

Epidemiology Of Alcohol and Medication As Aids To Sleep in Early Adulthood

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Study objectives: In a representative sample of adults 18-45 years of age, this study addressed three questions about the use of sleep aids in the general population: (1) what are the past-year prevalences of the use of alcohol, over-the-counter medication and prescription medication to facilitate sleep? (2) among those who use these substances for sleep problems, what are the patterns of use? and (3) are there social factors, independent of sleep characteristics, that increase the likelihood of alcohol and medication use to aid sleep?

Design: The 1996 Detroit Area Survey was a random-digit-dial, computer-assisted survey of a representative sample of 2,181 adults ages 18-45 in the Detroit primary metropolitan statistical area. Eligible household response rate was 86.8%.

Results: In the general population, use of alcohol and medication as sleep aids in the past year was found to be fairly common: 13% used alcohol, 18% used medications and 5% used both. The prevalence of any substance use to aid sleep was 26%. The duration of use was short for the majority of users, less than 1 week. However, duration of use was greater for the majority of those using prescription sleep aids. A substantial minority of users report regular use lasting longer than 1 month: 15%, 9%, and 36% for alcohol, OTC medications, and prescription medications, respectively. Both sociodemographic and sleep characteristics were associated with alcohol and medication use to aid sleep. Difficulty falling asleep was the factor most strongly associated with use of substances to improve sleep. Sex, race/ethnicity, work shift, marital status and education were also significantly associated with one or more types of sleep aid use adjusting for difficulty falling asleep.

Key words: Sleep aids; epidemiology; alcohol; over-the-counter medication; prescription medication

EPIDEMIOLOGIC STUDIES of sleep disorders have consistently reported high prevalence of severe insomnia in the general population (10% to 17%).¹⁻⁵ However, information about the use of substances to facilitate sleep is limited. Prescription hypnotics, specifically the benzodiazepines, have been the most frequently studied drugs used for the treatment of insomnia. Consistent with the finding that the majority of those with sleep difficulties do not consult a doctor regarding their insomnia,² the 12-month prevalence

of benzodiazepine use in the US is fairly low, approximately 3%.³ The low rates of treatment-seeking and prescription hypnotic use compared to the prevalence of sleep difficulties raises a question as to what degree alternative substances are used to facilitate sleep. Only two population based studies—sponsored by the National Sleep Foundation—have addressed this issue briefly.^{4,5} In those studies, 22% to 29% of people with insomnia reported ever having tried over-the-counter medications and 15% to 28% had used alcohol specifically to help them sleep.^{4,5}

Remaining important questions are these: (1) among those who do use substances for perceived sleep problems, what are the patterns of use? and (2) are there social factors, independent of sleep characteristics, associated with use of alcohol and medications to aid sleep?

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Table 1.—Sociodemographic characteristics (n=2181)

	n	Unweighted %	Weighted % ¹	US Census % ²
Sex:				
Male	1107	50.8	48.6	48.6
Female	1074	49.2	51.4	51.4
Race:				
White	1549	71.8	74.7	76.3
Nonwhite	608	28.2	25.3	23.7
Age:				
18 - 25	488	22.5	25.2	26.2
26 - 35	838	38.6	40.3	39.7
36 - 45	843	38.9	34.5	34.1
Marital Status:				
Married	972	44.7	49.2	49.8
Separated/Divorced/Widowed	335	15.3	11.6	12.9
Never Married	868	39.9	39.2	37.3
Education:				
< High School	166	7.6	8.1	16.2
High School Graduate	744	34.1	35.9	29.6
Some College	707	32.4	31.7	36.3
4yr College Graduate +	563	25.8	24.3	17.9
Employment:				
Employed	1726	79.5	77.8	72.3
Not Employed	445	20.5	22.2	27.6
Income:				
< 10,000	178	8.6	6.5	9.3
10,000 - 14,999	155	7.5	6.3	4.0
15,000 - 19,999	166	8.1	7.0	5.5
20,000 - 24,999	170	8.2	6.9	5.3
25,000 - 34,999	290	14.1	15.9	13.6
35,000 - 49,999	385	18.7	20.4	21.8
50,000 - 74,999	396	19.2	20.3	24.9
75,000 +	322	15.6	16.8	15.7
County:				
Lapeer	58	2.7	2.9	1.7
Macomb	416	19.1	19.3	16.9
Monroe	65	3.0	3.6	3.1
Oakland	547	25.1	24.8	26.4
St. Clair	101	4.6	4.7	3.3
Wayne	994	45.6	44.7	48.7
City of Detroit	464	21.3	20.2	23.5
Other	530	24.3	24.5	25.2

