attempts (SA), and suicide completion.<sup>1-3</sup> Specifically, in a recent study of suicide completions, short sleep was more common among completers than controls.<sup>4</sup> This result was replicated in a prospective, community-based study of subjects aged 65 years and older, which showed that poorer sleep quality was associated with greater risk of suicide.<sup>5</sup> Additionally, a prospective cohort

study in Japan showed that individuals who exhibit difficulty maintaining sleep were at greater risk of suicide than those who did not.<sup>6</sup> Specific sleep disturbances, for example nightmares, have also been implicated as predictors of suicide.<sup>7</sup> A second source of evidence comes from behavioral studies and has shown that sleep disturbances are strongly associated with aggressive and impulsive behavior, as well as mood lability, in clinical settings. For instance, Pakyurek et al (2002) found that treatment of sleep disorders was associated with a significant reduction in aggressive and impulsive behavior among hospitalized youth.<sup>8</sup> Third, data from preclinical laboratory studies have shown that sleep deprivation is associated with panic and anxiety, which is independently related to SI and SA in humans<sup>9</sup> and physical fighting in rats.<sup>10</sup> Overall, aggressive and impulsive behavior are thought to be linked with SA among youth and adults. While sleep problems and mental disorders are both associated with SI and SA (mental disorders, specifically major depression, are the strongest risk factor for SI and SA), it is not known whether sleep has a direct influence on SI and SA.

Despite consistent evidence linking sleep with mental disorders, aggression/impulsivity, and SI and SA, previous studies have not examined the relationship between sleep and SI and SA in a representative population sample, taking into account the link with comorbid mental disorders, independent of diagnosis-specific information. Based on previous reports showing a link between sleep and mental disorders, especially those which are strong risk factors for SI and SA (e.g., major depression, bipolar disorder, alcohol dependence), and evidence that sleep problems are associated with increased aggression and impulsivity, we hypothesized that sleep problems would be associated with significantly increased likelihood of SI and SA among adults in

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**Table 1**—Association Between Short Sleep and Demographic Characteristics

	Other	Short Sleep	P-value
Age (y)			P = 0.01
15-24	25.50%	15.90%	
25-34	30.70%	30.50%	
35-44	27.30%	31.40%	
45-54	16.60%	22.30%	
Gender			ns
Male	50.10%	52.30%	
Female	49.90%	47.70%	
Race			ns
White	75.70%	75.20%	
Black	11.30%	15.20%	
Hispanic	9.50%	6.80%	
Other	3.50%	2.80%	
Marital status			P = 0.0003
Married	59.80%	66.30%	
Sep/Div	10.70%	16.10%	
Never Married	29.50%	17.60%	
Education			ns
9-11th grade	21.40%	23.20%	
HS diploma	35.00%	36.50%	
Some college	22.90%	27.80%	
College degree	20.70%	12.60%	
Income			ns
<19,999	25.30%	28.50%	
20-34,999	24.70%	22.60%	
35-69,999	35.50%	39.80%	
70,000+	14.60%	9.10%	

