dence that behavioral insomnia therapy reduces health care utilization among those who receive an adequate *dose* of this treatment. Additional controlled clinical effectiveness studies of this nature are warranted.

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127.L

The Distribution of Insomnia: Age, Gender, Type, and Race

Lichstein KL,[1] Durrence HH,[1] Taylor DJ,[1] Bush AJ,[2] Riedel BW[1]
(1) The University of Memphis, (2) University of Tennessee

Introduction: Epidemiological studies assessing sleep usually ask respondents to confirm or deny the presence of insomnia, but collect little additional data on sleep pattern. Thus, data on demography and detailed data on sleep characteristics are often unavailable. The present study randomly sampled a metropolitan community and collected 2-weeks of sleep diaries to study insomnia sleep patterns.

Methods: We used random-digit dialing to solicit participation from at least 50 men and 50 women in each decade from age 20 to 80 and older. Volunteers were paid between $15 and $200 (it was more difficult to recruit older adults and they were paid more) for completing 14 sleep diaries and seven questionnaires evaluating associated daytime functioning, such as fatigue and sleepiness. This paper will focus on the sleep diaries.

Results: We have analyzed data from 744 people, and we will have nearly 800 subjects by the meeting. The current sample is 48% men and 52% women, ranging from 20 to 98 years of age. The racial breakdown is 69% White, 29% African American (AA), and 2% Asian and Hispanic. We will report analyses on how insomnia varies by age, gender, type (onset, maintenance, mixed, or combined), and race. Below is a sampling of the results we will report. As suggested in Figure 1, insomnia prevalence, ignoring race, gradually rises across the life span and peaks in the decades 70 and 80, $\chi 2$ (6, N = 737) = 44.79, $p < .01$. Also in Figure 1, it can be seen that insomnia prevalence among AA about doubles that of Whites in the decades beginning 30-50, $\chi 2$ (1, N = 338) = 7.56, $p < .01$. This pattern reverses in the decades 60-80, with Whites showing a higher rate of insomnia, though this does not attain significance, $\chi 2$ (1, N = 289) = 3.34, p = .07. To compare types of insomnia (Figure 2), we first tested the whole sample and found that maintenance insomnia was the most common, $\chi 2$ (3, N = 262) = 11.62, $p < .01$. We then compared types within age groupings suggested by the Figure. In the younger age groups, decades beginning 20-50, there was no significant difference in prevalence of types, chi2 (3, N = 124) = 1.68, p = ns. In decades beginning 60-80, the prevalence of maintenance insomnia about doubled any other type, $\chi 2$ (3, N = 138) = 19.74, $p < .01$.

Figure 1. % insomnia by race

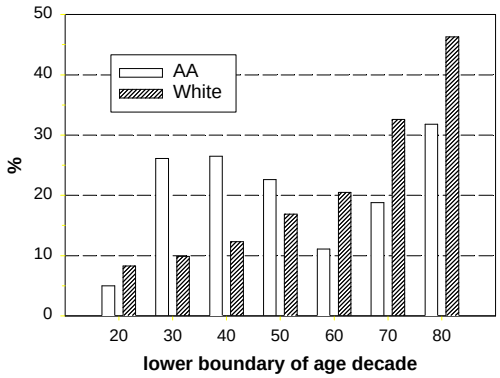
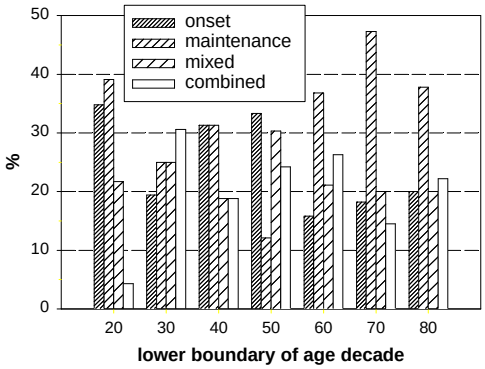


Figure 2. proportion of types of insomnia



Conclusions: Based upon self-reported sleep derived from 14 days of sleep diaries, we conclude that (1) the prevalence of insomnia significantly increases with advancing age, (2) in the middle-aged range, insomnia is significantly more prevalent among AA than Whites, and (3) the several types of insomnia do not significantly differ till about age 60, when maintenance insomnia predominates. Gender analyses will also be presented at the meeting. These data shed new light on insomnia among AA, dispute the common belief that onset insomnia predominates in the middle-aged, and confirm clinical lore that maintenance insomnia escalates in older adults.

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Predictors of Objective Sleepiness in Insomniacs and Normal Sleepers

Bonnet MH,[1,2] Rosa RR[3]
(1) Dayton Department of Veterans Affairs Medical Center, (2) Wright State University, (3) National Institute for Occupational Safety and Health

Introduction: Patients with insomnia typically have consistent physiological abnormalities including longer MSLT latencies despite poor nocturnal sleep. The present study examined demographic, subjective sleep, personality, performance, and mood correlates of MSLT scores in subjects reporting insomnia or normal sleep to identify non-EEG sleep predictors of objective sleepiness.

Methods: Subjects in the insomnia group (72 males, 49 females, ages 19-52) reported a sleep problem lasting at least one year with sleep latencies of at least 45 min, or wake after sleep onset (WASO) of at least 60 min, at least four nights per week. Those in the normal group (35

males, 21 females, ages 19-53) reported no persistent sleep problem, sleep latencies no longer than 30 min, and WASO no greater than 30 min. Subjects were excluded if they reported excessive caffeine intake, substance abuse, clinical depression, or other psychiatric illness, or if laboratory recordings indicated sleep apnea, periodic leg movements, or drug-activated EEGs. Subjects were recorded polysomnographically for two nights and spent the intervening day participating in MSLT, mood, and performance tests. Metabolic rate was measured during the day. For the reported correlation and regression analyses, the mean value for the MSLT across the day was used.