(1) Weights adjust estimates for sampling design and poststratification to Census characteristics

(2) US Bureau of the Census: Public use microdata sample - 1% sample (1990)

This study addressed these questions in a representative community-based sample. Past-year prevalences of alcohol and medication use (over-the-counter [OTC] and prescription) as sleep aids were estimated. Patterns of use were examined by the number of occasions and the duration of alcohol and medication use. Finally, social and sleep factors associated with the use of alcohol and medication as sleep aids were assessed.

METHODS

Sample

The 1996 Detroit Area Survey collected information from a representative sample of 2,181 respondents, ages 18 to 45, in the Detroit primary metropolitan statistical area (PMSA). The survey employed random-digit dialing and computer-assisted telephone interviewing techniques. Of

Table 2.—Past year alcohol and medication use to aid sleep

	n	Percent of Population	Percent of Users	Percent of OTC	Percent of Prescription
Alcohol as Sleep Aid					
No	1888	86.7			
Yes	290	13.3			
Longest period used					
< 1 week	196	8.9	68.0		
<2 weeks	31	1.4	10.7		
2 to 4 weeks	19	0.9	6.7		
<4 weeks	42	1.9	14.6		
Number of times used					
< 30	244	11.2	84.1		
30 - 59	20	0.9	6.8		
60 - 180	8	0.4	2.9		
> 180	18	0.8	6.2		
Medication as Sleep Aid					
No	1793	82.2			
Yes	387	17.8			
Medication Type					
Prescription	115	5.3	29.9		
Over the Counter	221	10.1	57.1		
Both Presript & OTC	14	0.6	3.5		
Other	37	1.7	9.5		
Longest period used					
< 1 week	211	9.7	55.7	69.7	30.5
< 2 weeks	67	3.1	17.6	16.0	20.8
2 to 4 weeks	31	1.4	8.1	5.5	12.1
>4 weeks	70	3.2	18.5	8.8	36.5
Number of times used					
< 30	279	12.8	73.3	83.8	54.7
30 - 59	30	1.4	7.9	5.5	13.6
60 - 180	39	1.8	10.1	7.4	16.0
> 180	33	1.5	8.7	3.3	15.6

analyses are weighted

the 6,110 households identified, 76.2% completed the age and English-language screening; 64.1% of these included an eligible respondent. One eligible respondent was selected per household. Additional respondents were obtained from a random sample of initial non-respondents. Thirty percent of a subsample of initial non-respondents were recruited using greater financial incentives. A response rate among eligible households of 86.8% was achieved, including those recruited from the initial non-responders. Weights were used to adjust for differences in number of eligible persons in a household, oversampling of men, initial respondent or converter status, and to post-stratify the sample to match cross-classification of important census variables for the Detroit PMSA population 18 to 45 years of age.

Table 1 presents sociodemographic characteristics of the sample. Relatively few differences were found between 1990 US Census estimates and unweighted sample estimates. Differences were further narrowed when weights were employed. The study sample was highly representative of the 18- to 45-year-old southeastern Michigan popu-

lation, although slightly more educated and employed.

Measures

As part of the computer-assisted telephone interview, subjects were asked about a wide variety of sleep-related behaviors, including past-year use of alcohol and medications to help the respondent fall asleep (“In the past year, did you ever drink alcohol to help you fall asleep?”; “In the past year, did you ever take medication to help you fall asleep, or stay asleep?”). Information on the longest period of regular use (“What was the longest period of time that you drank/took medication on a regular basis?”) and the total number of times used (“What was the total number of nights or days that you drank/took medication to help you sleep?”) was also gathered. The distinction between OTC and prescription medications was assessed by the question, “Was this a prescription medication, an over-the-counter medication, or some other kind of medication?” Those respondents who used both OTC and prescription medication were included in each of the separate analyses of OTC and prescription sleep aids.