**Table 2**—Association Between Short Sleep and Current (Past 12-Month) Mental Disorders Among Adults in the Community

	Other	Short Sleep	OR (95% CI)	AOR (95% CI)
Mood disorders				
MDD	9.27%	19.90%	<b>2.4</b> <b>(1.9-3.2)</b>	<b>2.6</b> <b>(2.0-3.4)</b>
Dysthymia	2.27%	5.96%	<b>2.7</b> <b>(1.7-4.3)</b>	<b>2.6</b> <b>(1.7-4.0)</b>
Bipolar	0.92%	4.98%	<b>5.61</b> <b>(3.3-9.5)</b>	<b>5.57</b> <b>(3.3-9.4)</b>
Anxiety disorders				
Panic	4.06%	6.82%	<b>1.7</b> <b>(1.1-2.8)</b>	1.3 (0.7-2.2)
Agoraphobia	3.35%	7.50%	<b>2.3</b> <b>(1.4-3.9)</b>	<b>2.4</b> <b>(1.4-4.2)</b>
Specific phobia	8.37%	14.40%	<b>1.8</b> <b>(1.3-2.5)</b>	<b>1.9</b> <b>(1.4-2.6)</b>
Social phobia	7.97%	9.80%	1.3 (0.9-1.9)	1.3 (0.9-1.9)
GAD	2.68%	6.20%	<b>2.4</b> <b>(1.4-4.0)</b>	<b>2.2</b> <b>(1.3-3.6)</b>
PTSD	3.55%	7.20%	<b>2.1</b> <b>(1.3-3.3)</b>	<b>2.1</b> <b>(1.3-3.5)</b>
Substance use				
Alcohol dependence	6.97%	10.20%	<b>1.5</b> <b>(1.04-2.2)</b>	<b>1.6</b> <b>(1.1-2.3)</b>
Sub dependence	2.75%	3.40%	1.29 (0.7-2.1)	1.25 (0.7-2.2)
Nonaffective psychosis	0.27%	0.74%	2.8 (0.8-9.4)	3.1 (0.8-12.5)
Antisocial PD	3.00%	7.60%	<b>2.65</b> <b>(1.76-3.98)</b>	<b>2.5</b> <b>(1.6-4.0)</b>

Bold = P < 0.05

the community. We also predicted that sleep problems would differentiate those with SI who had and had not made a SA in the past year.

## METHODS

### Sample

The National Comorbidity Survey, conducted in 1992-1993, is based on a national probability sample (n = 8,098) of individuals age 15 to 54 in the noninstitutionalized population.<sup>11,12</sup> There was an 82.4% response rate. The data were weighted for differential probabilities of selection and non-response. A weight was also used to adjust the sample to approximate the cross-classification of the population distribution on a range of sociodemographic characteristics. Weighting and a full description of study methodology are reported in detail elsewhere.<sup>11,12</sup> The weighted sample includes 5,877 respondents. Data were weighted and analyses were run using STATA 6.0. Written informed consent was obtained from each participant after the survey had been fully explained.

### Diagnostic Assessment

Psychiatric diagnoses were generated from a modified version of the World Health Organization (WHO) Composite International Diagnostic Interview,<sup>13</sup> a structured interview designed for use by trained interviewers who are not clinicians.

WHO field trials<sup>14</sup> and National Comorbidity Survey clinical reappraisal studies<sup>15-17</sup> documented acceptable reliability and validity of all the diagnoses. Psychiatric disorders examined here include major depression, generalized anxiety disorder, agoraphobia, simple phobia, social phobia, panic attacks, panic disorder, posttraumatic stress disorder, non-affective psychosis, antisocial personality disorder, bipolar disorder, alcohol dependence, and substance use dependence. All diagnoses considered for the purposes of this study are current (within the past 12 months).

### Suicidal Ideation (SI) and Suicide Attempt (SA)

Information on lifetime SI and SA was obtained with 2 questions inquiring about lifetime SI and SA. Current (past 12 month) SI and SA was determined with questions inquiring whether the individual had experienced SI or made a SA in the past 12 months.

### Short Sleep

Information on amount of regular sleep was obtained with the question, "how many hours do you usually sleep in a 24-

hour period?" which was asked of every individual in the study. Response varied from 1-18 h. For the purposes of this study, the variable was dichotomized using the top 5% of response, to reflect a clinically significant sample, which included individuals who reported from 1-5 h of sleep per 24 h. We did not anticipate a linear relationship; therefore the variable was not used as a continuous measure. We did not use items on sleep from the diagnostic interviews for mental disorders, as we wanted to obtain a measure asked of the entire population without bias for those who selected each diagnostic module.

### Analytic Strategy

First, demographic characteristics were compared using the binary sleep variable (i.e., between those with  $\leq 5$  h sleep usually and those with  $\geq 6$  h or more within a 24-h period) using *F*-based tests of statistical independence. Next, the prevalence of current (past 12 months) mental disorders was compared between those with and without short sleep. Multiple logistic regression analyses were used to compute odds ratios (with 95% confidence intervals), both unadjusted and adjusted for differences in sociodemographic characteristics. The same method was then used to compare current and lifetime SI and SA, as well as current SI without SA, and SA among those with SI, among those with and without short sleep. Fourth, multiple logistic regression analyses were used to examine the relationship between short sleep and the likelihood of current SI and SA, adjusting stepwise for depression, antisocial personality disorder, bipolar disorder, alcohol dependence, substance dependence, and panic in order to examine the specific contributions of each disorder to the link between short sleep and SI and SA. The same analyses were rerun comparing short sleep to SI without SA and SA among those with SI, to those without short sleep.