Results: MSLT results for the normal and insomnia groups were correlated with 44 demographic, subjective sleep, personality, psychomotor performance, and mood variables. For the normal group, significant correlations were observed between MSLT and two subjective sleep variables (number of nocturnal awakenings and amount of wake time during the night) and number of lines reviewed in a proofreading task (see Table). For the insomnia group, MSLT values were significantly correlated with the POMS Tension/Anxiety Scale, subjective nocturnal sleep latency, habitual level of caffeine consumption, and habitual tobacco use. Stepwise regression reinforced these findings. For normal sleepers, only number of nocturnal awakenings remained significantly related to MSLT with a multiple correlation of r = .41. For the insomnia group, MSLT was best predicted by a combination of caffeine use, cigarettes smoked, POMS Tension/Anxiety and a subjective sleepiness scale resulting in a multiple correlation of r = .41.

Table 1

Table: Correlations with MSLT

Variable	Insomnia	Normal	p
Subj. Awakenings	-.06	.33*	.02
Subj. Time awake	.15	.30*	.05
Subj. Latency	.20*	-.04	.05
Proofreading	.11	.28*	.05
POMS Tension	.20*	.21	.05
Caffeine	-.23*	.00	.02
Cigarettes	.20*	.03	.05

Conclusions: To the extent that the MSLT is a 'pure' measure of sleepiness, it would not be expected to relate to any non-sleep variable following normal nights of sleep. The current results from normal sleepers broadly support that conclusion except for the fact that the correlation between the subjective wake variables and MSLT was positive - more frequent awakenings and wake time during the night were associated with longer MSLT values on the following day. A different pattern was observed in the insomnia group where caffeine use, tobacco use and tension/anxiety were associated with MSLT latencies. These correlations suggest either increased sensitivity to stimulants (i.e., increasing already elevated arousal), increased use of stimulants, or both. In the current data, the insomnia group smoked significantly more than normals but caffeine use did not differ between groups. Overall, the results suggest that non-sleep sources of arousal consistently influence sleep tendency in subjects reporting insomnia.

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Daytime Versus Nighttime Self-Administration of Hypnotics

Roehrs TA, Bonahoom A, Pedrosi B, Rossman B, Koshorek G, Rosenthal L, Roth T
Henry Ford Hospital Sleep Center, Detroit, MI

Introduction: Previous studies have shown insomniacs self-administer hypnotics at high nightly rates. This study assessed whether insomniacs self-administration of hypnotics extends to the daytime. Further, given that studies have reported that insomniacs are "hyperaroused" during the day as reflected by elevated scores on the MSLT, the study also determined whether MSLT scores would be predictive of individual differences in daytime self-administration.

Methods: Forty-four healthy men and women with (n=22) and without (n=22) insomnia, 21-55 yrs, were studied. To qualify insomniacs had complaints for >1 yr, estimated nightly sleep of <6.5 hr, and had a sleep efficiency of <85% without apnea or leg movements, while normals had estimated nightly sleep of >7 hr and sleep efficiency of >85% on diagnostic NPSGs. They were randomized to one of two triazolam dose groups (0.125 or 0.25 mg) and their preference for placebo versus triazolam was assessed at night (2230 h) and day (0900 h). In both night and day phases of the study, subjects received triazolam or placebo in color-coded capsules on two sampling days or nights and then were required to choose their preferred capsule on 5 subsequent days or nights. The order of day and night phases and the placebo and triazolam sampling days was counterbalanced. In the night phase subjects went to bed from 2300 h to 0700 h and in the day phase were tested for level of sleepiness-alertness at 1000, 1200, 1400, and 1600 hr by the Multiple Sleep Latency Test (MSLT) and divided attention performance at 1100 and 1500 hr.

Results: At night more triazolam was chosen than placebo. The preference for triazolam was comparable for the two triazolam doses, both at night and during the day. Insomniacs did not differ in their triazolam preferences between night and day, while normals choose triazolam less frequently during the day. Insomniacs were grouped by their daytime preference. Forty percent choose triazolam on most days and 50% choose placebo on most days. Those with a daytime triazolam preference had greater average daily sleep latencies on the MSLT than those with a placebo preference, on both the screening and placebo sampling days. Despite the higher MSLT scores, the triazolam preference subgroup had poorer divided attention performance than the placebo preference subgroup. Triazolam reduced MSLT latencies to a similar level in both preference groups and impaired the divided attention performance of both subgroups.

Table 1

MSLT, Performance, and Mood of Insomniacs with Triazolam or Placebo Preference

	Triaz Pref		Plac Pref	
Sampling Days	Plac	Triaz	Plac	Triaz
Div Att Dev (pixels) ++	24.3 (10.1)	32.6 (13.5)	15.6 (2.18)	26.8 (12.8)
Div Att CRT (sec) ++ *	0.59 (0.16)	0.67 (0.14)	0.44 (0.09)	0.59 (0.11)
Div Att PRT (sec) ++ *	0.57 (0.15)	0.67 (0.19)	0.44 (0.55)	0.55 (0.10)
POMS Vigor	53.0 (10.9)	50.4 (9.42)	52.0 (10.8)	51.9 (10.8)
POMS Fatigue	39.6 (3.96)	40.1 (4.38)	39.6 (9.87)	41.3 (7.70)
MSLT (min) ++ ##	17.0 (2.29)	8.0 (3.66)	11.9 (4.79)	7.3 (2.30)

Daily mean (standard deviation)
++ p<.01 day difference; * p<.04 group difference;
p<.01 group by day interaction

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