Difficulty falling asleep at night and daytime sleepiness and were assessed with self-report scale items from the Sleep-Wake Activity Inventory (SWAI). Based on a previously reported psychometric evaluation of the original scales in this sample,⁶ the following eight items comprised the daytime sleepiness scale (DSS): “During the past two weeks. . .” (1) “I fell asleep when riding as a passenger”; (2) “I dozed off while watching TV”; (3) “I got drowsy within 10 minutes when I sat still”; (4) “I fell asleep when visiting with friends”; (5) “I fell asleep during conversations”; (6) “I got drowsy driving a few minutes”; (7) “I got sleepy after reading for 15 minutes”; and (8) “I dozed off when I relaxed.” Scored 0 to 3 for the responses *never*, *rarely*, *sometimes*, and *often*, the scale had a range of 0 to 24, with a higher score meaning greater daytime sleepiness. Insomnia is conventionally defined as difficulty initiating and/or maintaining sleep, or nonrefreshing or restorative sleep.⁷ In this study, insomnia was operationalized by the

nocturnal sleep onset scale (NSOS) which was composed of two items scored 0 to 3: during the past 2 weeks . . . “I had difficulty falling asleep,” and “it took me less than 5 minutes to fall asleep.” The rating of the second item was reversed. The NSOS had a range of 0 to 6, with a higher score conveying greater difficulty falling asleep.

Average weekday total time in bed (TIB) for the 2 weeks prior to the interview was calculated from the reported average bed time and rise time. Average total sleep time (TST) was based on answers to the question, “Thinking about your average weekday, how many hours did you actually sleep each day, not including naps?”

Analyses

Past-year prevalences of alcohol and medication use to aid sleep were estimated for the total sample, and separately by sex and work schedule. Differences in proportions of use, frequency, and duration of use by sex and work sched-

Table 3.—Past-year sleep aid use by sex and work schedule¹

	Sex		χ^2 p-value	Work Schedule			χ^2 p-value
	Male	Female		Day	Shift ²	Nw ³	
Alcohol as Sleep Aid							
No	85.6	87.7		87.8	83.1	88.0	
Yes	14.4	12.3	0.15	12.2	16.9	12.0	0.03
Longest period used							
< 1 week	67.8	68.3		67.9	71.6	63.6	
< 2 weeks	10.8	10.6		11.5	11.9	4.0	
2 to 4 weeks	9.5	3.6		9.8	5.6	0.0	
> 4 weeks	11.9	17.5	0.15	10.8	10.8	32.5	<0.01
Number of times used							
< 30	80.4	88.0		86.1	82.9	78.6	
30 - 59	10.0	3.3		8.5	7.7	1.5	
60 - 180	3.6	2.2		3.1	1.7	4.9	
> 180	6.0	6.5	0.12	2.3	7.7	14.9	0.03
Medication as Sleep Aid							
No	58.8	78.8		83.9	81.7	77.7	
Yes	14.2	21.2	<0.01	16.1	18.3	22.3	0.02
Medication Type							
Prescription	24.7	33.1		23.8	35.7	40.1	
Over the Counter	60.1	55.3		63.9	49.9	48.1	
Both Pre & OTC	2.6	4.1		3.3	0.9	6.6	
Other	12.6	7.5	0.13	9.0	13.5	5.2	<0.01
Longest period used							
< 1 week	64.8	49.9		66.9	47.4	38.0	
< 2 weeks	8.3	23.7		14.2	15.6	25.7	
2 to 4 weeks	9.1	7.5		6.7	14.6	6.3	
> 4 weeks	17.2	19.0	<0.01	12.3	22.5	30.0	<0.01
Number of times used							
< 30	74.0	72.8		78.9	70.5	61.1	
30 - 59	5.2	9.6		7.0	5.3	12.7	
60 - 180	10.0	10.2		8.8	12.7	11.6	
> 180	10.8	7.4	0.32	5.3	11.4	14.6	0.03

(1) analyses are weighted;

(2) evening, night & rotating shifts combined;

(3) not working: includes unemployed, retired, students, and not working outside the home

ule were evaluated by chi square statistic. Mean differences between substance users and non-users for sleep characteristics were tested by t-test. Multiple logistic regression was used to assess the association of sociodemographic characteristics with alcohol, OTC medication and prescription medication use, adjusted for sleep characteristics. Regression analyses were also run using only the difficulty-falling-asleep item from the NSOS. No differences were found between the results of regression analyses using the NSOS or the single difficulty-falling-asleep item (data available upon request). In all analyses, sample weights were used. Since sample size was not increased by the final weighting, and there was no complex sampling design (eg, stratified or cluster sampling), standard errors and statistical tests are appropriate without more complex calculation of standard errors (ie, Taylor series estimates).