## RESULTS

### Prevalence of Short Sleep

Among adults aged 15-54 years in the community, 7.37% ( $n = 596$ ) reported  $\leq 5$  h of sleep per 24-h period usually, while the remaining persons reported  $\geq 6$  h of usual sleep. For comparison, 21.15% reported 6 h per 24-h period, 31.27% reported 7 h, and 29.48% reported  $\geq 8$  h.

### Association Between Short Sleep and Demographic Characteristics

Short sleep was associated with older age and increased likelihood of being separated/divorced or married, with a decreased likelihood of being never married (see Table 1). There were no statistically significant differences in gender, race, income, or years of formal education between adults with and without short sleep.

### Association Between Short Sleep and Current Mental Disorders (Past 12 Months)

Short sleep was associated with significantly increased likelihood of all mental disorders assessed with the exception of

**Table 3**—Association Between Short Sleep and Suicidal Ideation and Suicide Attempt Among Adults in the Community

	Other	Short Sleep	OR (95% CI)
<b>Past 12-month</b>			
Suicidal ideation	2.94%	8.75%	<b>3.5 (2.2-5.4)</b>
Suicide attempt	0.65%	2.37%	<b>5.1 (2.1-12.4)</b>
SI no SA	2.08%	4.34%	<b>2.3 (1.4-3.6)</b>
SA (vs SI without SA)	21.00%	38.34%	<b>3.5 (1.01-12.2)</b>
<b>Lifetime</b>			
Suicidal ideation	12.19%	21.93%	<b>2.1 (1.6-2.7)</b>
Suicide attempt	4.27%	9.48%	<b>2.3 (1.7-3.3)</b>
SI no SA	8.65%	13.96%	<b>1.8 (1.3-2.5)</b>
SA (vs SI without SA)	31.72%	42.21%	<b>1.7 (1.1-2.6)</b>

Bold =  $P < 0.05$

substance dependence, non-affective psychosis, and social phobia (see Table 2). With the exception of panic attacks, these associations persisted after adjusting for differences in demographic characteristics. The strongest associations were evident between bipolar disorder (AOR = 5.57), ASPD (AOR = 2.5), dysthymia (AOR = 2.6), and major depression (AOR = 2.6) and short sleep.

### Association between Short Sleep and SI and SA

Short sleep was associated with significantly increased likelihood of current SI (OR = 3.5) and SA (OR = 5.1), and similar patterns were seen in the links between short sleep and lifetime SI (OR = 2.1) and SA (OR = 2.3) (see Table 3).

Short sleep was associated with increased likelihood of SI, without SA (OR = 2.3), in the past 12 months as well as lifetime (OR = 1.8). Among adults with SI in the past 12 months, short sleep was associated with a significantly increased likelihood of SA (OR = 3.5), and the same pattern was evident among those with lifetime SA (OR = 1.7) among those with SI, compared to adults without short sleep.

### Adjusted Association Between Short Sleep and SI and SA (past 12 months) Among Adults in the Community

Short sleep was associated with a statistically significant increase in likelihood of SI (OR 2.5, 95% CI 1.6-3.9) and SA (OR 3.0, 95% CI 1.4-6.4), which persisted after adjusting for differences in comorbid mental disorders (see Table 4). Depression, ASPD, alcohol dependence, substance dependence, bipolar disorder, and panic attack were associated with increased SI and SA. Adjusting for these mental disorders revealed that the relationships were slightly attenuated after adjusting, but they remained statistically significant.