RESULTS

Past-year prevalences of alcohol and medication use to improve sleep are presented in Table 2. Overall, 25.9% of respondents reported using any substance to aid their sleep in the past year. Approximately 13% reported using alcohol to help them fall asleep. Nearly 18% used medications to improve sleep, over-the-counter and prescription drugs combined. Of those who used medication, the majority (57%) reported using only over-the-counter sleep aids. Five percent of respondents reported using both alcohol and medications to help them fall asleep.

The majority of respondents who used alcohol and/or medications reported regular use for less than 1 week at a time, and a total of less than 30 times in the past year (see Table 2). However, a substantial minority who used alcohol and/or medications used them regularly for a duration greater than 1 month (approximately 15% and 18%). Use of alcohol or medications 180 or more times (the equivalent of daily use for 6 or more months) among sleep-aid users was 6% and 9%, respectively.

Over-the-counter and prescription medications showed different patterns of use (see Table 2). OTCs were used for short duration and with low frequency by the majority of users, as was alcohol. Much larger percentages of those using prescription sleep aids used them for a long duration (36% for more than 4 weeks), and with substantial frequency (15.6% used 180 or more times in the past year).

Information on alcohol and medication use to aid sleep is presented separately by sex and work shift in Table 3. There was no significant difference in the percentages of men and women who used alcohol as a sleep aid, nor in the frequency or duration of use ($p > 0.10$). In contrast, a significantly greater percentage of women reported using medications to help them fall asleep, as well as a longer duration of use ($p < 0.01$). Similar results were found for both OTC and prescription medications (data not shown).

Substance use differed by work schedule (see Table 3). A higher proportion of respondents working evening, night or rotating shifts (ie, shift-work group) used alcohol than those working a regular day schedule or not working (ie, unemployed, retired, students and not working outside the home). However, nonworking respondents who did use alcohol reported greater duration and frequency of use than did workers. Regular day workers reported less use of medication as a sleep aid than other groups. Among those regular day workers who did use, a higher proportion reported OTC use than other groups, but of shorter duration and less frequency. Taken separately, regular day workers also reported shorter duration and less frequency of prescription medication use relative to shift workers and those not working, although no differences were found for duration or frequency of OTC use.

Insomnia, daytime sleepiness, time in bed, and total sleep time were also compared by alcohol and medication use (see Table 4). Insomnia, as measured by the nocturnal sleep-onset scale (range = 0-6), had a sample mean of 2.5 (sd=1.9). The sample mean daytime sleepiness score (range = 0-24) was 6.4 (sd=4.2). Time in bed and total sleep time sample means were 7.4 (sd=1.7) and 6.8 (sd=1.4) hours, respectively. Those who used alcohol and those who used medications to aid sleep (both OTC and prescription) reported greater difficulty falling asleep, as indicated by a higher NSOS score, compared to respondents who either did not use alcohol or did not use medications to fall asleep. Mean total sleep time was significantly lower for those who used alcohol (0.2 hours or 12 minutes) and those who used prescription medications (0.3 or 18 minutes) than those using neither. However, no difference was found between the mean total sleep time of OTC users and nonusers ($p = 0.691$). Time in bed was equal among sleep aid users and nonusers across all sleep aids. Only those using alcohol to aid sleep showed significantly greater daytime sleepiness than nonusers.

Table 5 presents multiple logistic regression estimates of the associations of sleep and social characteristics with alcohol use. Respondents in the highest two quartiles of insomnia (NSOS) were approximately 2 and 5.5 times more likely to use alcohol to help them fall asleep than respondents in the lowest quartile. Adjusting for insomnia, males (OR=1.37) and those not married (OR = 1.78 and 1.62) showed significantly increased likelihood of alcohol use to aid sleep. Total sleep time and work schedule were unrelated to alcohol use to aid sleep once adjusted for other variables. Interactions for work shift and total sleep time with insomnia were examined and found not to be statistically significant ($p > 0.15$).