**Table 4—Adjusted Association Between Short Sleep and Current Suicidal Ideation and Suicide Attempt Among Adults in the Community**

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
	SI	SA	SI	SA	SI	SA	SI	SA	SI	SA	SI	SA	SI	SA
Sleep	3.5	5.1	2.7	3.7	2.4	3.4	2.5	3.4	2.7	3.7	2.5	3.1	2.5	3
	(2.2-5.5)	(2.1-12.6)	(1.7-4.4)	(1.5-9.2)	(1.5-3.9)	(1.4-8.1)	(1.5-4.0)	(1.4-8.1)	(1.7-4.2)	(1.7-8.2)	(1.6-4.0)	(1.4-7.0)	(1.6-3.9)	(1.4-6.4)
Age	0.8	0.5	0.8	0.5	0.8	0.6	0.8	0.6	0.9	0.6	0.9	0.9	0.9	0.59
	(0.7-0.99)	(0.3-0.9)	(0.6-0.97)	(0.3-0.8)	(0.7-1.04)	(0.4-0.9)	(0.7-1.1)	(0.4-0.9)	(0.7-1.1)	(0.4-0.9)	(0.7-1.1)	(0.7-1.1)	(0.7-1.1)	(0.38-0.92)
Gender	1.8	1.9	1.3	1.3	1.5	1.7	1.6	2.1	1.6	2.1	1.7	1.7	1.6	2.2
	(1.2-2.6)	(0.9-4.4)	(0.8-2.0)	(0.5-3.2)	(0.9-2.4)	(0.8-4.0)	(0.99-2.6)	(0.98-4.5)	(0.99-2.6)	(0.99-4.5)	(1.1-2.8)	(1.1-2.8)	(0.99-2.6)	(0.99-4.8)
Race	0.9	1.1	0.9	1.2	0.9	1.1	0.95	1.1	0.98	1.2	0.98	0.98	1	1.2
	(0.7-1.2)	(0.7-1.8)	(0.7-1.3)	(0.7-1.8)	(0.7-1.3)	(0.6-2.1)	(0.7-1.3)	(0.6-2.1)	(0.7-1.4)	(0.7-2.1)	(0.69-1.4)	(0.69-1.4)	(0.71-1.4)	(0.6-2.3)
Mar stat	1.2	1.1	1.1	0.9	1.1	0.99	1.1	0.97	1.2	0.97	1.2	1.2	1.2	1
	(0.98-1.5)	(0.7-1.7)	(0.9-1.3)	(0.6-1.5)	(0.9-1.4)	(0.7-1.4)	(0.9-1.4)	(0.7-1.4)	(0.9-1.5)	(0.7-1.4)	(0.9-1.5)	(0.9-1.5)	(0.9-1.5)	(0.7-1.5)
Education	0.8	0.4	0.8	0.4	0.8	0.4	0.8	0.4	0.8	0.4	0.8	0.8	0.8	0.4
	(0.6-0.93)	(0.3-0.6)	(0.6-0.9)	(0.3-0.6)	(0.7-1.3)	(0.3-0.7)	(0.7-0.9)	(0.3-0.6)	(0.6-0.96)	(0.3-0.6)	(0.7-0.98)	(0.7-0.98)	(0.6-0.99)	(0.3-0.6)
Income	0.8	0.8	0.8	0.7	0.8	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7
	(0.7-0.95)	(0.6-1.1)	(0.7-0.9)	(0.5-0.96)	(0.6-0.96)	(0.5-1.01)	(0.7-0.98)	(0.6-1.1)	(0.7-0.99)	(0.6-1.1)	(0.7-0.98)	(0.7-0.99)	(0.7-0.99)	(0.5-1.0)
Depression			14.9	14.5	14.2	13.7	13.4	10.7	12.9	10.7	11.3	8.4	10.2	6.9
			(10.1-21.9)	(7.1-29.9)	(9.5-21.3)	(6.7-28.0)	(9.0-19.9)	(5.3-21.6)	(8.7-19.3)	(5.4-21.1)	(7.5, 16.8)	(4.1-16.9)	(6.8-15.4)	(3.5-13.4)
ASPD					5.7	5.3	4.7	2.7	3.3	2.2	3.4	2.3	3.4	2.1
					(2.5-12.7)	(1.5-18.3)	(2.1-10.3)	(0.9-8.0)	(1.5-7.2)	(0.8-6.0)	(1.5-7.5)	(0.8-6.2)	(1.5-7.5)	(0.8-5.5)
Alc Dep							2.2	5.6	1.6	4.6	1.4	3.4	1.4	3.7
							(1.3-3.5)	(2.9-10.9)	(1.01-2.6)	(2.2-9.5)	(0.8-2.2)	(1.7-6.8)	(0.9-2.3)	(2.0-6.8)
Sub Dep									4.2	2.6	4.4	3.4	3.9	2.7
									(2.0-9.2)	(0.95-7.3)	(2.1-9.3)	(1.2-9.7)	(1.8-8.6)	(1.05-7.2)
Bipolar											4.7	6.6	4.2	6.6
											(2.3-9.7)	(2.6-16.4)	(2.0-8.8)	(2.9-15.3)
Panic													2.2	3.4
													(1.2-3.9)	(1.02-11.4)

Bold = P < 0.05

**Table 5—Adjusted Association Between Short Sleep and SI and SA Among Those with SI in the Past 12-Months**

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
	SI	SA	SI	SA	SI	SA	SI	SA	SI	SA	SI	SA	SI	SA
Sleep	2.2	3.5	1.7	3.1	1.6	2.9	1.6	3	1.8	3	1.7	2.7	1.7	2.4
	(1.2-4.3)	(1.01-12.2)	(0.9-3.2)	(0.9-10.4)	(0.8-3.0)	(0.9-9.5)	(0.9-3.1)	(1.03-8.8)	(0.95-3.3)	(1.05-8.7)	(0.9-3.3)	(0.96-7.4)	(0.9-3.3)	(0.95-6.0)
Age	0.9	0.59	0.9	0.5	0.9	0.6	0.9	0.6	0.95	0.6	0.9	0.49	0.95	0.5
	(0.7-1.1)	(0.35-0.99)	(0.7-1.1)	(0.3-0.98)	(0.7-1.2)	(0.3-1.1)	(0.8-1.2)	(0.3-1.1)	(0.7-1.2)	(0.3-1.1)	(0.8-1.2)	(0.22-1.1)	(0.75-1.2)	(0.3-1.2)
Gender	1.5	1.4	1.1	1.2	1.2	1.3	1.2	1.5	1.3	1.5	1.3	1.8	1.24	1.8
	(0.99-2.4)	(0.55-3.4)	(0.6-1.8)	(0.5-3.3)	(0.7-2.0)	(.5-3.5)	(0.7-2.1)	(0.6-3.9)	(0.8-2.2)	(0.6-3.9)	(0.8-3.3)	(0.7-4.6)	(0.74-2.1)	(0.7-4.6)
Race	0.9	1.2	0.9	1.2	0.9	1.2	0.9	1.20	0.96	1.2	0.97	1.1	0.98	1.3
	(0.6-1.4)	(0.7-2.1)	(0.6-1.4)	(0.7-2.0)	(0.6-1.4)	(0.7-2.0)	(0.6-1.4)	(0.7-2.0)	(0.6-1.5)	(0.7-2.0)	(0.6-1.5)	(0.7-4.6)	(0.6-1.5)	(0.7-2.3)
Mar stat	1.3	0.76	1.2	0.7	1.2	0.7	1.2	0.6	1.2	0.6	1.2	0.6	1.2	0.6
	(0.99-1.6)	(0.4-1.4)	(0.9-1.4)	(0.4-1.3)	(0.9-1.5)	(0.4-1.3)	(0.9-1.5)	(0.3-1.1)	(0.96-1.5)	(0.3-1.1)	(0.96-1.6)	(0.3-1.1)	(0.97-1.57)	(0.3-1.2)
Education	0.9	0.4	0.9	0.4	0.9	0.4	0.9	0.4	0.9	0.4	0.9	0.5	0.9	0.4
	(0.7-1.1)	(0.3-0.7)	(0.7-1.1)	(0.3-0.7)	(0.7-1.1)	(0.3-0.7)	(0.7-1.1)	(0.3-0.7)	(0.7-1.1)	(0.3-0.7)	(0.7-1.2)	(0.3-0.8)	(0.7-1.2)	(0.3-0.7)
Income	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.8	0.9	0.8	0.98	0.8	1
	(0.6-1.02)	(0.6-1.3)	(0.6-0.99)	(0.5-1.2)	(0.6-1.01)	(0.6-1.3)	(0.6-1.01)	(0.6-1.4)	(0.7-1.0)	(0.6-1.4)	(0.7-1.1)	(0.6-1.5)	(0.7-1.0)	(0.7-1.5)
Depression			14.7	1.7	14.1	1.9	13.6	1.7	12.9	1.7	12.9	1.4	11.3	0.97
			(9.1-23.9)	(0.5-5.4)	(8.5-23.22)	(0.6-5.9)	(8.2-22.5)	(0.5-5.1)	(7.8-21.5)	(0.5-5.3)	(7.8-21.5)	(0.4-4.6)	(6.7-19.0)	(0.3-2.9)
ASPD					3.6	2.9	3.2	0.8	2.4	0.8	2.4	1.1	2.4	0.98
					(1.1-11.3)	(0.9-9.5)	(1.03-9.9)	(0.2-2.8)	(0.9-6.5)	(.2-2.5)	(0.9-6.5)	(0.3-3.6)	(0.9-6.6)	(0.29-3.4)
Alc Dep							1.6	4.2	1.1	4.1	1.1	2.8	1.1	3.3
							(0.9-3.0)	(1.5-11.9)	(0.6-2.1)	(1.4-12.4)	(0.6-2.1)	(0.97-8.3)	(0.6-2.1)	(1.2-9.3)
Sub Dep									4.8	1.1	4.8	1.2	4.4	1.1
									(2.0-11.7)	(0.4-3.6)	(2.0-11.7)	(0.4-3.9)	(1.8-10.8)	(0.4-3.2)
Bipolar											3.1	4.9	2.8	4.8
											(0.97-9.8)	(1.6-14.9)	(0.9-9.1)	(1.7-13.4)
Panic													1.9	2.9
													(0.9-3.9)	(0.98-8.4)