To assess whether daytime sleepiness had an association with alcohol use independent of difficulties falling asleep, daytime sleepiness was added to the regression

Table 4.—Sleep characteristics by alcohol and medication use to aid sleep

	Alcohol		OTC		Prescription	
	No	Yes	No	Yes	No	Yes
Nocturnal Sleep Onset Scale						
Mean	2.4	3.5	2.4	3.5	2.4	4.0
sd	1.9	2.0	1.9	1.9	1.9	1.9
t-test p-value	<0.001		<0.001		<0.001	
Daytime Sleepiness Scale						
Mean	6.3	7.2	6.4	6.6	6.4	6.2
sd	4.1	4.6	4.2	3.9	4.2	4.7
t-test p-value	0.001		0.660		0.596	
Time in Bed						
Mean	7.4	7.4	7.4	7.5	7.4	7.4
sd	1.7	1.6	1.7	1.4	1.6	2.0
t-test p-value	0.706		0.868		0.608	
Total Sleep Time						
Mean	6.8	6.6	6.8	6.8	6.8	6.5
sd	1.4	1.4	1.4	1.2	1.3	1.4
t-test p-value	0.003		0.691		0.014	

model above. Respondents with daytime sleepiness scores in the highest three quartiles were significantly more likely to use alcohol as a sleep aid relative to the least sleepy quartile (OR = 1.47, 1.50 and 2.05, respectively). Other variables in the model were not affected by the addition of daytime sleepiness (data not shown).

Table 6 presents the logistic regression results for OTC medication use. Compared to the lowest quartile of nocturnal sleep onset, higher quartiles were increasingly more likely to use OTC medications as a sleep aid, the highest quartile being 5.8 times more likely. In contrast, total sleep time did not show an association with OTC use. No statistically significant interaction between NSOS and total sleep time was detected ($p > 0.15$). African Americans and other racial/ethnic groups were significantly less likely to use OTC medications to aid sleep compared to Caucasians, adjusting for the NSOS association. Sex, work shift, marital status, income and education did not show independent associations with OTC medication use.

Table 7 shows the results of multiple logistic regression analysis of prescription sleep-aid use. Higher quartiles of NSOS showed increasing likelihood of using prescription medications to aid sleep, although only the fourth quartile reached statistical significance, with an estimated odds of 6.4. In contrast to OTC use, the likelihood of using prescription medications to aid sleep was significantly increased among females (OR = 1.90), those not working outside the home (OR = 1.78), and those with a college education (OR = 2.69), adjusting for level of insomnia. As

with OTC use, African Americans showed significantly reduced likelihood of using prescription medications to aid sleep relative to Caucasians (OR = 0.51).

DISCUSSION

In the general population, use of alcohol and medication as sleep aids in the past year was found to be fairly common. The duration of use was short for the majority of users, less than 1 week. However, duration of use was greater for the majority of those using prescription sleep aids. A substantial minority of users report regular use lasting longer than 1 month. Both sociodemographic and sleep characteristics were associated with alcohol and medication use to aid sleep. Difficulty falling asleep was the factor most strongly associated with use of substances to improve sleep. Sex, race/ethnicity, work schedule, marital status and education were also significantly associated with one or more types of sleep aid use, adjusting for insomnia. As expected, based on the age range of this sample, age was only weakly associated with increased likelihood of alcohol and/or medication use to aid sleep.