Bold = P < 0.05

**Adjusted Association Between Short Sleep and SA in the Past 12 Months Among Adults with SI in the Past 12 Months**

Short sleep was associated with an elevated likelihood of SA in the past 12 months among those with SI in the past 12 months compared to those without short sleep (see Table 5). This association persisted after adjusting for differences in sociodemographic characteristics. After adjusting for depression, ASPD, alcohol dependence, substance dependence, bipolar disorder, and panic attacks, the association between short sleep and SA was no longer statistically significant.

**DISCUSSION**

Interesting results were obtained while studying the relationship between sleep and SI and SA in a representative population sample, taking into account the link with comorbid mental disorders, independent of diagnosis-specific information. The

main findings of this investigation and potential implications for clinical practice and future research will be reviewed and discussed. First, these data suggest an association between short sleep and SI and SA among adults in the community. Second, while mental disorders are common among adults who report short sleep, the link between short sleep and SI and SA appears to be relatively independent of the effects of comorbid mental disorders. Among adults with current SI however, panic, mood, and substance use disorders appear to be involved in the link between short sleep and SA.

In the future, more in-depth studies will be needed to determine the nature and clinical significance of these links. The data suggest that there is a consistent relationship between short sleep and SI and SA. Among those with SI, the link between short sleep and SA is no longer statistically significant after adjustment for comorbidity. This may therefore suggest that the relationship between short sleep and SA, among those with SI, differs from the nature of the link between short sleep and SI

and SA among adults in the community and is dependent on the presence of a mental disorder.

There are several limitations to the current study, which should be considered when examining the results of this investigation. First, the period for which “usual” sleep was less than 5 h a night is not clear from the data gathered. Therefore, these findings should be considered preliminary until replicated with more precise measures. Second, due to the cross-sectional nature of the data, we have no information on the sequence, timing, or mechanism of the links between short sleep and SI and SA. Future studies that replicate this result with longitudinal data using more precise measurement is needed and until then these data should be considered preliminary. Strengths of this study include the use of well-validated psychiatric diagnoses and a large community sample with results that are generalizable to the adult population of the United States.

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