Prevalence

Based on this population sample, an estimated 13% had used alcohol to improve sleep in the past year. An estimated 18% had used medications for the same purpose over the past year, with 10% using only OTCs and 5% using only prescription medications. These estimates are

Table 5.—Alcohol as a sleep aid: associations based on logistic regression

	Odds Ratio ¹	95% Confidence Interval
NSOS²		
1 st Quartile	1.00	--
2 nd Quartile	1.35	0.83 - 2.21
3 rd Quartile	2.06	1.29 - 3.31
4 th Quartile	5.54	3.46 - 8.86
Total Sleep Time		
≥ 8 hours	1.00	--
< 8 - 6 hours	1.36	0.97 - 1.92
< 6 hours	1.42	0.91 - 2.20
Sex		
Female	1.00	--
Male	1.37	1.04 - 1.81
Work Schedule		
Day	1.00	--
Shift ³	1.32	0.95 - 1.82
Not working	0.88	0.60 - 1.30
Age		
	1.01	0.98 - 1.03
Race		
Caucasian	1.00	--
Afr-American	0.84	0.59 - 1.19
Other	0.88	0.48 - 1.61
Marital Status		
Married	1.00	--
Sep/Div/Wid	1.78	1.15 - 2.76
Never Married	1.62	1.11 - 2.30
Income		
	1.00	0.93 - 1.08
Education		
< High School	1.00	--
HS Graduate	0.90	0.55 - 1.46
Some College	0.89	0.54 - 1.47
4 yr College+	1.18	0.69 - 2.03

- (1) Weighted analyses
- (2) Nocturnal sleep onset scale: higher scores equal greater difficulty getting to sleep at night
- (3) Evening, night, and rotating shifts combined

lower than those reported in the only population-based surveys on this topic, 16% to 28% and 22% to 29% for alcohol and OTCs, respectively.^{4,5} The primary explanation of the variation in estimates is that the previous study reports lifetime use. An additional explanation, and an important difference in the studies, is that the national study estimates were based on a subset of people with problems falling asleep at night, whereas the estimates reported in this study were based on the entire, unselected, sample.

An estimated 5% of young adults in the community reported using both alcohol and medications as sleep aids. Only 0.6% of respondents reported using both OTC and prescription medications (3.5% of medication users). These results suggest that the majority of people using alcohol and medications as sleep aids select only one of these widely available options, rather than using all available means in search of relief of their symptoms.

Patterns of Use

The majority of those who reported use of alcohol and/or OTC medications to aid them in falling asleep did so with relatively low frequency and short duration. Approximately 84% of alcohol and OTC users reported using less than 30 times in the past year. Similarly, the duration of 'use on a regular basis' was less than one week for the majority of alcohol and OTC users. Although the efficacy of use could not be evaluated, these results suggest a pattern of therapeutic use of alcohol and/or OTC medications as aids to sleep, as does the association of sleep-aid use with insomnia. Nevertheless, a substantial minority of users appear to use alcohol and/or OTC medications with high frequency (use more than 180 time in the past year) and long duration (more than a month of regular use).

In contrast to alcohol and OTC medication use, the pattern of use for prescription sleep aids showed relatively frequent and long duration use. The degree to which this pattern represents physician-directed therapeutic use or respondents use on their own cannot be ascertained from these data. However, prior general population studies of prescription hypnotic use to aid sleep have suggested a low abuse liability.³ Additionally, a recent laboratory study of the self-administration of benzodiazepines found no evidence of escalating use of these drugs when available to healthy normal volunteers.⁸

Characteristics Associated With Use

For alcohol as a sleep aid, the level of difficulty falling asleep (nocturnal sleep onset scale) showed a gradient association, with each higher quartile being increasingly associated with use. The sociodemographic factors associated with alcohol use to aid sleep, adjusting for level of insomnia, were sex and marital status. Males and those never having been married, or those separated or divorced/widowed, were approximately 1.5 times more likely to have used alcohol as a sleep aid than females or those who were married.

Use of medications (OTC and prescription) to aid in falling asleep were also associated with insomnia. For both OTC and prescription medication use, African Americans were significantly less likely to use these sleep aids than were Caucasians. A number of sociodemographic factors were associated with prescription medication use that were

Table 6.—OTC medication as a sleep aid: associations based on logistic regression

	Odds Ratio ¹	95% Confidence Interval
NSOS₂		
1 st Quartile	1.00	--
2 nd Quartile	1.73	0.97 - 3.09
3 rd Quartile	2.80	1.60 - 4.86
4 th Quartile	5.81	3.31 - 10.19
Total Sleep Time		
≥ 8 hours	1.00	--
< 8 - 6 hours	1.09	0.75 - 1.57
< 6 hours	0.86	0.51 - 1.46
Sex		
Male	1.00	--
Female	1.32	0.96 - 1.81
Work Schedule		
Day	1.00	--
Shift ³	0.76	0.50 - 1.14
Not working	0.73	0.48 - 1.12
Age		
	1.01	0.01 - 1.05
Race		
Caucasian	1.00	--
Afr American	0.49	0.31 - 0.78
Other	0.28	0.10 - 0.79
Marital Status		
Married	1.00	--
Sep/Div/Wid	1.43	0.88 - 2.33
Never Married	1.24	0.82 - 1.88
Income		
	1.06	0.97 - 1.16
Education		
< High School	1.00	--
HS Graduate	0.91	0.63 - 1.63
Some College	0.78	0.71 - 1.85
4 yr College+	0.89	0.85 - 2.39

- (1) Weighted analysis
- (2) Nocturnal sleep onset: higher scores equal greater difficulty getting to sleep
- (3) Evening, night and rotating shifts combined

Table 7.—Prescription medication as a sleep aid: associations based on logistic regression

	Odds Ratio ¹	95% Confidence Interval
NSOS₂		
1 st Quartile	1.00	--
2 nd Quartile	1.46	0.62 - 3.47
3 rd Quartile	2.17	0.94 - 5.00
4 th Quartile	6.40	2.91 - 14.12
Total Sleep Time		
≥ 8 hours	1.00	--
< 8 - 6 hours	0.63	0.38 - 1.04
< 6 hours	1.64	0.92 - 2.90
Sex		
Male	1.00	--
Female	1.90	1.21 - 2.98
Work Schedule		
Day	1.00	--
Shift ³	1.43	0.84 - 2.43
Not working	1.78	1.07 - 2.95
Age		
	1.05	1.02 - 1.09
Race		
Caucasian	1.00	--
Afr American	0.51	0.28 - 0.91
Other	1.00	0.43 - 2.32
Marital Status		
Married	1.00	--
Sep/Div/Wid	1.21	0.62 - 2.35
Never Married	1.59	0.91 - 2.77
Income		
	0.94	0.84 - 1.05
Education		
< High School	1.00	--
HS Graduate	1.25	0.53 - 2.97
Some College	1.87	0.79 - 4.37
4 yr College+	2.69	1.07 - 6.73

- (1) Weighted analyses
- (2) Nocturnal sleep onset: higher scores equal greater difficulty getting to sleep
- (3) Evening, night and rotating shifts combined

not associated with OTC use. Females, those not working outside the home, and those attaining a college degree all had increased odds of using prescription sleep aids, adjusting for level of insomnia. These differences suggest that one factor in the use of prescription rather than OTC medication use or alcohol use is difference in willingness to seek or access to professional care.

Logistic regression analyses of factors associated with alcohol, OTC, and prescription medication use to aid sleep

were also examined using only the difficulty-falling-asleep item from the NSOS. No differences in results were found between the NSOS and difficulty-falling-asleep item analyses.

The use of alcohol versus medication (OTC and prescription) to aid in falling asleep differed in relation to daytime sleepiness. Those who used alcohol as a sleep aid had a significantly higher mean daytime sleepiness. The association was maintained in the multiple logistic regression

analysis adjusting for level of insomnia, total sleep time, and sociodemographic factors. Use of medication, however, showed no such relationship. These findings are consistent with laboratory studies that report that alcohol quickly loses its effectiveness as a hypnotic, and that sleep is disturbed.⁹⁻¹¹ Continued use of alcohol as a sleep aid and the subsequent sleep disturbance may actually have the effect of increasing daytime sleepiness.

Limitations

A limitation of the current study is the age range of the sample (18 to 45 years of age). This age range represents a homogenous group in terms of sleep architecture, the prevalence of sleep disorders, and prevalence of hypnotic drug use.¹² However, the degree to which the results of this study might generalize to older age ranges is unknown. An additional limitation is that respondents, rather than professionals, classified the medications they took as sleep aids, increasing the possibility of misclassification.

CONCLUSION

The use of alcohol and/or medications in an attempt to self-medicate the conditions of insomnia are not uncommon. Overall, the patterns of use suggest therapeutic use of these substances, though efficacy remains a question. Sociodemographic factors, in addition to sleep factors, appear to be independently associated with substance use to aid sleep.

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